PHYSICS

1. Unit/Measurement/Measuring Instrument

(i) Unit

1. Newton is the unit to measure _____.

(a) Power (b) Force
(c) Pressure (d) Resistance

RRB NTPC 08.02.2021 (Shift-II) Stage Ist

Ans : (b) :

Quantity	SI - Unit
Power	Watt
Force	Newton
Pressure	Pascal
Resistance	Ohm

2. The SI unit of sound wave frequency was named in honour of which physicist?

(a) Werner Karl Heisenberg
(b) Heinrich Rudolf Hertz
(c) Albert Einstein
(d) J C Maxwell

RRB NTPC 19.01.2021 (Shift-II) Stage Ist

Ans : (b) The term 'Hertz' was proposed in the early 1920s by German scientists to honour the 19th century German physicist Heinrich Hertz. Hertz is a part of International System of Units or SI System which is based on the Metric System.

3. The work done by a force acting on an object is equal to the amount of force multiplied by the distance travelled in the direction of the force. Which of the following is NOT a unit of work ?

(a) Kgm/sec^2 (b) Kgm^2/sec^2
(c) Newton meter (d) Joule

RRB NTPC 13.03.2021 (Shift-I) Stage Ist

Ans : (a) Work can be defined as 'workdone by a force on an object is equal to the magnitude of the force multiplied by the distance travelled by the object the object in the direction of force.

$$\Rightarrow W = FS\cos\theta$$

The SI unit of work is Newton-metre (N-m) or Joule (J) or $Kg\text{-}m^2/sec^2$ and its CGS unit is Erg. Newton ($Kg\text{-}m/sec^2$) is the unit of Force.

4. The unit of Force is:

(a) gms^{-1} (b) $Kgms^{-2}$
(c) gms^{-2} (d) $Kgms^{-1}$

RRB NTPC 13.03.2021 (Shift-I) Stage Ist

Ans : (b) The SI unit of Force is $kg.ms^{-2}$. The quantity of force is expressed by the vector product of mass (m) and acceleration (a).

$\Rightarrow \boxed{F = ma}$

5. Which of the following is not a unit of temperature?

(a) Fahrenheit (b) Pascal
(c) Celsius (d) Kelvin

RRB Group-D 31-10-2018 (Shift-II)

Ans : (b) Fahrenheit, Celsius and Kelvin are the units of temperature. Pascal is a unit of pressure.

6. The SI unit of electrical resistivity is …….

(a) Ohm-meter (b) Ohm
(d) Coulomb (d) Ampere

RRB Group-D 04-12-2018 (Shift-III)
RRB Group-D 23-10-2018 (Shift-I)

Ans : (a) The electrical resistivity of a substance indicates its ability to resist the flow of electric current by the substance. Low resistivity of materials allow electric charge to flow smoothly. Its SI unit is Ohm meter (Ωm).

7. The commercial unit of electric energy is .....

(a) watt (b) kW
(c) kilowatt-hour (d) joule

RRB Group-D 20-09-2018 (Shift-II)

Ans : (c) The commercial unit of electric energy is the kilowatt hour. A 1 kilowatt hour or a unit is the amount of electrical energy that will be spent in an hour in a circuit by an instrument of 1000 watt of power.
$1\ kWh = 3.6 \times 10^6$ joule = 1 unit

8. The amount of radiation being emitted by a radioactive material is measured using the conventional unit ———.

(a) Watt (b) Pascal
(c) Ampere (d) Curie

RRB NTPC 29.01.2021 (Shift-II) Stage Ist

Ans : (d) The amount of radiation being emitted by a radioactive material is measured in Curie. It is the traditional unit of radioactivity and shows the activity of 1g of pure radium and is equal to 3.7×10^{10} disintegration/second.
Becquerel is also the SI unit of radioactivity and is defined as the amount of a radioactive substance showing one disintegration/second.

9. What is measured in 'joules'?

(a) Energy (b) Velocity
(c) Force (d) Power

RRB NTPC 28.01.2021 (Shift-I) Stage Ist

Ans : (a)

Physical Quantity	SI Unit
Energy and Work	Joule
Velocity	m/s.
Force	Newton
Power	Watt
Pressure	Pascal
Wavelength	Angstrom

10. Henry per meter is the unit of_____.

(a) Watt per steradian
(b) Electronegativity
(c) Magnetic permeability
(d) electrical conductivity

ALP Stage -II 23.01.2019 (shift - II)

Ans : (c) "Henry per Metre" is the SI unit of magnetic permeability.

11. A light-year is a unit of _____

(a) Time (b) Intensity of light
(c) Mass (d) Distance

RRB NTPC 01.02.2021 (Shift-I) Stage Ist

Ans : (d) A light year is a measurement of distance. A light year is the distance that a beam of light travels in a single Earth year or 6 trillion miles. One light year is equal to 9.461×10^{12} kilometres.
Another units of distance are:
1 Parsec = 3.26 light year
1 Astronomical Unit = 1.496×10^{11}m.

12. Light-year is the unit of –

(a) Time (b) Distance
(c) Speed of light (d) Intensity of light

RRB JE (14-12-2014, Green Paper)

Ans : (b) See the explanation of above question.

13. What is the SI unit of power of a lens called?

(a) Hypermetropic (b) Dioptre
(c) Myopic (d) Presbyopic

RRB NTPC 13.01.2021 (Shift-II) Stage Ist

Ans : (b) Power of lens - The inverse of the focal length of the lens is called the power of lens. If the focal length of a lens is 'f' in meter, then its power 'P' = $\frac{1}{f}$ in diopters. Its SI unit is diopter which is represent by D.

- **Myopia (Near sightedness) →** A person suffering from this disease can see the near object, but is unable to see the distant object. A concave lens is used to correct myopia.
- **Hypermetropia (Far sightedness) →** A person suffering from this disease can see distant objects clearly but near objects are not clearly visible. A convex lens is used to correct hypermetropia.
- **Presbyopia →** Due to old age, the coordination ability of the eye decrease or ends, due to which a person is neither able to see distant objects nor near objects. This defect can be corrected by using bi-focal lens.

14. The SI unit of 'Magnetic Flux' is:

(a) Farad (b) Henry
(c) Pascal (d) Weber

RRB NTPC 03.03.2021 (Shift-II) Stage Ist
RRB NTPC 07.04.2021 (Shift-II) Stage Ist

Ans : (d) The measurement of the total magnetic field which passes through a given area is known as magnetic flux. It is useful in describing the effects of the magnetic force acting on something occupying a given area. The SI unit of magnetic flux is Weber and is represented by wb.

15. Which of the following quantities has the SI unit as Candela?

(a) Impulse (b) Velocity
(c) Force (d) Luminous intensity

RRB JE CBT-II 29–08–2019 (evening)

Ans : (d) The Candela (cd) is the SI unit of luminous intensity, which is a measure of power emitted from a light source.

16. The rate of doing work is called power. The unit of power is

(a) Ampere (b) Volt
(c) Kelvin (d) Watt

RRB NTPC 11.02.2021 (Shift-I) Stage Ist

Ans : (d) In physics, power is the rate of doing work. It is the amount of energy consumed per unit of time. The unit of power is the joule per second (J/s), known as the Watt (in honor of James Watt, the eighteenth century developer of the steam engine). (1 HP =746 watt).

17. Unit of power is known as –

(a) Watt (b) Joule
(c) Newton (d) Pascal

RRB JE (24-05-2019, Shift -I)
RRB Group-D, 01-10-2018 (Shift –II)
RRB Group-D, 22-10-2018 (Shift –I)
RRB ALP & Tec.(21-08-2018, Shift-I)

Ans : (a) See the explanation of above question.

18. Which of the following units is used to measure the intensity of sound?

(a) Pascal (b) Curie
(c) Decibel (d) Joule

RRB NTPC 25.01.2021 (Shift-I) Stage Ist

Ans : (c) The decibel is the unit used to measure the intensity of sound. It is also widely used in electronics, signals and communication.

19. Unit used for measuring the sound is –

(a) Decibel (b) Hertz
(c) Ohm (d) Volt

RRB NTPC Stage-Ist, 22-04-2016, Shift -II
RRB NTPC Stage-Ist, 18-04-2016, Shift -II

Ans : (a) See the explanation of above question.

20. Which of the following units is used for measuring the amount of a substance?

(a) Lux (b) Mole
(c) Tesla (d) Joule

RRB NTPC 28.12.2020 (Shift-I) Stage Ist

Ans : (b) The mole is used for measuring the amount of a substance. It is the SI unit of amount of substance. One mole contains 6.022×10^{23} molecule of the substance.
Tesla → SI unit of Magnetic flux density.
Joule → SI unit of Work and Energy.
Lux → SI unit of Illumination.

21. What is the SI Unit of amount of substances

(a) Radian (b) Mole
(c) Jule (d) Kelvin

RPF Constable 05.02.2019

Ans : (b) See the explanation of above question.

22. S.I. unit of weight is -

(a) Kilogram (b) Newton
(c) Gram (d) Dyne

RRB JE (24-05-2019, Shift-I)
RRB Group-D, 03-10-2018 (Shift –II)
RRB ALP & Tec.(17-08-2018, Shift-II)

Ans : (b) The SI unit of measurement of weight is Newton. Since weight is the force on an object due to gravity. The dyne is a derived unit of force specified in the centimeter–gram–second (CGS) system of units.

Dimensional formula of the weight is MLT^{-2}

23. Unit of momentum is –

(a) $kgms^2$ (b) $kgms^{-1}$
(c) kgms (d) $kgms^{-2}$

RRB ALP & Tec.(14-08-2018, Shift-II)
RRB Group-D, 23-10-2018 (Shift –I)
RRB Group-D, 19-09-2018 (Shift –III)

Ans : (b) Momentum (P) = mass (m) × velocity (v)
= kg × m/s
Unit of momentum (P) = $kgms^{-1}$
Dimensional formula of momentum = MLT^{-1}

24. Unit of power in industry is –

(a) Kilowatt (b) Watt
(c) Joule (d) Horsepower

RRB ALP & Tec.(13-08-2018, Shift-III)

Ans : (d) The industrial unit of power is Horsepower.
1 Horsepower (HP) = 746 watt

25. S.I. unit of electric charge is –

(a) Volt (b) Coulomb
(c) Kelvin (d) kg

RRB Group-D, 26-11-2018 (Shift –III)
RRB Group-D, 04-10-2018 (Shift –II)
RRB ALP & Tec.(31-08-2018, Shift-III)
RRB ALP & Tec.(10-08-2018, Shift-III)
RRB NTPC Stage-Ist,28-03-2016, Shift -II

Ans : (b) The S.I. unit of electric charge is coulomb and is represented by the symbol 'C'.
A coulomb is defined as the amount of charge that passes through an electrical conductor carrying one ampere of current in one second.
Electric charge = Electric Current × Time

$E \Rightarrow Q = I.\ t$
$= 1\ I \times 1\ t$
= One Coulomb (c)

26. S.I. unit of resistance is –

(a) Coulomb (b) Ohm
(c) Joule (d) Newton

RRB Group-D, 23-11-2018 (Shift –I)
RRB Group-D, 31-10-2018 (Shift –II)
RRB ALP & Tec.(09-08-2018, Shift-I)
RRB NTPC Stage-Ist,26-04-2016, Shift -III
RRB NTPC 21.01.2021 (Shift-II) Stage Ist

Ans : (b) The SI unit of electrical resistance is ohm (Ω). Its denoted by 'R'. The resistance (R) of an object is defined as the ratio of voltage (V) across to current (I) through it.

Resistance (R) = $\frac{V}{I}$ ohm.

27. Ohm is unit of which physical quantity?

(a) Resistance (b) Charge
(c) Voltage (d) Current

RRB JE (28-06-2019, Shift -IV)

Ans : (a) See the explanation of above question.

28. S.I. unit of stress is –

(a) kg/cm^2 (b) N
(c) N/m^2 (d) Watt

RRB SSE (21-12-2014,Set-8, Green Paper)

Ans : (c) SI unit of stress is N/m^2 or Pa(Pascal). It is represented by (σ)

$$1Pa = \frac{1N}{m^2}$$

29. S.I. unit of electric current is –

(a) Ampere (b) Coulomb
(c) Joule (d) Watt

RRB Group-D, 04-12-2018 (Shift –II)
RRB Group-D, 24-10-2018 (Shift –II)
RRB ALP & Tec.(30-08-2018, Shift-II)

Ans : (a) The SI unit of electric current is ampere, which is the flow of electric charge across a wire at the rate of one coulomb per second. Ampere is represented by symbol 'A'. Electric current is measured by using a device called an ammeter.
Electrical charge (Q) = I.t

$$I = \frac{Q}{t} \text{ amp.}$$

30. Match the following –

(1) Magnetic flux density - (a) Tesla
(2) Self inductance - (b) Weber
(3) Magnetic flux - (c) Henry

Match –

(a) 1-b, 2-c, 3-a (b) 1-c, 2-a, 3-b
(c) 1-a, 2-b, 3-c (d) 1-a, 2-c,3-b

RRB SSE (21-12-2014, Set-8, Green Paper

Ans : (d) SI unit of magnetic flux density (b) is Tesla (T).
CGS unit of magnetic flux density (b) is Gauss (G).
SI unit of self inductance is Henry (H).
S.I unit of magnetic flux is weber (Wb), magnetic flux is commonly denoted by (ϕ_s). The CGS unit is Maxwell.

31. Which unit is equal to unit of energy –

(a) Power (b) Density
(c) Work (d) Force

RRB ALP & Tec.(21-08-2018, Shift-II)

Ans : (c) The SI unit of energy and work is same i.e. Joule (J), named after English physicist James Prescott Joule (1818 - 1889). Joule discovered the relationship between heat and mechanical work, which led to the development of the laws of thermodynamics.

32. Which of the following has no unit –

(a) Density (b) Relative density
(c) Displacement (d) Pressure

RRB ALP & Tec.(29-08-2018, Shift-I)
RRB Group-D, 03-12-2018 (Shift –III)

Ans : (b) Relative density of a substance is defined as the ratio of density of the substance to the density of water at 4°c.

Thus, $\text{Relative Density} = \frac{\text{Density of the substance}}{\text{Density of water}}$

It has no unit.

33. Ampere second is the unit of –

(a) Charge (b) Power
(c) Voltage (d) Energy

RRB JE (14-12-2014, Red Paper)

Ans : (a) Ampere second is the unit of charge.
Electric Charge (Q) = Ampere (I) × Second (t)

34. Gallon is generally used for –

(a) For velocity
(b) For a container
(c) For measuring the volume
(d) None of these

RRB NTPC Stage-Ist,31-03-2016, Shift -II

Ans : (c) The gallon is a unit of measurement of volume. Gallon is represented by symbol (gal).
One gallon is equal to 3.7854 liters and 1 Imperial gallon is equal to 4.54609 liters .

35. Which unit is used for measuring Astronomical distance?

(a) Pedometer (b) Parsec
(c) Light year (d) Length of Hubble

RRB NTPC Stage-Ist,04-04-2016, Shift -II

Ans : (c) A light year is a unit of length used to express astronomical distances. Its equivalent to about 9.4607×10^{12} km.

36. S.I. unit of pressure is –

(a) Newton/cm^2 (b) Newton-m^2
(c) Newton/m^2 (d) Newton-cm^2

RRB Group-D, 04-10-2018 (Shift –I)
RRB Group-D, 01-10-2018 (Shift –III)
RRB Group-D, 25-09-2018 (Shift –II)
RRB Group-D, 25-09-2018 (Shift –III)
RRB NTPC Stage-Ist, 09-04-2016, (Shift -II)
RRB JE, 25-05-2014, (Shift -III)

Ans : (c) The unit of pressure in the SI system is the Pascal (Pa), defined as a force of one Newton per square meter. Hence one pascal is equal to the one newton per square metre.
(1 Pa = 1N/m^2) or (1Pa = 1N.m^{-2})
The conversion between atm, Pa and torr is follows.
1 atm = 101325 Pa = 760 Torr.
1 atm = 1.01325 Bar

37. What is the SI unit of pressure?

(a) Pascal (b) Radian
(c) Ampere (d) Steradian

RRB NTPC 15.03.2021 (Shift-II) Stage Ist

Ans : (a) See the explanation of above question.

38. Nm^{-2} is S.I. unit of –

(a) Force (b) Repulsion
(c) Momentum (d) Pressure

RRB Group-D, 05-11-2018 (Shift –I)

Ans : (d) See the explanation of above question.

39. The unit of approximate distance from the earth to the sun is –

(a) Light year (b) Astronomical Unit
(c) Kelvin (d) Joule

RRB NTPC Stage-Ist,16-04-2016, Shift -I

Ans : (b) The unit of approximate distance from the earth to the sun is Astronomical unit (symbol : au or AU).
$\Rightarrow$ 1AU =1.5 $\times 10^{11}$m

40. S.I. unit of force is -

(a) Kelvin (b) Newton
(c) Pascal (d) Volt

RRB NTPC Stage-Ist,16-04-2016, Shift -II

Ans : (b) The SI unit of force is Newton or kg m/s^2.
1 Newton = 10^5 dyne
Force is product of mass and acceleration
$\therefore$ Force = mass × acceleration

41. What is the SI unit of force?

(a) Newton (b) Dyne
(c) Pascal (d) Kip

RRB NTPC 30.12.2020 (Shift-II) Stage Ist

Ans : (a) See the explanation of above question.

42. Which of the following is not correctly matched -

(a) Frequency - Hertz
(b) Magnetic flux - Tesla
(c) Pressure - Pascal
(d) Electric conductance - Siemens

RRB NTPC Stage-Ist,30-04-2016, Shift -II

Ans : (b)

Physical Quantities		**Unit**
Frequency	-	Hertz
Pressure	-	Pascal
Electric Conductance	-	Siemens or ohm^{-1} (Ω^{-1})
Magnetic flux	-	Weber

Note : SI unit of Magnetic Flux Density (b) is Tesla (T).

43. S.I. unit of displacement is –

(a) Meter (b) Kilometer
(c) Centimeter (d) Meter per second

RRB Group-D, 02-11-2018 (Shift –II)

Ans : (a) The shortest distance between the starting and ending point is referred as displacement. Displacement always takes place in a straight line between the initial and ending or final position of the body.
Displacement is a vector quantity. 'Meter ' is the SI unit of displacement and in CGS system, unit of displacement is centimeter.

44. The S.I. unit of 'g' is same as –

(a) Pressure (b) Momentum
(c) Velocity (d) Acceleration

RRB Group-D, 13-12-2018 (Shift –II)

Ans : (d) The S.I. unit of gravitational acceleration 'g' is same as the S.I. unit of linear acceleration, The SI unit of acceleration is meter per second square (m s^{-2}).
Dimensional formula of acceleration is (LT^{-2}).
CGS unit of acceleration = cm/s^2.

45. Which of the following has same unit ?
(a) Work & Energy (b) Force & Pressure
(c) Force & Momentum (d) Force & Work

RRB Group-D, 12-12-2018 (Shift –III)
RRB Group-D, 03-10-2018 (Shift –II)

Ans : (a) Work and energy has the same unit. The SI unit of work and energy is the Joule (J), which is defined as the work done by a force of one Newton for the displacement of one meter.
Energy/Workdone (W) = Force (F) × Displacement (d)
W = 1 N × 1 m
W = 1 N-m = 1 Joule

46. Nm^2kg^{-2} is S.I. unit of –
(a) Pressure
(b) Momentum
(c) Acceleration
(d) Universal constant of gravitation.

RRB Group-D, 01-10-2018 (Shift –I)

Ans : (d) Nm^2kg^{-2} is S.I. unit of Universal constant of Gravitation (G).
The value of G = 6.67×10^{-11} Nm^2kg^{-2}

47. Weight has equal S.I. unit of-
(a) Impulse (b) Acceleration
(c) Force (d) Mass

RRB Group-D, 12-11-2018 (Shift –II)
RRB Group-D, 07-12-2018 (Shift –III)

Ans : (c) The SI unit of measurement of weight is 'Newton'. Since weight is the force on an object due to gravity. The dyne is a derived unit of force specified in the Centimeter–Gram–Second (CGS) system of units.
Force or Weight (W) = m × g
where, W = weight or force
m= mass of the object in (kg)
g = acceleration due to gravity in (m/s^2).
Dimensional formula of the weight is [MLT^{-2}]

48. Which of the following two physical quantities have the same unit?
(a) Pressure and Force
(b) Force and Dyne
(c) Force and Speed
(d) Force and Weight

RRB Group-D, 09-10-2018 (Shift –II)

Ans : (d) See the explanation of above question.

49. Newton is S.I. unit of …… ?
(a) Weight and Velocity
(b) Weight and Force
(c) Weight and Mass
(d) Weight and Acceleration

RRB Group-D, 01-10-2018 (Shift –I)

Ans : (b) See the explanation of above question.

50. Which of the following pairs does not have the same S.I. units?
(a) Speed and Velocity
(b) Work and Energy
(c) Force and Pressure
(d) Displacement and distance

RRB Group-D, 01-10-2018 (Shift –III)
RRB Group-D, 05-10-2018 (Shift –II)

Ans : (c) The Newton is the SI unit of force defined as the force is the external factor that produces an acceleration of one meter per second square in an object of one kilogram.
F = mass × acceleration
F = m × a
= 1 kg × 1 m/s^2 = 1N
Whereas the unit of Pressure in the SI system is the Pascal (Pa), defined as a force of one Newton per square meter.
1 Pascal (Pa) = 1 N/m^2

51. In the following which pair has not same unit?
(a) Speed and Velocity
(b) Work and Energy
(c) Distance and Displacement
(d) Force and Pressure

RRB Group-D, 05-10-2018 (Shift –II)

Ans : (d) See the explanation of above question.

52. The international unit of Speed is-
(a) m/s (b) km/h
(c) m/minute (d) km/s

RRB Group-D, 01-10-2018 (Shift –III)

Ans : (a) Speed is defined as the distance covered in unit time $\Rightarrow \text{Speed} = \frac{\text{Distance}}{\text{Time}}$
Its SI unit is metre/sec.

53. ms^{-2} is S.I. unit of which of the following?
(a) Velocity (b) Speed
(c) Force (d) Acceleration

RRB Group-D, 15-10-2018 (Shift –III)
RRB Group-D, 24-09-2018 (Shift –I)
RRB Group-D, 11-10-2018 (Shift –II)
RRB Group-D, 19-09-2018 (Shift –III)

Ans : (d) Acceleration is defined as the rate of change of velocity with respect to time.
i.e. $\text{Acceleration} = \frac{\Delta v}{\Delta t}$
It is a vector quantity and its SI unit is m/s^2.

54. Which of the following has S.I. unit Joule / second?
(a) Work (b) Force
(c) Thrust (d) Power

RRB Group-D, 02-11-2018 (Shift –II)

Ans : (d) Power is defined as the rate of work done by a body.
$\Rightarrow \text{Power} = \frac{\text{Work}}{\text{Time}}$
It is a scalar quantity and its SI unit is Joule/sec or watt (w).

55. Volt is S.I. unit of……?

(a) Resistance (b) Electric charge
(c) Electric current (d) Electric potential

RRB Group-D, 05-10-2018(shift -I)

Ans : (d) The SI unit for voltage is Volt and is represented by the letter 'V'. Volt is a derived SI unit of electric potential.
Voltage (V) = I × R
where, V = Voltage in (volt)
I = Current in (ampere)
R = Resistance in (ohm Ω)

56. What is the unit of electric potential?

(a) Volt (V) (b) Coulomb (c)
(c) Joule (J) (d) Ampere (a)

RRB JE CBT-II 31.08.2019 IInd Shift

Ans : (a) See the explanation of above question.

57. S.I. unit of voltage is –

(a) Coulomb (b) Joule
(c) Volt (d) Watt

RRB Group-D, 11-12-2018 (Shift –II)
RRB Group-D, 25-10-2018 (Shift –III)

Ans : (c) See the explanation of above question.

58. Which of the following is unit of temperature -

(a) Degree (b) Celsius
(c) Fahrenheit (d) Kelvin

RRB Group-D, 15-11-2018 (Shift –II)

Ans : (d) The SI unit of temperature according to the International System of unit is Kelvin, which is represented by the symbol K.
Celsius to Kelvin,
$K = {}^{0}C + 273.15$

59. Ohm-m is unit of…….?

(a) Resistivity (b) Electric current
(c) Charge (d) Resistance

RRB Group-D, 05-10-2018 (shift–II)

Ans : (a) The S.I. unit of electrical resistivity is Ohm-meter.
Resistivity is the resistance offered by an object per unit length and per unit cross-sectional area at a specified temperature.
The Ohm (symbol : Ω) is the S.I. unit of electrical resistance, named in honor of German physicist Georg Simon Ohm.

60. …….. has S.I. unit ampere?

(a) Voltage (b) Electric charge
(c) Electric current (d) Resistance

RRB Group-D, 03-10-2018 (Shift –III)

Ans : (c) The SI unit of electric current is ampere, which is the flow of electric charge across a wire at the rate of one coulomb per second.

$$\text{Electric current (I)} = \frac{\text{Electric Charge}(Q)}{\text{Time}(t)}$$

Electric current is measured using a device called ammeter.

61. What is the S.I. unit of retardation ?

(a) ms^2 (b) ms
(c) ms^{-1} (d) ms^{-2}

RRB Group-D, 03-10-2018 (Shift –III)

Ans : (d) The SI unit of retardation is m/s^2 (meter per second square). Retardation is nothing but it is a negative acceleration that acts in the opposite direction to that of motion.

62. 1Pascal=?

(a) $1Nm^{-2}$ (b) 100 atmosphere
(c) 1 dyne cm^{-2} (d) $1Nm^2$

RRB Group-D, 11-12-2018 (Shift –II)

Ans : (a) 1 Pascal = 1 N/m^2 = 1 $(kg\ m/sec^2)/m^2$.

63. Match the following with the correct response-

(1) Watt - (a) N-m/sec
(2) 1 Kilowatt - (b) 3.6×10^6J
(3) 1 Kilowatt hour - (c) 1000W
(4) 1 Horsepower - (d) 746W
(a) 1-A, 2-C, 3-B, 4-D
(b) 1-A, 2-C, 3-D, 4-B
(c) 1-D, 2-B, 3-C, 4-A
(d) 1-A, 2-B, 3-C, 4-D

RRB ALP & Tec.(31-08-2018, Shift-I)

Ans : (a) Watt - Nm/sec
1kilowatt - 1000W
1 kilowatt hour - 3.6×10^6J
1 Horsepower - 746W

64. What is the S.I. unit of wavelength?

(a) Hertz (b) Kilogram
(c) Second (d) Meter

RRB JE (26-06-2019,Shift-IV)

Ans : (d) Wavelength is the distance between two successive crests or troughs of a wave. It is always measured in the direction of the propagation of wave. The SI unit of wavelength is meter (m).

65. Which one of these is a symbol of mole in S.I. unit ?

(a) g (b) mol
(c) kg (d) mg

RRB JE (28-06-2019,Shift-IV)

Ans : (b) 'Mol' is the symbol of mole in S.I. unit. One mole is equal to 6.023×10^{23} atom.

$$\text{Number of moles (m)} = \frac{\text{Total mass}}{\text{Molecular mass}}$$

66. What is the unit of electric power expenditure ?

(a) kWh (b) Joule
(c) Watt (d) Volt

RRB JE (02-06-2019,Shift-I)

Ans : (a) A unit (as mentioned on the electricity bills) is represented in kWh or Kilowatt Hour. If you use 1000 Watts or 1 Kilowatt of power for 1 hour then you consume 1 unit or 1 Kilowatt-Hour (kWh) of electricity.

67. What is another name for coulomb / second ?

(a) Joule (b) Ampere
(c) Volt (d) Second

RRB JE (28-05-2019,Shift-III)

Ans : (b) A coulomb per second is the definition of one ampere. Ampere is the SI unit of electric current.
1 Q/s = 1 A.

$$\text{Electric Current (I)} = \frac{\text{Electric Charge}(Q)}{\text{Time}(t)}$$

$$= \frac{1Q}{1s} = 1 \text{ ampere}$$

68. Lux is the SI unit of

(a) Intensity of illumination
(b) Luminous efficiency
(c) Luminous flux
(d) Luminous intensity

RRB JE (14-12-2019,Green Paper)

Ans : (a) The SI unit of intensity of illumination (illuminance) is lux. An illuminance of 1.0 lux is produced by 1.0 lumen of light shining in an area of 1.0 m^2.

69. What is the S.I. unit of wave speed ?

(a) Meter (b) Meter/second
(c) Second (d) Hertz

RRB JE (28-05-2019, Shift-III)

Ans : (b) Speed = Wavelength × Wave Frequency

$v = \lambda \times n$

In this equation, wavelength is measured in meters and frequency is measured in hertz (Hz), or number of vibration per second. Therefore, wave speed is given in metre per second, which is the SI unit of wave speed.

(ii) Measurement

70. A 'light year' is a unit that is use to measure:

(a) Time (b) Distance
(c) Motion (d) Speed

RRB NTPC 14.03.2021 (Shift-II) Stage Ist

Ans : (b) Light year is a unit that used to measure distance. A light-year is the distance that light travels in vacuum in one year (365.25 days). The distance that light travels in one year is about 9.4607×10^{12} kilometers.

71. 1 atmosphere = ?

(a) 1.01×10^5Pa (b) 10.1×10^5Pa
(c) 1.01×10^6Pa (d) 10.1×10^6Pa

RRB Group-D, 28-11-2018 (Shift –I)
RRB Group-D, 24-11-2018 (Shift –III)

Ans : (a) 1 Atmosphere = 101325 Pa
$= 1.01325 \times 10^5$ Pa
$\because$ 1 Bar = 1×10^5 Pa
1 Atmosphere = 1.01325 bar
= 1 atmosphere = 101.325 kPa
1 atmosphere = 760 Torr
1 Atmosphere = 760 mm Hg column.

72. 1 horse power is equal to -

(a) 764 watt (b) 768 watt
(c) 746 watt (d) 786 watt

RRB ALP & Tec.(20-08-2018, Shift-II)

Ans : (c) The electrical equivalent of one horsepower is 746 watts in the International System of Unit (SI) or one horse power is equal to the 746 Joule per sec.

73. What is 746 watt called?

(a) 1 horsepower (b) 1 kW
(c) 1 Pascal (d) 1 Joule

RRB Group D 05-11-2018(Shift-III)

Ans : (a) See the explanation of above question.

74. 1 Diopter is equal to –

(a) 1 mm^{-1} (b) 1 m^{-1}
(c) 1 dm^{-1} (d) 1 cm^{-1}

RRB JE (02-06-2019,Shift-III)

Ans : (b) • 1 diopter of power of a lens is described as the unit of measurement of the optical power of a lens which is equal to reciprocal of the focal length (f), measured in meter.
• The SI unit of power of lens is diopter whose focal length is one meter, which is denoted by the letter 'D'.

$$1 \text{ diopter (d)} = \frac{1}{f(\text{meter})} = \frac{1}{(\text{meter})}$$
$$= 1m^{-1}$$

where, (f) = focal length

75. What does a meter equal ?

(a) 10^{-6} micron (b) 10^6 micron
(c) 10^{-3} micron (d) 10^3 micron

RRB JE (14-12-2019,Yellow Paper)

Ans : (b)
1 micron = 1×10^{-6} meter
1 meter = 10^6 micron
Micrometer is represented by 'μm'

76. Sound pollution is measured in-

(a) Decibel (b) Joule
(c) Ampere (d) Ohm

RRB JE (22-05-2019, Shift-IV)
R.R.B. JE. Stage - II 30-08-2019 (Shift - III)

Ans : (a) Sound pollution is measured in 'Decibel'.

77. Loudness of sound is measured in ?

(a) Resonance (b) Frequency
(c) Decibel (d) Hertz

RRB Group-D, 12-11-2018 (Shift –II)

Ans : (c) The loudness of sound is measured in units called decibels (dB). A decibel unit expresses the relative intensity of sounds on a scale from zero for the average least perceptible sound to about 100 dB, which is near the level most people find uncomfortably loud.

78. 1 kWh = ?

(a) 3.6×10^5J (b) 3.6×10^{-6J}
(c) 3.6×10^6J (d) 3.6×10^{-5}J

RRB Group-D, 20-09-2018 (Shift –III)
RRB Group-D, 18-09-2018 (Shift –II)
RRB Group-D, 27-09-2018 (Shift –I)
RRB Group-D, 09-08-2018 (Shift –II)
RRB ALP & Tec.(09-08-2018, Shift-I)

Ans : (c) 1 kWh = 3.6×10^6J

79. 1 kilowatt is equal to?

(a) 100 watt (b) 10000watt
(c) 10watt (d) 1000watt

RRB Group-D, 26-05-2019 (Shift –III)

Ans : (d) A kilowatt, is a globally recognized standard for measuring electricity. One kilowatt is equal to 1,000 watt or 1 KW = 1000 Joule per second. Companies charge an electric bill by how much electricity we use per kilowatt hour (kWh).

80. 1 KW= ?

(a) $1000Js^{-1}$ (b) $100Js^{-1}$
(c) $10Js^{-1}$ (d) $10000Js^{-1}$

RRB Group-D, 12-11-2018 (Shift –I)

Ans : (a) See the explanation of above question.

81. 5.5 kWh = ?

(a) 14.4×10^8J (b) 14.4×10^5J
(c) 14.0×10^6J (d) 19.80×10^6J

RRB Group-D, 04-12-2018 (Shift –II)

Ans : (d) We know that,
$1kWh = 3.6 \times 10^6J$
$5.5\ kWh = 5.5 \times 3.6 \times 10^6J = 19.80 \times 10^6J$

82. 5.6 kWh = ?

(a) 20.16×10^8J (b) 14.4×10^6J
(c) 14.4×10^5J (d) 19.8×10^6J

RRB Group-D, 22-09-2018 (Shift –II)

Ans : (a) We know that,
$1kWh = 3.6 \times 10^6J$
$5.6\ kWh = 5.6 \times 3.6 \times 10^6J = 20.16 \times 10^6J$

83. Atomic radius is measured in-

(a) Millimeter (b) Centimeter
(c) Kilogram (d) Nanometer

RRB-JE 30.08.2019, Ist Shift

Ans : (d) Atomic Radius is measured in Nanometres (10^{-19}m). Atomic Radius is defined as the Shortest distance Nucleus to its Outermost Orbit.

84. 1 Newton = ?

(a) $1\ kg \times 1\ ms^1$ (b) $1\ kg \times 1\ ms^{-2}$
(c) $1\ kg \times 1\ ms^{-1}$ (d) $1\ kg \times 1\ ms^2$

RRB Group-D, 10-12-2018 (Shift –III)
RRB Group-D, 22-10-2018 (Shift –II)

Ans : (b) A Newton (N) is the international unit of force. One Newton is equal to 1 kilogram meter per second square.

$1\ N = 1\ kg \times \frac{1m}{sec^2} = 1\ kg \times 1\ ms^{-2}$

85. 4.6 kWh = ?

(a) 14.0×10^6J (b) 16.56×10^6J
(c) 14.1×10^8J (d) 14.4×10^5J

RRB Group-D, 05-12-2018 (Shift –II)

Ans : (b) $4.6kWh = 4.6 \times 3.6 \times 10^6J = 16.56 \times 10^6J$

86. 2 kWh = ?

(a) 7.2×10^8J (b) 7.2×10^6J
(c) 7.2×10^5J (d) 72×10^5J

RRB Group-D, 03-12-2018 (Shift –II)

Ans : (b) We know that,
$1kWh = 3.6 \times 10^6J$
$2\ kWh = 2 \times 3.6 \times 10^6J = 7.2 \times 10^6J$

87. 4.2 kWh = ?

(a) 14.4×10^5J (b) 15.12×10^6J
(c) 14.0×10^6J (d) 14.4×10^6J

RRB Group-D, 05-12-2018 (Shift –I)

Ans : (b) We know that,
$1kWh = 3.6 \times 10^6J$
$4.2\ kWh = 4.2 \times 3.6 \times 10^6J$
$= 15.12 \times 10^6J$

88. 1 Nano meter = ?

(a) $1/10^{-8}$m (b) $1/10^{-9}$m
(c) $1/10^8$m (d) $1/10^9$m

RRB Group-D, 16-11-2018 (Shift –I)

Ans : (d) 1 Nano meter = 1×10^{-9} m = $1/10^9$m

89. 1 coulomb/1s = ?

(a) 1 volt (b) 1 ampere
(c) 1 ohm (d) 1 watt

RRB Group-D, 12-10-2018 (Shift –III)

Ans : (b) In terms of SI unit, 1 Coulomb is equivalent to one Ampere/second.

$1\ ampere = \frac{1\ coulomb}{1\ sec}$

90. 1 Pico meter = ?

(a) 10-^{11}m (b) 10^{12}m
(c) 10^{-12}m (d) 10^{11}m

RRB Group-D, 20-09-2018 (Shift –III)

Ans : (c) 1 Pico meter = 10^{-12}m

91. 1 Joule = ?

(a) 1N ×1m (b) 1W ×1h
(c) 1N ×1cm (d) 1Pa ×1m

RRB Group-D, 15-10-2018 (Shift –II)

Ans : (a) One joule is defined as the amount of energy exerted, when a force of one Newton is applied over an object and the displacement of object is one meter . (1 Joule = 1 N × 1 m). One joule (1 Joule = 1 watt × 1 second) is the equivalent to one watt of power radiated or dissipated for one second.

92. The strength of winds is measured with the help of

(a) Tintometer (b) Wind indicator
(c) Barometers (d) Beaufort scale

RRB JE CBT-II 28–08–2019 (evening)

Ans : (d) The strength of winds is measured with the help of Beaufort scale which starts with Zero (0) and goes to a force of 12. It was developed by British Admiral Sir Francis Beaufort in 1805 to help sailors.

93. Korotkoff sounds are observed during measuring the-

(a) Electrical insulation
(b) Almospheric pressure
(c) Blood pressure
(d) Speed of wind flow

R.R.B. JE. Stage - II 01-09-2019 (Shift - III)

Ans : (c) Korotkoff sounds are usually observed when one measures blood pressure.

94. A particular household has consumed 100 unit of energy during 5 days. How much energy is this converted to Joule.

(a) 360×10^8J (b) $360 \times 10^{-8}J$
(c) $3.6 \times 10^{-8}J$ (d) 3.6×10^8J

RRB Group-D, 03-10-2018 (Shift –III)

Ans : (d) 1 unit = 1 kWh
1 kWh = 3.6×10^6 J
Therefore, 100 units = $100 \times 3.6 \times 10^6 = 3.6 \times 10^8$J

(iii) Measuring Instrument

95. Which of the following does NOT match?

(a) Compass – used for navigation and indicates north-south directions

(b) Cyclotron – measures small magnitude Cyclones

(c) Actinometer – measures the intensity of radiation

(d) Electroscope – detects the presence of electric charge

RRB NTPC 23.02.2021 (Shift-I) Stage Ist

Ans : (b) A cyclotron is a type of compact particle accelerator which produces radioactive isotopes that can be used for imaging procedure. Rests are correctly matched.

96. Which instrument is used to detect the presence of electric charge on an object?

(a) Multimeter (b) Electroscope

(c) Amperemeter (d) Ohmmeter

RRB NTPC 19.03.2021 (Shift-I) Stage Ist

Ans : (b) The electroscope is an early scientific instrument used to detect the presence of electric charge on a body. It detects charge by the movement of a test object due to the Coulomb electrostatic force on it. An electroscope can only give a rough indication of the quantity of charge. An instrument that measures electric charge quantitatively is called an electrometer.

97. What does a hygrometer measure?

(a) Heat (b) Humidity

(c) Force (d) Radiation

RRB NTPC 27.01.2021 (Shift-II) Stage Ist

Ans : (b) A hygrometer is an instrument used to measure the amount of water vapour or humidity in atmosphere.

Measuring Quantity	Instruments
Temperature	Thermometer
Force	Force gauge
Amount of heat	Calorimeter

98. A lie detector apparatus is also known as a :

(a) Seismograph (b) Barograph

(c) Polarimeter (d) Polygraph

RRB NTPC 01.02.2021 (Shift-II) Stage Ist

Ans : (d) (i) Polygraph:– used as lie detector apparatus/machine

(ii) Seismograph – used to measure seismic waves.

(iii) Barograph – used to measure change in atmospheric pressure.

(iv) Polarimeter – used to measure the angle of rotation caused by passing polarized light.

99. Which of the following is a lie detector machine?

(a) Telescope (b) Photometer

(c) Polygraph (d) Tachometer

RRB NTPC 03.03.2021 (Shift-I) Stage Ist

Ans : (c) See the explanation of above question.

100. Which instrument is used to show the direction of flow of current in a circuit?

(a) Galvanometer (b) Ammeter

(c) Rheostat (d) Voltmeter

RRB NTPC 19.01.2021 (Shift-I) Stage Ist

Ans : (a)

	Instruments	Uses
♦	Galvanometer	to measure small electrical current & direction.
♦	Ammeter	to meausre wide range of current value.
♦	Rheostat	to adjust resistance.
♦	Voltmeter	to measure voltage.

101. Which of the following devices is used to measure relatively high temperature, such as are encountered in furnaces?

(a) Bolometer (b) Pyrometer

(c) Ammeter (d) Fluxmeter

RRB NTPC 07.01.2021 (Shift-II) Stage Ist

Ans : (b) Pyrometer is an instrument used to measure high temperature, such as are encountered in furnances. When the temperature of an object is very high its temperature cannot be measured with a normal thermometer.

102. Which device is used in submarines to see things above the level of the sea ?

(a) Pyrometer (b) Epidiascope

(c) Periscope (d) Odometer

RRB NTPC 10.04.2016 (SHIFT-III) Stage-I

Ans : (c) Submarines have a special device called a periscope that allows people inside the submarine to see what's going on above the level of sea. The main part of a periscope is a long tube that has a mirror at each end. The mirrors are attached so that they are parallel to each other at a 45-degree angle. Arranged in this way, the mirrors bounce reflection of light between them.

103. Which instrument is used to measure atmospheric pressure?

(a) Lactometer (b) Barometer

(c) Thermometer (d) Multimeter

RRB NTPC (12.04.2016) SHIFT) Stage- Ist

Ans : (b) Barometer is a device used to measure atmospheric pressure.

- A barometer can also be used to measure altitude. There are two main types of barometers: mercury and aneroid.
- A lactometer is used to find out the amount of water in the milk.
- A thermometer is an instrument that measures temperature.
- Multimeter is a testing tool used to measure two or more electrical values.

104. Which among the following devices is used to measure the atmospheric pressure?

(a) Tetrameter (b) Odometer

(c) Thermometer (d) Barometer

RRB NTPC 10.01.2021 (Shift-I) Stage Ist

Ans : (d) See the explanation of above question.

105. Which device is used to see the Sun?

(a) Stroboscope (b) Telescope
(c) Helioscope (d) Sun meter

RRB NTPC 10.04.2016 (SHIFT-I) Stage-I[st]

Ans : (c) The helioscope is an instrument that is used to see the Sun and Sun's surface area etc.

106. Potentiometer basically –

(a) Is a measuring instrument
(b) Is a connective device
(c) Is a calibration equipment
(d) Is a notation tool

RRB J.E. (14.12.2014), Green paper

Ans : (a) Potentiometer is a measuring instrument used for measuring an electromotive force by balancing it against the potential difference produced by passing a known current through a known variable resistance.
Potentiometers are commonly used to control electrical devices such as volume controls on audio equipment.

107. From which device is the electric current measured?

(a) Voltmeter (b) Ammeter
(c) Ohmmeter (d) Wavemeter

RRB J.E. (14.12.2014), Red paper

Ans : (b) An ammeter is a measuring instrument used to measure the current in a circuit. Electric currents are measured in amperes (a), hence the named Instruments are used to measure smaller currents, in the milliampere or microampere range, are designated as milliammeters or microammeters.
Hence-
(i) Ammeter is connected in series to the circuit.
(ii) It must have the following legitimate resistance.
(iii) Ammeter Draws less power.

108. Ammeter is –

(a) Is connected in a series to the circuit
(b) Must have the following legitimate resistance
(c) Draws less power
(d) All of the above

RRB J.E. (14.12.2014, Set-2), Red paper

Ans : (d) See the explanation of above question.

109. What does stalagmometer used to measure?

(a) Dynamic viscosity (b) Surface tension
(c) Refractive index (d) Lighted activity

RRB SSE 21.12.2014

Ans : (b) A stalagmometer is a device used for measuring surface tension using the stalagmometric method. It is also called a stactometer or stalagmometer. The device is a capillary glass tube whose middle section is widened. The volume of a drop can be predetermined by the design of the stalagmometer.

110. Odometer is an instrument which is used in motor vehicle for measuring-

(a) Direction (b) Distance
(c) Smell (d) Speed

RRB Group –D, 10-10-2018 (Shift-III)
RRB ALP & TECH (14.08.2018) Shift – I

Ans : (b) An odometer is an instrument used for measuring the distance travelled by a vehicle. The device may be electronic, mechanical, or a combination of both.
It is sometimes called a milometer.

111. Odometer in vehicle measures –

(a) Fuel (b) Distance
(c) Smell (d) Speed

RRB Group –D, 25-10-2018 (Shift-II)

Ans : (b) See the explanation of above question.

112. Which instrument is used for measuring distance travelled by vehicle?

(a) Accelerometer (b) Odometer
(c) Speedometer (d) Tachometer

RRB Group- D,05-11-2018(Shift-II)

Ans : (b) See the explanation of above question.

113. Which of the following speed of flow measuring instrument is area meter?

(a) Venturimeter (b) Rotameter
(c) Pitot tube (d) None of these

RRB SSE 21.12.2014

Ans : (b) Rotameter measuring instrument is an area meter. A rotameter is a device that measure the volumetric flow rate of liquids in a closed pipe or tube. It belongs to a class of meters called variable-area flow meters, which measure flow rate by allowing the cross sectional area the liquid travells through the pipe or tube.

114. Tachometer is used for-

(a) R.P.M.
(b) Torque
(c) Rotational kinetic energy
(d) Distance

RRB J.E. 2014(14-12-2014 ,Green Paper)
RRB NTPC Stage-I[st] 31.03.2016 (SHIFT-II)
RRB S.S.E. 2014(21-12-2014 ,Set-08,Green Paper)

Ans : (a) Tachometer is an instrument used for measuring the rotation or revolution speed of objects, such as an engine or a shaft. The tachometer measures rotations per minute (RPM) of engines shafts and is widely used in automobiles, airplanes, marine engineering field and many others.

115. Multimeter consist of-

(a) Current and Ohm meter
(b) Voltmeter & Ohm meter
(c) Voltmeter & Current
(d) Voltmeter, Currentmeter & Ohm meter

RRB J.E. 2014(14-12-2014, Green Paper)

Ans : (d) A multimeter is the combination of a DC voltmeter, AC voltmeter, Ammeter, and Ohmmeter. An un-amplified analog multimeter combines a meter movement, range resistors and switches; VTVMs are amplified analog meters and contain active circuitry.

116. What is false about richter scale?

(a) It was developed by Charles Richter and Gutenberg in 1935.
(b) It is a logarithmic scale
(c) It can be measured using seismometer
(d) A magnitude of 8-9 on the Richter scale means a light earthquake.

RRB NTPC Stage-I[st] 03.04.2016 (SHIFT-I)

Ans : (d) A magnitude of 8-9 on the Richter scale means a destructive earthquake. The Richter magnitude scale is a scale of numbers used to tell the power (or magnitude) of earthquake. Charles Richter And Gutenberg developed the Richter Scale in 1935.

117. Instrument used for measuring density of liquid is-

(a) Hygrometer (b) Hydrometer
(c) Hypsometer (d) Fathometer

RRB NTPC Stage-Ist 05.04.2016 (SHIFT-I)

Ans : (b) A hydrometer is an instrument used for measuring the relative density of liquids based on the concept of buoyancy. They are typically calibrated and graduated with one or more scales such as specific gravity.
Fathometer is a depth finder that uses sound waves to determine the depth of water. A hygrometer is a meteorological instrument that is used to measure the humidity of the air. The common way these devices work by using a material that attracts moisture.
A hypsometer is an instrument for measuring height or elevation.

118. Which instrument is used for discovering the things in water?

(a) Laser (b) Radar
(c) Sonar (d) Scuba

RRB NTPC Stage-Ist 28.03.2016 (SHIFT-II)

Ans : (c) SONAR (Sound Navigation and Ranging) is a technique that uses sound propagation (usually underwater, as in submarine navigation) to navigate, communicate with or detect objects under the surface of the water, such as other vessels.

119. Echolocation in ships is used for measuring-

(a) Depth of light
(b) Density of fish
(c) Depth of water
(d) Density of oceanic vegetation

RRB Group- D, 12-11-2018(Shift-I)

Ans : (c) Echolocation in ships is used for measuring depth of water. The principle of echolocation is same as SONAR system. Hence, SONAR is the type of Echolocation.

120. .....is type of Echolocation –

(a) Vibration (b) Frequency
(c) Radar (d) Sonar

RRB Group –D, 01-11-2018 (Shift-II)

Ans : (d) See the explanation of above question.

121. Which instrument is used for measuring density of milk?

(a) Hydrometer (b) Lactometer
(c) Barometer (d) Thermometer

RRB Group- D,12-11-2018(Shift-III)

Ans : (b) A lactometer is an instrument that is used to check the purity of milk by measuring its density. The lactometer works on the principle of specific gravity of milk.

122. Voltmeter is used for measuring-

(a) Air resistance (b) Voltage
(c) Magnetic flux (d) Electric current

RRB J.E., 29-05-2019(Shift-III)
RRB Group –D, 27-09-2018 (Shift-III)

Ans : (b) A voltmeter is an instrument used for measuring electrical potential difference between two points in an electric circuit. Analog voltmeters move a pointer across a scale in voltmeter for the voltage of the circuit; digital voltmeters give a numerical display of voltage by the use of an analog-to-digital converter.

123. Which instrument is used for measuring voltage?

(a) Ammeter (b) Potentiometer
(c) Galvanometer (d) Voltmeter

RRB Group- D, 08.10.2018 (Shift-I)
RRB Group –D, 08-10-2018 (Shift-II)

Ans : (d) See the explanation of above question.

124. Galvanometer is used for measuring-

(a) Direction of speed
(b) Direction of magnetic flux
(c) Direction of sound
(d) Direction of current

RRB Group- D, 24-09-2018(Shift-I)
RRB Group –D, 22-09-2018 (Shift-I)

Ans : (d) A galvanometer is an electromechanical instrument used for detecting and indicating an electric current on a circuit. A galvanometer works as an actuator, by producing a rotary deflection, in response to electric current flowing through a coil in a constant magnetic field.

125. Which of the following is used to detect current in a circuit?

(a) Galvanometer (b) Anemometer
(c) Barometer (d) Lactometer

RRB NTPC Stage-Ist 26.04.2016 (SHIFT-II)

Ans : (a) See the explanation of above question.

126. Which is used for measuring speed of motor-

(a) Speedometer (b) Voltmeter
(c) Velometer (d) Lactometer

RRB Group- D,05-11-2018(Shift-I)

Ans : (a) A speedometer is a device used to measure the travelling speed of a vehicle, usually for the purpose of maintaining a sensible speed.

127. Ammeter : Electric current :: Ohmmeter : ?

(a) Voltage (b) Pressure
(c) Resistance (d) Speed

RRB Group –D, 03-10-2018 (Shift-II)

Ans : (c) Ohmmeter is related to measure resistance in a circuit. It measures the resistance in ohms.

128. Which instrument is used for measuring power and speed of wind?

(a) Lactometer (b) Speedometer
(c) Thermometer (d) Anemometer

RRB Group –D, 12-10-2018 (Shift-I)
RRB NTPC 25.01.2021 (Shift-I) Stage Ist
RRB NTPC 23.07.2021 (Shift-II) Stage Ist

Ans : (d) An anemometer is an instrument that measures wind speed and wind pressure and power. Anemometers are important tools for meteorologists, who study weather patterns. The anemometer counts the number of rotations, or turns, which is used to calculate wind speed. It is also a common weather station instruments.

129. Which of the following can be measured temperature without touching to object?

(a) Infrared thermometer
(b) Filled system thermometer
(c) Mercury glass thermometer
(d) Electric thermometer

RRB J.E. (14.12.2014, Green paper)

Ans : (a) Infrared thermometer enables to measure temperature quickly, at a distance and without touching the object. They are so useful, easy to use even fun to use that they have become as common in kitchens as they have on factory floors. Infrared thermometer are often used to find over heated equipment and electrical circuits temperature but they have hundreds of other uses.

(iv) Physical Quantities

130. Which of the following is a scalar quantity?

(a) Pressure (b) Displacement
(c) Force (d) Momentum

RRB Group-D 26-10-2018 (Shift-II)

Ans : (a) Pressure is a scalar quantity, because it has magnitude but does not have direction, whereas force, displacement and momentum all are vector quantities because they have both direction and magnitude.

131. Which of the following is not a vector quantity-

(a) Speed / Impulse (b) Force of gravity
(c) Electric current (d) Displacement

RRB NTPC 12.04.2016 (Shift-I) Stage Ist

Ans : (c) Electric current is not a vector quantity because it does not follow the vector law of addition.

132. A vector quantity has both magnitude and direction, whereas a scalar quantity has only magnitude and no direction. Which of the following is a vector quantity?

(a) Work (b) Speed
(c) Displacement (d) Energy

RRB Group-D 12-11-2018 (Shift-I)

Ans : (c) Vector Quantity– The physical quantities which need both magnitude and direction for their complete description are called 'vectors' or 'vector quantities'. Displacement, velocity, force, etc. are all vector quantities.

133. What is an example of vector quantity?

(a) Weight (b) Temperature
(c) Velocity (d) Length

RRB NTPC Stage Ist 28.04.2016 (Shift-I)

Ans : (c) See the explanation of above question.

134. Which of the following is a vector quantity?

(a) Time (b) Temperature
(c) Distance (d) Velocity

RRB NTPC 09.04.2016 (Shift-III) Stage Ist

Ans : (d) See the explanation of above question.

135. Which of the following has both direction and magnitude?

(a) Mass (b) Distance
(c) Momentum (d) Speed

RRB Group-D 05-11-2018 (Shift-II)

Ans : (c) Momentum is a vector quantity, as it has both direction and magnitude. Mass, distance and speed are scalar quantities because they contain only magnitude.

136. In the given physical quantities which is not a relative quantity?

(a) Time (b) Acceleration
(c) Velocity (d) Distance

RRB Group-D, 03-12-2018 (Shift –III)

Ans : (a) Time is not a relative quantity.
Velocity is defined as the rate of displacement of an object

$$\text{Velocity (V)} = \frac{\text{Displacement}}{\text{Time}}$$

- Acceleration is defined as the rate of change of velocity.
- Velocity and acceleration is a vector quantity.

Note : Negative acceleration is called as retardation.

137. Which of the following is vector quantity ?

(a) Volume (b) Mass
(c) Force (d) Length

RRB JE (14-12-2014, Red Paper)

Ans : (c) Vector quantities refers to that physical quantities characterized by the presence of both magnitude as well as direction. For example, displacement, force, torque, momentum, acceleration, velocity, etc.

138. Which of the given below is NOT a vector quantity?

(a) Power (b) Torque
(c) Displacement (d) Acceleration

RRB NTPC 09.03.2021 (Shift-I) Stage Ist

Ans : (a) The physical quantities which require magnitude as well as direction to be fully represented are called vector quantities. Example- Momentum, impulse, acceleration, force, displacement, velocity, electric field, torque etc. Whereas energy, distance, time, power etc, are scalar quantities.

139. Which of the following is a scalar quantity?

(a) Momentum (b) Force
(c) Mass (d) Velocity

RRB NTPC 28.12.2020 (Shift-II) Stage Ist

Ans : (c) A quantity that has magnitude but no particular direction is described as scalar quantity. A quantity that has magnitude and acts in a particular direction is described as vector quantity. Scalar quantities include: mass, distance, speed, time, power, energy etc. Vector quantities include: displacement, velocity, acceleration, force, weight, momentum etc.

140. Which of the following only gives magnitude and not direction?

(a) Momentum (b) Displacement
(c) Work (d) Force

RRB Group –D, 25-09-2018 (Shift-III)

Ans : (c) Work is a scalar quantity because it is the dot product of two vectors (Force and Displacement).
Work (W) = F.d

Work	=	Force	·	Displacement
↓		↓		↓
Scalar quantity		Vector		Vector

Thus, dot product of two vectors becomes scalar quantity. So, work done has only magnitude but not direction.

141. In work –
(a) There is no direction , only have magnitude
(b) There are no direction & magnitude
(c) Both magnitude and direction is present
(d) Only direction, no magnitude

RRB Group –D, 27-11-2018 (Shift-II)

Ans : (a) See the explanation of above question.

142. Which of the following has magnitude and no direction?
(a) Work (b) Impulse
(c) Displacement (d) Force

RRB Group –D, 12-11-2018 (Shift-II)

Ans : (a) Work is a scalar quantity which has only magnitude, no direction.

2. Mechanics

(i) Work

1. Which of the following can do more work?
(a) A raised hammer
(b) A bullet fired by the gun
(c) A moving stone
(d) A rotating wheel

RRB ALP & Tec.(31-08-2018)Shift-III
RRB Group –D, 12-10-2018 (Shift-II)

Ans : (b) A bullet fired by gun has the maximum work.

2. A force of 20 N displaces an object through 2 m and does a work of 20 J. The angle between the force and displacement is:
(a) 60^0 (b) 30^0
(c) 90^0 (d) 0^0

RRB ALP & Tec.(20-08-2018)Shift-II

Ans : (a) Given that,
F = 20N
d = 2m
W = 20J
$\Rightarrow$ Work (W) = F. d cosθ
$20 = 20 \times 2 \times \cos\theta$
$1 = 2\cos\theta$
$\cos\theta = 1/2$
$\cos\theta = \cos 60^0$
$\theta = 60^0$

3. A porter raise 12 kg object from surface of earth and put object 1.5 meter above from surface on his head. Calculate the work done on object ($g = 10\ ms^{-2}$).
(a) 140 J (b) 150 J
(c) 180 J (d) 150 J

RRB Group-D, 04.10.2018 (shift-I)

Ans : (c)
m = 12kg
$g = 10\ m/s^2$
h = 1.5m
So, if an object of mass (m) is raised through a height h, the work done on the object is equal to potential energy (mgh) of an object.
Therefore,
W = mgh
= 12×10×1.5
= 180J.

4. If an aeroplane travelled 4000m distance and work done is 20000J. Then force applied on it is
(a) 5 N (b) 50 N
(c) 0.20 N (d) 10 N

RRB Group –D, 10-12-2018 (Shift-I)

Ans : (a) Work = Force × Displacement
20000 = Force × 4000
F = 20000/4000
= 5 N

5. The gravitational potential energy of an object at a point above the ground. Is defined as the work done in. . . . . .
(a) Lifting it from the ground to the point opposite gravity
(b) Applying gravitational force on it
(c) Keep it at the center
(d) Placing it on the ground of against gravity

RRB Group –D, 22-10-2018 (Shift-II)

Ans : (a) The gravitational potential energy of an object at a point above the ground is defined as the work done to lift it from the ground to the point opposite to gravity.

6. The work done, to increase speed 5 m/s to 10 m/s by a car of 800kg is.....
(a) 30kJ (b) 40kJ
(c) 20kJ (d) 10kJ

RRB Group-D 22-09-2018(Shift-II)

Ans : (a) Work done = change in kinetic energy
$= 1/2m(v_2^2 - v_1^2)$
$= 1/2 \times 800(10^2 - 5^2)$
$= ½ \times 800 \times 75$
$= 30000\ J = 30kJ$

7. An object of 1kg is dropped to the ground from a height of 30m. What is the work done by the force of gravity ? ($g = 10\ m/s^2$)
(a) 10J (b) 300J
(c) 0.33J (d) 30J

RRB Group-D 19-09-2018(Shift-I)

Ans : (b) m = 1 kg
$g = 10\ m/s^2$
h = 30 m
P.E. = mgh
Or work done by the force of gravity
$= 1 \times 10 \times 30 = 300$ Joule

8. A person picks up 20kg of goods at 2m above the ground and keeps it on his head, work done by the person is?

(a) 200J (b) 400J
(c) 40J (d) 20J

RRB Group-D 17-09-2018(Shift-II)

Ans : (b) Given that, m = 20 kg
height (h) = 2 m
$g = 10\ m/s^2$
$W = mgh = 20 \times 10 \times 2 = 400\ J$

9. An object of 1 kg, raised 10m above the surface of earth then work done by gravitational force will- ($g = 9.8\ m/s^2$)

(a) 98J (b) -9.8J
(c) 9.8J (d) -98J

RRB Group –D, 20-09-2018 (Shift-II)

Ans : (d) m = 1kg
$g = 9.8 m/s^2$ (object raise from surface against gravitational force)
h = 10m
As work done by an object is equal to the potential energy stored in an object.
Therefore,
W = mgh
$= 1 \times 9.8 \times 10$
= 98J.
When the displacement is opposite to the direction of force, work is automatically -98J

10. A man raised 20kg object from the surface of earth and put the object 2m above on his head. Calculate the work done by the man is- ($g = 10\ m/s^2$)

(a) 350J (b) 200J
(c) 400J (d) 150

RRB Group –D, 24-09-2018 (Shift-II)

Ans : (c) m = 20kg
$g = 10 m/s^2$
h = 2.0m
So, if an object of mass (m) is raised through a height h, the work done on the object is equal to potential energy (mgh).
Therefore,
W = mgh
$= 20 \times 10 \times 2$
= 400J.

11. When an object move 1m distance by 1N force on the direction of force then work done will-

(a) 10J (b) 100J
(c) 0.01J (d) 1J

RRB ALP & Tec.(20-08-2018)Shift-II

Ans : (d) Given, Force = 1 N, Distance = 1 m
Work done = F.d cosθ
$= 1 \times 1 \times \cos 0^0$ (because force and displacement are in same direction)
Hence work done = 1J

12. Work done by a man standing on a platform holding 10kg suitcase is-

(a) 100J (b) 0J
(c) 98J (d) 980J

RRB ALP & Tec.(21-08-2018)Shift-I

Ans : (b) $W = F \times d$
Here, F = force
d = displacement
But there is no displacement of the man,
Hence, d = 0
Work done = F×0
$\boxed{W = 0}$

13. A 4.0 kg object is moving horizontally with a speed of 5.0 m/s. To increase its speed to 10 m/s, the amount of net work required to be done on this object is:

(a) 150J (b) 100J
(c) 75J (d) 50J

RRB ALP & Tec.(09-08-2018)Shift-I

Ans : (a)
Given that, m = 4kg, $V_1 = 5$ m/s and $V_2 = 10$ m/s
For raising speed of the object, the work done is equal to kinetic energy,
Work done (W) = K.E

$$= \frac{1}{2} m\left(v_2^2 - v_1^2\right)$$

$$= \frac{1}{2} \times 4\left(10^2 - 5^2\right)$$

Work done = $\{4 \times (10^2 - 5^2)\}/2 = 150$ J

14. A ball weighing 0.1 kilogram is dropped from a stationary position when it falls from a distance of 2 meters, then what will be the work done by the force of gravity.

(a) 1.96 J (b) - 1.96 J
(c) - 0.98 J (d) 0.98 J

RRB ALP & Tec.(10-08-2018)Shift-III

Ans : (a) Given, Mass of ball (m) = 0.1 kg
Total height (h) = 2m
Acceleration due to gravity (g) = $9.8\ m/s^2$
Here, work done by the gravitational force = potential energy of ball at 2 m height.
$W = 0.1 \times 9.8 \times 2 = 1.96$ J

15. When the force exerted on an object, then the work done will be zero if it has displacement.

(a) Negative (b) Positive
(c) Neutral (d) Zero

RRB ALP & Tec.(21-08-2018)Shift-III

Ans : (d) If displacement of the object is zero then work done also will be zero.
$\because\ W = F \times d$
Where, F = force
d = displacement
$W = F \times 0$
$\boxed{W = 0}$

16. A boy raises a box with a weight of 120 N through a height of 2 m. The work done by the boy is-

(a) 60 J (b) 120 J
(c) 240 J (d) 180 J

RRB ALP & Tec.(30-08-2018)Shift-I

Ans : (c) Given, Weight = mg = 120N, Height (h)= 2 m
Work done = mgh
$= 120 \times 2$
= 240J.

17. Capacity of doing work is known as-

(a) Power (b) Pressure
(c) Energy (d) Force

RRB ALP & Tec.(31-08-2018)Shift-III

Ans : (c) Energy is defined as the capacity to do work. Work and energy has same S.I. unit i.e. 'Joule (J)'. Work and energy both are scalar quantity.

18. If the value of work is positive then the kinetic energy of the body -

(a) Decrease his energy
(b) Its value will be zero
(c) It will stay
(d) Increase his energy

RRB Group –D, 20-09-2018 (Shift-I)

Ans : (d) If work done by conservative forces is positive, then $\vec{F}.\vec{s} > 0$. Thus, the one component of force is along the direction of displacement. Thus, speed of the object tends to increase as the force continues to be applied on the object. Since, the total energy is increased.

19. Which of the following position is no work done?

(a) Kapil stands with a weight of 10 kg on his shoulder
(b) Sachin walks 4 km.
(c) A porter carries weight from a bus to a car.
(d) Arun plays cricket on the field.

RRB Group –D, 19-09-2018 (Shift-III)

Ans : (a) Kapil is standing with a weight of 10 kg on his shoulder. It is clear that displacement is zero, so the work done by Kapil will be zero.

20. The work done by the force is positive when-

(a) Displacement occurs in the direction of force
(b) Displacement is perpendicular to the force
(c) There is no displacement due to the force
(d) Displacement occurs in opposite direction of force

RRB Group –D, 19-09-2018 (Shift-III)

Ans : (a) Positive Work–When force and displacement are in the same direction, the work performed on an object is said to be positive work.
Negative Work–Negative work is performed if the displacement is opposite to the direction of the force applied.
Zero Work–When force and displacement are perpendicular to each other, or when force or displacement is zero then there will be no work done.

21. Which of the following activities can be said to have work done ?

(a) Harsh is reading the book
(b) Pinky is walking on a flat road with a book on her head
(c) Shruti is sitting on the chair
(d) Khusi is pushing the wall of the house, but fails to do it.

RRB Group –D, 18-09-2018 (Shift-II)

Ans. (*) Pinky is walking on a flat road with a book on her head, it can be said their will be no work done. Because here, the force due to the gravity is perpendicular to the displacement of object. In other options their are no any displacement of object.
So here remaining option also work done will be zero.

22. A porter lifts 500 N up to a distance of 100 meters work done by the porter is-

(a) 50N (b) 0.20N
(c) 0N (d) 5N

RRB Group –D, 06-12-2018 (Shift-I)

Ans : (c) A porter lifts 500N up to a distance of 100 meters then the work done by porter is zero because the displacement of the object is perpendicular to the direction of the force applied. So, the angle between the force and displacement is 90 degrees ($\theta = 90°$).
Work done = F.dcosθ
$= F.d\cos 90^0 = 0$

23. In which of the following work is not done –

(a) A wind mill raising the water from well
(b) A donkey put a weight on his back
(c) Suman is swimming in a pool
(d) A engine is pulling a train

RRB Group –D, 02-11-2018 (Shift-II)

Ans : (b) A donkey is carrying weight on its back, in this case no work is being done because the displacement of the object is perpendicular to the direction of the force applied.
$W = f.d\cos\theta$
$= f.d\cos 90^0 = 0$
$W = 0$

24. Efficiency of work is known as-

(a) Energy (b) Velocity
(c) Force (d) Speed

RRB Group –D, 16-11-2018 (Shift-II)

Ans : (a) Energy is called the ability to do work. Efficiency can be determined quantitatively by the ratio of energy transferred to useful form compared to the total energy supplied initially is called the efficiency.

25. If the work done is zero, then the angle between force and displacement is –

(a) 0º (b) 90º
(c) 45º (d) 30º

RRB Group –D, 08-10-2018 (Shift-II)
RRB Group –D, 17-09-2018 (Shift-II)

Ans : (b) We know that,
$W = F.d\cos\theta$
when, $W = 0$
$0 = F.d\cos\theta$
$\therefore \cos\theta = 0 = \cos 90^0$
$0 = 90^0$
In the case of zero work the angle between the displacement and the applied force is 90 degree.

26. 20 N force is acting on a body. Body moves 4 meter in direction of applied force, then work done is-

(a) 80W (b) 80Pa
(c) 80N (d) 80J

RRB Group –D, 05-10-2018 (Shift-II)

Ans : (d) Given, Force (F) = 20 N, Displacement (d) = 4 m
Work done (W) = F.dcosθ
[θ = 0º Displacement occurs in the direction of the force]
Work = 20 N × 4 m × cos 0º
Work = 20 N × 4 m × 1
Work = 80 Nm = 80 J

27. A worker takes 15kg object and put the object 1 meter above on his head from the surface of earth. Then work done by the worker is – (g = 10 ms^{-2}).
(a) 155J (b) 150J
(c) 140J (d) 100J

RRB Group –D, 05-10-2018 (Shift-II)

Ans : (b) Given, m = 15kg
g = 10m/s^2
h = 1.0m
As work done by an object is equal to the potential energy stored in an object.
Therefore,
W = mgh = 15×10×1 = 150J.

28. Work present if there is –
(a) Force (b) Energy
(c) Friction (d) Power

RRB Group –D, 26-09-2018 (Shift-I)

Ans : (a) Work is said to be done when body or object moves with the application of external force. We can define work as an activity involving a movement and force.
Work = force × displacement

29. If displacement is horizontal to the applied force, then work done is –
(a) Zero (b) Negative
(c) Positive (d) Neutral

RRB Group –D, 26-10-2018 (Shift-II)

Ans : (c) When a body moves on the horizontal surface, force and displacement act in the same direction. The work done in this case is known as positive work.

30. Which of the following work done does not depend -
(a) Applied force
(b) Mass of object
(c) Displacement
(d) The angle between force and displacement

RRB Group –D, 09-10-2018 (Shift-II)
RRB Group –D, 03-10-2018 (Shift-III)
RRB Group –D, 09-10-2018 (Shift-II)

Ans : (b) Work done (W) = F.d cosθ
where, F = External/applied force
d = Displacement of the body/object
θ = Angle between force and displacement
From the above equation, the work done depends upon applied force, displacement and angle between the force and displacement but does not depend upon mass or initial velocity of object/body.

31. Which of the following the work done by a body does not depend on ?
(a) Initial velocity of object
(b) Displacement
(c) Angle between force and displacement
(d) Applied force

RRB Group –D, 15-11-2018 (Shift-II)
RRB Group –D, 12-12-2018 (Shift-I)
RRB Group –D, 13-12-2018 (Shift-II)
RRB Group –D, 02-11-2018 (Shift-I)
RRB Group –D, 08-10-2018 (Shift-III)

Ans : (a) See the explanation of above question.

32. A worker raise 10kg object from the ground and put 1.2m above on his head then work done is- (g = 10 ms^{-2})
(a) 120J (b) 155J
(c) 150J (d) 140J

RRB Group –D, 08-10-2018 (Shift-II)

Ans : (a) Given, m= 10kg
h = 1.2m
acceleration due to gravity (g) = 10 ms^{-2}
As work done by an object is equal to the potential energy stored in an object. Therefore,
Work done = m ×g× h =10×1.2× 10= 120J

33. Work known as-
(a) Force × displacement
(b) Mass × acceleration
(c) Length × width
(d) Mass × volume

RRB Group –D, 08-10-2018 (Shift-I)

Ans : (a) Work = Force × displacement

34. The work done by an object is 56 J and applied force on object is 7 N. Find the displacement.
(a) 80ms^{-1} (b) 80m
(c) 8 m (d) 80ms^{1}

RRB Group –D, 08-10-2018 (Shift-III)

Ans : (c) Given, Work (W) = 56J, displacement (d) =?
F = 7N
Work = Force × Displacement
Displacement = W/F = 56/7 = 8m

35. 10 N force is working on an object. Object displaced 5m in the direction of applied force, then work done is -
(a) 50N (b) -50N
(c) 50J (d) -50J

RRB Group –D, 04-10-2018 (Shift-I)
RRB Group –D, 01-11-2018 (Shift-II)

Ans : (c) Given, Force (F) = 10 N, Displacement (d) = 5 m
Work = force × displacement in the direction of force
= 10×5= 50J

36. If force F=0, then work done W = ?
(a) 20 (b) 0
(c) 1 (d) 100

RRB Group –D, 31-10-2018 (Shift-III)

Ans : (b) Given, Force = 0, Work done = ?
W = F.d
= 0.d
= 0

37. A porter picks up 12 kg of goods from the ground and places it on his head 1.5 meters above the ground then work on the goods to be done by him is: ($g = 10\ ms^{-2}$)

(a) 140J (b) 150J
(c) 180J (d) 155J

RRB Group –D, 04-10-2018 (Shift-II)

Ans : (c) Given,
$m = 12$ kg, $g = 10\ ms^{-2}$, $h = 1.5$m
As work done by the porter is equal to the potential energy stored in an object.
Therefore, $W = mgh$
$= 12\times10\times1.5 = 180$J

38. The force of 25 N is working on an object, that object is moved in the direction of force by 5 m, the work done by the force is:

(a) 125W (b) 125N
(c) 125J (d) 125Pa

RRB Group –D, 26-10-2018 (Shift-II)

Ans : (c) Force (F) = 25N
Displacement (d) = 5m
Work = force × displacement
$W = F.d$
$= 25\times5 = 125$J

39. When a man pushes a wall but fails to displace it, it does ?

(a) Positive work (b) Negative work
(c) Most positive work (d) No any work

RRB Group –D, 12-12-2018 (Shift-II)

Ans : (d) When a man pushes the wall but fails to displace it, he does absolutely zero work.
Work done (W) = Force × displacement
Here, displacement = 0
$W = 0$

40. When a person walks 4 meters with a constant force of 12N, the work done by him is –

(a) 6J (b) 2J
(c) 48J (d) 3J

RRB Group –D, 12-12-2018 (Shift-I)

Ans : (c) Given, Force (F) = 12N
Displacement (d) = 4m
Work (W) = ?
Work (W) = F.d
$W = 12\times4 = 48$J

41. To say that the work has been done, two conditions must be completed, one of them is-

(a) Force is not required
(b) Object must be displaced
(c) There should be no absorption and emission of energy
(d) There should be no change in the condition of the object

RRB Group –D, 24-10-2018 (Shift-III)

Ans : (b) To say that the work has been done, there are two conditions must be completed–
1- Force is required
2- Object must be displaced

42. The product of force and displacement is called-

(a) Momentum (b) Acceleration
(c) Work (d) Burden

RRB Group –D, 19-09-2018 (Shift-I)

Ans : (c) Work done(W)=Force(F)×Displacement(d)

43. The work is product of –

(a) Energy and volume
(b) Power and displacement
(c) Force and Displacement of object towards the direction of force
(d) Displacement of the object in the direction of the force

RRB Group –D, 08-08-2018 (Shift-I)

Ans : (c) The work is the product of force and displacement of object towards the direction of force.
Work done (W)=Force (F)×Displacement (d)

44. If a stationary force applied to an object, the object moved in the direction of force, is expressed as a result of force and displacement, it is called –

(a) Retardment (b) Work done
(c) Impulse (d) Acceleration

RRB Group –D, 27-09-2018 (Shift-III)

Ans : (b) If a force applied to an object, the object moved in the direction of force, is expressed as a result of force and displacement, it is called work done. Work is a dot product of force and displacement. The dot product of vector quantities (force and displacement) is always scalar which means it has only magnitude not direction.
Work done (W) = Force (F). Displacement (d)

45. Work is done on a body only when –

(a) It experiences energy gain through a mechanical effect
(b) Forces work on it
(c) There is displacement
(d) It moves through a certain distance

RRB Group –D, 11-12-2018 (Shift-III)

Ans : (a) Work is done on a body only when it experiences energy gain through a mechanical effect.

46. What is the work done if the angle between applied force and the direction of the displacement is 90^0?

(a) Disintegrated (b) Negative
(c) Positive (d) Zero

RRB Group –D, 10-12-2018 (Shift-III)
RRB Group –D, 05-11-2018 (Shift-III)

Ans : (d) If the angle between the applied force and the direction of displacement is 90 degrees ($\theta = 90^o$), the work done will be zero.
Work done = $F.d\cos\theta$
$= F.d\cos90^0 = 0$

47. The ability of an object to do the work energy contained in an object is depend on the-

(a) Mass and volume of object
(b) Motion of object in a certain direction
(c) State and condition of object
(d) The magnitude and the direction of the object

RRB Group –D, 16-10-2018 (Shift-I)

Ans : (c) The ability of an object to do the work or the energy contained in an object depends on the condition and state of the object.

48. A worker takes 10 kg of goods from the ground and puts it on 1.1m above the land on his head. What will be the work done by the worker.

(a) 140J (b) 155J
(c) 165J (d) 110J

RRB Group –D, 05-10-2018 (Shift-III)

Ans : (d) Given that,
$m = 10$ kg, $g = 10$ m/s^2, $h = 1.1$ m
As workdone by an object is equal to the potential energy stored in an object.
Therefore, $W = mgh$
$= 10 \times 10 \times 1.1$
$= 10 \times 10 \times 11/10$
$= 110J$

49. A moving car faces the wind in the opposite direction. What will be the work done by the wind on the car?

(a) Negative (b) Zero
(c) Infinite (d) Positive

RRB Group –D, 01-10-2018 (Shift-III)

Ans : (a) When a car in motion faces the wind in the opposite direction, then the force exerted on the car by the wind acts opposite to the displacement of the car. Therefore, the angle between the direction of the applied force and the displacement of the car is 180 °.
Work done (W) = F.d cos 180^0 [$\because \cos 180^o = -1$]
W = -F.d
So, the work done by air on the car will be negative

50. A girl whose weight is 200 N, climbs on a tree which height is 2-meter. What was the work done by the girl after climbing the tree? (g = 10 m /sec^2)

(a) 800J (b) 400J
(c) 200J (d) 2000J

RRB Group –D, 12-12-2018 (Shift-III)

Ans : (b) Given, Weight = mg = 200N
h = 2m
Work done by the girl = Potential energy
= mgh = 200×2 = 400J

51. If someone travels 15 km distance with a fixed force of 500N, then calculate the work done.

(a) 750000J (b) 75000J
(c) 7500000J (d) 7500J

RRB Group –D, 13-12-2018 (Shift-II)

Ans : (c) Force = 500N , Work = ?
Displacement = 15km = 15000m
Work = force×displacement
W = 500×15000
= 7500000J

52. A horizontal force of 10 N displaces an object of 5 kg to a distance of 2 m in the direction of the force. What will be the work done by the object?

(a) 20J (b) 5J
(c) 50J (d) 10J

RRB Group –D, 20-09-2018 (Shift-III)

Ans : (a) Work = force ×displacement in the direction of force
W = F×d
[$\therefore$ Given, F = 10N, d = 2m]
W = 10×2
= 20J

53. What is the amount of work done when an object moves under a force of 10 N at a distance of 10 m in the direction of force?

(a) 1J (b) 10J
(c) 100J (d) 0.01J

RRB Group –D, 31-10-2018 (Shift-II)

Ans : (c) Given,
d = 10m
F = 10N
Work = F.d
= 10×10
= 100J

54. A force of 50 N displaces an object 10 m. What will be the work done by the force?

(a) 500J (b) 5J
(c) 10J (d) 50J

RRB Group –D, 03-12-2018 (Shift-III)

Ans : (a) Given,
F = 50N, displacement = 10m, work =?
Work = force × displacement
W = 50×10 = 500J

55. If an object not moving after applying a force, then we can say that –

(a) Maximum power has used
(b) Work has done
(c) Minimum power has used
(d) Any work has not done

RRB Group –D, 16-11-2018 (Shift-I)

Ans : (d) If an object is not moving after applying a force, then we can say that work done on an object will be zero.
$\therefore$ Displacement (d) = 0
Work done (W) = Force × Displacement
= F.d
Work done (W) = F × 0
$\boxed{\text{Work done}(W) = 0}$

56. If the displacement of an object is zero. Then work done by the applied force is –

(a) Neutral (b) Negative
(c) Positive (d) Zero

RRB Group –D, 16-11-2018 (Shift-I)

Ans : (d) If the displacement of an object is zero, then the work done will be zero. If a applied force on a object is zero, then the work done on an object will be zero, such as - if a person pushes a wall and that wall remains stationary.
Work done (W) = Force × Displacement (d)
= F × d (Where d = 0)
$\boxed{\text{Work done}(W) = 0}$

57. The work done is zero with zero-

(a) Velocity
(b) Displacement
(c) Power
(d) Momentum

RRB Group –D, 11-10-2018 (Shift-I)

Ans : (b) See the explanation of above question.

58. Which of the following is not a characteristic of work?

(a) Work has a direction
(b) For doing work it is necessary to apply a force on an object
(c) Work has only magnitude
(d) For work done their should be a displacement of an object

RRB Group –D, 16-11-2018 (Shift-III)

Ans : (a) Work is a scalar quantity, because it has only magnitude, not direction.

59. A bus runs with a force of 4000 N. The work done by the bus is 2000 J. What is the distance covered by the bus?

(a) 1 meter (b) 2 meter
(c) 1.5 meter (d) 0.5 meter

RRB Group –D, 06-12-2018 (Shift-III)

Ans : (d) Given,
Force (F) = 4000 N
Work done (W) = 2000 J
Work = force × displacement
Displacement = Work/force
= 2000/4000
= 0.5 meter

60. If a man pulls a trolly by applying force of 50N and trolly is displaced 30m. What is work done?

(a) 1500J (b) 80J
(c) 1500J (d) 20J

RRB Group –D, 15-11-2018 (Shift-II)

Ans : (a) Given, Force = 50N
Displacement = 30m
Work = force × displacement
W = 50 × 30 = 1500J

61. A man puts 20kg object on his head by raising the object 2m above from the surface of earth. Then work done will be –

(a) 400W (b) 400J
(c) 200W (d) 200J

RRB Group –D, 30-10-2018 (Shift-II)

Ans : (b) Given,
m = 20 kg, $g = 10\ m/s^2$, h = 2 m
Work done = Potential energy of object
W = mgh
= 20× 10× 2 = 400J

62. A man puts 13kg object on his head by raising the object 1.5m above from the surface of earth. Then work done will be: ($g=10ms^{-2}$)

(a) 195J (b) 100N
(c) 150J (d) 140J

RRB Group –D, 05-10-2018 (Shift-I)

Ans : (a) The work done by the man is equal to the potential energy stored in an object.
Work done by the man = Potential energy of object
W = mgh
[Given, m = 13kg, $g = 10ms^{-2}$, h = 1.5m]
W = 13×10×1.5
= 195J

63. A boy hold 4 kg school bag for 30 seconds, the work done by him will be in joule.

(a) 4 (b) 4
(c) Zero (d) 39.20

RRB Group –D, 24-09-2018 (Shift-II)

Ans : (c) If the boy holds a school bag of 4 kg for 30 seconds, the force exerted by bag will be mg = 4 ×10 = 40 N.
The boy holds this force for 30 seconds, the work done is zero because displacement is zero
Work done = force × displacement = 40 × 0
Work done (W) = 0

64. Work can only be done when ___is present.

(a) Energy (b) Force
(c) Momentum (d) Power

RRB Group –D, 05-11-2018 (Shift-III)

Ans : (a) Work can only be done when energy is present. Energy is the ability to do work. Energy is a conserved quantity and the law of conservation of energy states that energy can neither be created nor be destroyed but can only be converted from one form to another.
Work and energy both has same S.I unit 'Joule (J)'.
Both are a scalar quantities.

65. Which of the following is not an example of work done ?

(a) A man pushing against the wall
(b) Trolley moves when the boy pushes the trolley
(c) Applied force on an object in that direction the object is moving
(d) Raise the book to some height and walking

RRB Group –D, 26-10-2018 (Shift-III)

Ans : (a) Work is said to be done when the body displaces form its initial position when the force is applied because.
Work done (W) = Force × Displacement
Here, in this case the wall does not displace from its initial position even though the force is applied and since here displacement is zero, so the work done is said to be zero.

66. When the direction of the force applied and the direction of movement of the object is perpendicular to each other.

(a) Power exercised
(b) No work done
(c) Power not exercised
(d) Work done

RRB Group –D, 24-10-2018 (Shift-I)

Ans : (b) If the direction of the force is perpendicular to the displacement in the direction of motion of the object then,
$\theta = 90^0$
Work done = F.d cos 90^0
W = 0

67. If the work done is negative, then what will be the angle between the force and displacement?

(a) 45^0 (b) 0^0
(c) 90^0 (d) 180^0

RRB Group –D, 09-10-2018 (Shift-I)

Ans : (d) If the angle between the force and the displacement is 90 degrees ($\theta = 90°$), then the work done

$W = F.d.\cos\theta$
$= F.d.\cos 90^0$
$= 0$ J

If the angle between the force and displacement is 180 degrees ($\theta = 180°$) then the work done will be negative because the value $\cos 180^0 = -1$.

$W = F.d.\cos 180^0$
$= - F \times d$

68. A force of 125 N is acting on an object, that object is moved up to 5 m in the direction of the force, what will be the work done by the force.
(a) 625W (b) 625Pa
(c) 625N (d) 625J

RRB Group –D, 09-10-2018 (Shift-I)

Ans : (d) Given,
Force (F) = 125N, displacement (d) = 5m
Work done (W) = Force × displacement
$W = 125 \times 5 = 625$J

69. If a person pulls the trolley up to the distance of 10 m with the force of 50 N, what will be the work done by him ?
(a) 5J (b) 500J
(c) 20J (d) 0.2J

RRB Group –D, 27-09-2018 (Shift-I)

Ans : (b) Given,
Force (F) = 50N, Displacement (d) = 10m
$W = F.d$
$W = 50 \times 10$
$= 500$ N-m or 500J

70. If an object is rotated in a circular path, what will be the work done on it in one rotation?
(a) Is zero
(b) Cannot be determined
(c) Is positive
(d) Is negative

RRB ALP & Tec. (17-08-018, Shift-III)

Ans : (a) If an object is rotated in a circular path, the work done on it is zero because the displacement in the circular path is zero.

71. A person picks up 25 kg of weight from the ground and puts it 2.5 meters above from the ground on his head if g = 10 m/s^2 then work done by the person is-
(a) 225 Joule (b) 22.5 Joule
(c) 625 Joule (d) 220 Joule

RRB ALP. & Tec. 20-08-2018(Shift-III)

Ans : (c) Work done is given by the equation,
$W = mgh$
where m = mass = 25 kg
g = acceleration due to gravity = 10 m/sec^2
h = height = 2.5 m
Hence, work done = $25 \times 10 \times 2.5 = 625$ Joule

72. An object of 5.0 kg is raised to a height of 2 m, in this process, how much work was done – (g=9.8m/s^2)
(a) 49 joule (b) 10 joule
(c) 19.6 joule (d) 98 joule

RRB ALP. & Tec. 20-08-2018(Shift-III)

Ans : (d) Work done is given by the equation
$W = mgh$
where m = mass
g = acceleration due to gravity
h = height
Hence work done = $5 \times 9.8 \times 2 = 98$ Joule

73. An object of 5 kg is raised to a height of 4 m. What will be the value of the work done due to the force of gravity on that object? (g = 10m/s^2)
(a) 200J (b) 20J
(c) -20J (d) -200J

RRB ALP. & Tec. 21-08-2018(Shift-III)

Ans : (d) Work done is given by the equation,
$W = - mgh$
where m = mass = 5 kg
g = acceleration due to gravity = 10 m/s^2
h = height = 4 m
Hence, work done $= -5 \times 10 \times 4 = -200$ Joule

74. An object of 20 kg is raised through a height of 2m, what will be the work done by the force of gravity on the object?
(a) 400J (b) 50J
(c) 40J (d) 100J

RRB ALP. & Tec. 14-08-2018(Shift-II)

Ans : (a) Work done, $W = mgh$
Here, m is 20 kg, h is 2m and g=10 m/sec^2
$W = 20 \times 10 \times 2 = 400$ J

75. When displacement occurs, the work done by the force is considered to be negative.
(a) Is perpendicular to the direction of force
(b) Is in the direction of momentum
(c) Is in the direction of force
(d) Is in the opposite direction of the force

RRB Group –D, 03-12-2018 (Shift-II)

Ans : (d) • When the displacement of a body or object is in the opposite direction of the force, the work done by the force is considered to be 'negative'.
• When the displacement of the object is in the same direction of the force, the work done by the force is considered to be positive.
• When the displacement of the object is in perpendicular to the force, the work done by the force is considered to be zero.

(ii) Power

76. How is power interpreted?
(a) Work done in energy transfer
(b) Force charged to increase load
(c) Working rate or energy transfer rate
(d) Work done in a minute

RRB Group-D 19-09-2018(Shift-I)

Ans : (c) Power is defined as the rate of doing work or the rate of transfer of energy.

77. What is working rate or energy transfer rate ?
(a) Power (b) Work done
(c) Impulse (d) Force

RRB Group-D 15-10-2018(Shift-II)

Ans : (a) Power is defined as rate of doing work in other words the work done per second or energy transfer rate is called as power. It turns out that: Power = Force × Velocity.The SI unit of power is Joule per second or watt.

78. Rate of doing work is called?
(a) Energy (b) Velocity
(c) Power (d) Force

RRB Group-D 17-09-2018(Shift-III)

Ans : (c) See the explanation of above question.

79. Rate of doing work is called?
(a) Energy (b) Power
(c) Pressure (d) Force

RRB Group-D 05-10-2018 (Shift-I)
RRB Group-D 22-10-2018 (Shift-III)

Ans : (b) See the explanation of above question.

80. If a man do 'W' work in 't' time, then his power 'P' will be-
(a) t-W (b) t×W
(c) W/t (d) t/W

RRB Group-D 01-10-2018(Shift-II)

Ans : (c) The rate of doing work is called power.

$$\text{Power} = \frac{\text{work}}{\text{time}}$$

$$P = \frac{W}{t}$$

Work, power and energy all are scalar quantities.
SI unit of Power is Watt (W)

$$1 \text{ watt} = \frac{1 \text{ Joule}}{1 \text{ Second}}$$

81. What is the formula for power–
(a) Work/Time (b) Time/Area
(c) Work × Time (d) Time/Work

RPF SI 24.12.2018 (Shift - I)

Ans : (a) See the explanation of above question.

82. If an agent doing 'W' works in time 't', then his power will be –
(a) W×t (b) W+t
(c) t/W (d) W/t

RRB Group-D 24-09-2018(Shift-I)

Ans : (d) See the explanation of above question.

83. Formula of power is -
(a) Momentum/time (b) Work/time
(c) Speed/time (d) Displacement/time

RRB ALP & Tec(29-08-018, Shift-I)

Ans : (b) See the explanation of above question.

84. Which of the following physical quantity measures the rate of work done?
(a) Power (b) momentum
(c) Force (d) Energy

RRB ALP & Tec.(14-08-018, Shift-II)

Ans : (a) See the explanation of above question.

85. Power= W/T, what is the meaning of W ?
(a) Power (b) Weight
(c) Watt (d) Work done

RRB Group-D 12-10-2018 (Shift-I)

Ans : (d) Here W indicate work done.
Power is defined as rate of doing work (measured in watts (W)), in other words the work done per second.
i.e. P = W/T.

86. Which of the following physical quantity measure the rate of work ?
(a) Force (b) Velocity
(c) Energy (d) Power

RRB Group-D 01-10-2018(Shift-I)

Ans : (d) Power is defined as the rate of doing work or the rate of transfer of energy.
1 H.P. = 746 Watt.

87. Mohan having a mass of 40 kg. He climbs 50 steps of a staircase in 10s. If the height of each step is 15cm then what is his power? ($g = 10\ m/s^2$)
(a) 200W (b) 400W
(c) 300W (d) 100W

RRB ALP & Tec. (14-08-2018, Shift-III)

Ans : (c) m = mass of Mohan = 40 kg
n = number of steps = 50
h = height of each step = 15 cm = 0.15 m
H = Total height at which Mohan climbs
H = 50 x 0.15 = 7.5 m
We know that, potential energy gained is given as
PE = mgh
hence W = work done = PE = mgh
t = time taken to travel at that height = 10 sec
P = W/t
P = mgh/t

$\frac{40 \times 10 \times 15 \times 50}{10 \times 100}$ $[\because g = 10 m/s^2]$

= 300 watt $[15\text{cm} \ \frac{15}{100}\text{m}]$

88. If a boy covers a distance of 20 meters with 600 Newton force in 4 minutes, then the amount of power consumed by the boy is?
(a) 50watt (b) 100watt
(c) 80watt (d) 25watt

RRB ALP & Tec.(29-08-2018, Shift-III)

Ans : (a) Time taken by the boy = 4×60=240sec
Here, F=600N, and d=20m
Now, work done = 600×20=12000J
Total power consumed by the boy =12000/240=50 watt

89. A boy of 50 kg mass climbs 40 stairs in 9 seconds. If the height of each stair is 15cm, then find his power.($g= 10ms^{-2}$)
(a) 333.33W (b) 333.34J
(c) 333.34ms (d) 387.5W

RRB Group-D 23-10-2018(Shift-III)

Ans : (a) Height of 40 stairs = 40 x15=600cm=6m
m = 50 kg, h = 6 m, g = 10 m/s^2
Work done = mgh
= 50 × 10 × 6 = 3000J
Power = work done/time=3000/9=333.33Watt

90. Name the physical quantity that is equal to the product of force and velocity.
(a) Work (b) Energy
(c) Power (d) Acceleration

RRB Group-D 10-12-2018 (Shift-I)

Ans : (c) Power = work done/time
Work done = Force × displacement
Velocity = displacement/time
Power = Force × displacement/time
Power = Force × velocity
Power = F ×V

91. A 40 kg girl quickly climbs up the stairs to 5m height in 4 sec, what will be the power developed by her?
(a) 500W (b) 200W
(c) 2000W (d) 100W

RRB Group-D 18-09-2018(Shift-I)

Ans : (a) W = mgh
(here m= 40kg, g =10m/sec^2 and h=5m)
W = 40 × 10 × 5 = 400 × 5 = 2000
W = 2000 Joule
t = 4 s
$P = \frac{W}{t}$
Hence, $P = \frac{2000}{4} = 500$ watt

92. A boy of 50 kg mass climbs 45 stairs in 10 seconds. If the height of each stair is 16cm then find his power ?
(a) 337.5ms (b) 387.5W
(c) 360W (d) 360J

RRB Group-D 23-10-2018(Shift-II)

Ans : (c) Given, mass of boy, m = 50 kg
h = 45 x16 = 720 cm = 7.20 m
t = 10 s, g = 10 m/s^2
PE = mgh = 50 x 10 x 7.20 = 3600 J
Power = PE / time = 3600 / 10
= 360 J/s = 360W

93. The average power is equal to which of the following?
(a) Total time taken/ total used energy
(b) Total free energy/total used energy
(c) Total time taken/distance travelled
(d) Total used energy/total time

RRB Group-D 25-10-2018(Shift-II)

Ans : (d) Average Power (P_{avg}) = Total used energy/ total time
$\boxed{P = E/t}$

94. A boy of 50 kg mass climbs 40 stairs in 10 seconds. If the height of each stair is 15cm, then calculate his power.(g= 10ms^{-2})
(a) 337.5W (b) 300J
(c) 300W (d) 300ms

RRB Group-D 23-10-2018(Shift-I)

Ans : (c) Given, mass of boy, m = 50 kg
h = 40 x15 = 600 cm = 6.0 m
t = 10 s, g = 10 m/s^2
PE = mgh = 50 x 10 x 6 = 3000 J
Power = PE / time
= 3000/ 10 = 300 W

95. A boy of 50 kg mass climbs 45 stairs in 9 seconds. If the height of each stair is 15cm, then calculate his power.(g= 10ms^{-2})
(a) 325W (b) 275W
(c) 475W (d) 375W

RRB Group-D 22-09-2018(Shift-I)

Ans : (d) Given,
mass of boy = 50 kg
h = 45 x15 = 675 cm = 6.75 m
t = 9 s, g = 10 m/s^2
PE = mgh = 50 x 10 x 6.75 = 3375 J
Power = PE / time = Energy / time
$= \frac{3375}{9} = 375$ J/s=375 W

96. If a girl with a weight of 40 N, climbs on the rope for 20 seconds with the power of 160 watts, then at which height will she reach?
(a) 80 meter (b) 4 meter
(c) 8 meter (d) 0.8 meter

RRB Group-D 18-09-2018(Shift-III)

Ans : (a) Let assume that girl climbs to the h meter.
Then, power = potential energy (work)/time
P = (mgh)/t
Here,
weight (mg) = 40N,t = 20 sec., Power (P) = 160W
160 = (40×h)/20
h = 80 meter

97. A boy of 50 kg mass climbs 44 stairs in 10 seconds. If the height of each stair is 15cm then find his power?
(a) 337.5ms (b) 387.5W
(c) 330J (d) 330W

RRB Group-D 24-09-2018(Shift-I)

Ans : (d) Given, mass of body, m = 50 kg
h = 44 x15 = 660 cm = 6.60 m
t = 10 s, g = 10 m/s^2
PE = mgh = 50 x 10 x 6.60 = 3300 J
Power consumed by the boy = PE/time = 3300/10 = 330 W

98. A boy of 50 kg mass climbs 43 stairs in 10 seconds. If the height of each stair is 15cm then find its power ?
(a) 337.5W (b) 325.5J
(c) 322.5W (d) 322.5ms

RRB Group-D 24-10-2018(Shift-III)

Ans : (c) Given, mass of boy, m = 50 kg
h = 43 x15 = 645 cm = 6.45 m
t = 10 s, g = 10 m/s^2
PE = mgh = 50 x 10 x 6.45 = 3225 J
Power of the boy = PE / time = 3225 / 10 = 322.5 W

99. A more powerful engine can do more work in less time like an aeroplane travel more distance as compare to a car in less time. So aeroplane is more powerful than a car. It is an example of which of the following ?
(a) Work performed (b) Power
(c) Energy (d) The wave

RRB Group-D 29-10-2018(Shift-III)

Ans : (b) A more powerful engine can do more work in less time like an aeroplane travel more distance as compare to a car in less time. So aeroplane is more powerful than a car. It is the basic example of explaining power.

100. What will be the average power required to lift an object of 80 kg to a height of 40 m in 50s ? ($g=10m/s^2$)

(a) 3200J/s (b) 640J/s
(c) 800J/s (d) 600 J/s

RRB Group-D 18-09-2018(Shift-III)

Ans : (b) Power required to lift this weight = mgh/t
p = (80 x 10 x 40) / 50
p = 640 J/s

101. A person does 1000J of work in 2s. What was the energy he spent ?

(a) 50W (b) 1000W
(c) 500W (d) 25W

RRB Group-D 17-09-2018(Shift-II)

Ans : (c) The working rate is called power. The unit of power is watt (W).

Power (P) =Work/time $= \frac{1,000}{2} = 500W$

102. Which of the following is the electric power's formula?

(a) $P=V^2/R$ (b) $P=V\times I$
(c) $P=I^2\times R$ (d) All of these

RRB J.E. 27.06.2019(Shift-I)

Ans : (d) All are the formula for the electric power.
Power = $V^2/R = V \times I = I^2 \times R$

(iii) Energy

103. Which energy of the wind does a windmill use?

(a) Thermal energy (b) Kinetic energy
(c) Heat energy (d) Hydro energy

RRB NTPC 09.02.2021 (Shift-II) Stage Ist

Ans : (b) Wind turbines convert the kinetic energy in the wind into mechanical power. Wind energy describes the process by which wind is used to generate electricity. In India 40,034 MW (10.2%) energy produced by wind turbines.

104. If the air resistance is negligible, then what will be sum of the potential energy and kinetic energy of the freely falling object.

(a) Endless
(b) Double the sum of the potential energy
(c) Zero
(d) Constant

RRB Group-D 28-11-2018(Shift-I)

Ans : (d) An object can have both kinetic and potential energy at the same time. For example, an object which is falling freely, but it not yet reached the ground has kinetic energy because it is moving downwards, and potential energy because it is able to move downwards even further than it already has. The sum of an object's potential and kinetic energy is called the object's mechanical energy.
As an object falls its potential energy decreases, while its kinetic energy increases. The decrease in potential energy is exactly equal to the increase in kinetic energy. So if the air resistance is negligible then the sum of the potential energy and kinetic energy of an object will remain constant.

105. A uniform chain of length 2m is kept on a table such that a length of 60cm hangs freely from the edge of the table. The total mass of the chain is 4kg .What is the work done in pulling the entire chain on the table ?

(a) 12J (b) 7.2J
(c) 3.6J (d) 1.2J

RRB Group-D 07-12-2018(Shift-I)

Ans : (c) Definition of work done by variable force -

$W = \int \vec{F}.\vec{ds}$

$\vec{F}$ is variable force and $\vec{ds}$ is small displacement
Consider a small part dx at a depth x from table.
Work done in lifting this small portion is

$dw = dm\, gx$

Total work done $= \int dw = \int_0^h \left(\frac{m}{\ell}dx\right)gx$

$= \frac{mg}{\ell}\int_0^h xdx = \frac{4\times10}{2}\times\frac{(0.6)^2}{2} = 3.6J$

106. …….. particles have a greater kinetic energy-

(a) Liquid (b) Plasma
(c) Solid (d) Gas

RRB Group-D 26-10-2018(Shift-III)

Ans : (d) Molecules in the solid phase have the least amount of kinetic energy, while in the gaseous phase particles or molecules have the greatest amount of kinetic energy.

107. The kinetic energy of which particle is maximum –

(a) Liquid and Solid (b) Solid
(c) Liquid (d) Gases

RRB Group-D 12-11-2018(Shift-III)

Ans : (d) Gas particles have the greatest or maximum amount of energy.

108. 900×10^6 J of energy is consumed in a month in a house. How much this energy is in the unit?

(a) 25 (b) 2.5
(c) 2500 (d) 250

RRB Group-D 26-11-2018(Shift-III)

Ans : (d) 1 unit of energy is equal to 1 kilowatt hour (kWh).
1 unit = 1 kWh
1 kWh = 3.6×10^6 J
Then, 900×10^6 J energy in unit will be-
900×10^6 J/3.6×10^6 J = 250 unit

109. When a compressed spring is released, it converts its potential energy into-

(a) Mechanical energy
(b) Wind power
(c) Elastic potential energy
(d) Kinetic energy

RRB Group-D 31-10-2018(Shift-III)

Ans : (d) When the compressed spring is released the stored potential energy is converted kinetic energy and a transfer of momentum takes place between the spring and the object.

110. The potential energy of an object increases with its-

(a) Velocity (b) Height
(c) Displacement (d) Distance

RRB Group-D 10-10-2018(Shift-I)

Ans : (b) Potential energy of an object increases when it raised through a height. This is because work is done on it against gravity while it is being raised. The energy present in such an object is the gravitational-potential energy. This gravitational-potential energy of an object at a point above the ground is defined as the work done in raising it from the ground to that point against gravity. An object of mass 'm', when raised through a height 'h' from the ground, then work done on the object will be W = force x displacement = mg x h = mgh

111. Which of the following energy varies with the height of an object ?

(a) Kinetic energy
(b) Nuclear Energy
(c) Chemical energy
(d) Potential energy

RRB Group-D 11-10-2018(Shift-I)

Ans : (d) Potential energy varies with the height of an object.

112. What is the energy exerted due to the position and shape taken by an object ?

(a) latent energy
(b) Potential energy
(c) Kinetic energy
(d) Electrical energy

RRB Group-D 23-10-2018(Shift-I)

Ans : (b) Potential energy is the energy which is stored in an object due to its position or shape position. An object possesses gravitational potential energy if it is positioned at a height above (or below) to the ground.

113. Which energy is in the water stored in the dam ?

(a) Potential energy
(b) Electric energy
(c) Kinetic energy
(d) Gravitational energy

RRB Group-D 26-09-2018(Shift-I)

Ans : (a) Water stored in a dam possesses potential energy and when the water is flowing or falling on turbine blade from the dam that energy is known as kinetic energy.

114. A moving object essentially receives -

(a) Kinetic energy
(b) Potential energy
(c) Mechanical energy
(d) Thermal energy

RRB NTPC 29.03-2016(Shift-III) Stage- Ist

Ans : (a) Kinetic energy is the energy of an object in motion. If an object is moving faster then it has more kinetic energy. Any object (car) that is moving or running it has kinetic energy – the moving object has kinetic energy because of its motion.

115. A car running at high speed, which energy does it contains ?

(a) Gravitational force (b) Friction force
(c) Potential energy (d) Kinetic energy

RRB Group-D 19-09-2018(Shift-II)

Ans : (d) See the explanation of above question.

116. Which of the following energy is always positive ?

(a) Static energy
(b) Kinetic energy
(c) Potential energy
(d) Gravitational energy

RRB Group-D 26-10-2018(Shift-III)

Ans : (b) Kinetic energy is always positive.

117. The commercial unit of energy is ?

(a) Kilowatt –hour (b) Kilowatt
(c) Joule (d) Watt –hour

RRB Group-D 18-09-2018(Shift-II)

Ans : (a) The commercial unit of energy is kWh (Kilowatt hour). One kilowatt hour is equal to 3.6×10^6J.

118. An 8 kg iron ball and an 3 kg aluminium ball are dropped from a height of 20 meters. Which of the following quantity amount will be same in them above 10 m height from the ground?

(a) Kinetic energy (b) Acceleration
(c) Potential energy (d) Momentum

RRB Group-D 31-10-2018(Shift-I)

Ans : (b) According to question,
$\because m_1 = 8\text{ kg} > m_2 = 3\text{ kg}$
So, $\rightarrow m_1gh > m_2gh$
$800\text{ J} > 300\text{ J}$
Velocity at 10m height,
$v^2 = u^2 + 2gh$
$= 0 + 2 \times 10 \times 10$
$v^2 = 200 \Rightarrow v = 10\sqrt{2}$
Kinetic Energy-$\rightarrow$
$\frac{1}{2}m_1v^2 > \frac{1}{2}m_2v^2$ ($\because$ here, $v_1=v_2$)
So, momentum, $\rightarrow m_1v > m_2v$
So at the 10 m height the acceleration of both balls will be same.

119. When a compressed slinky (spring) is released, it changes the potential energy into?

(a) Mechanical energy (b) Kinetic energy
(c) Heat energy (d) Chemical energy

RRB ALP. & Tec. 10-08-2018(Shift-I)

Ans : (b) A compressed slinky (spring) contains potential energy.
When it is released it expands.
As it expands it moves.
When the spring is in motion, there is a type of energy is related to it.
This energy is known as kinetic energy.
Therefore:
Potential energy is converted in to Kinetic energy.

120. What is the energy in a compressed spring?

(a) Potential (b) Chemical
(c) Kinetic (d) Electric

RRB Group-D 22-09-2018(Shift-II)

Ans : (a) The energy stored in a compressed spring is elastic potential energy.

121. By which the kinetic energy of an object increases –

(a) Friction (b) Time
(c) Mass (d) Speed

RRB Group-D 13-08-2018(Shift-I)

Ans : (d) It turns out that an object's kinetic energy increases as the square of its speed. When something is in motion, then a type of energy stored in it. This energy is known as kinetic energy.

122. The kinetic energy of a moving object depends on-

(a) Weight and its location
(b) Mass and its location
(c) Mass and momentum
(d) Mass and velocity

RRB ALP. & Tec. 14-08-2018(Shift-III)

Ans : (d) Kinetic energy depends on the velocity of the object. This means that when the velocity of an object doubles, its kinetic energy becomes four times. The kinetic energy of the object also depends upon its mass.

$$K = \frac{1}{2}mv^2$$

123. In a hydro power, what is the energy that is converted into electrical energy ?

(a) Mechanical energy (b) Potential energy
(c) Heat energy (d) Kinetic energy

RRB ALP. & Tec. 29-08-2018(Shift-I)

Ans : (d) When the water flows down through the dam its kinetic energy is used to turn a turbine. The generator converts the turbine's mechanical energy into electricity.

124. Which of the following notable activities, potential energy has been converted into kinetic energy.

(a) A firecracker explosion
(b) Switch on a torch
(c) Switch of a torch
(d) Swinging of a pendulum

RRB ALP. & Tec. 31-08-2018(Shift-III)

Ans : (d) In swinging of a pendulum, potential energy has been converted into kinetic energy.

125. If the momentum of an object is tripled, its kinetic energy-

(a) Will be become tripled of original value
(b) Will remain unchanged
(c) Will be nine times the original value
(d) Will be six times the original value

RRB ALP. & Tec. 31-08-2018(Shift-II)

Ans : (c) $KE = \frac{1}{2}mv^2 = \frac{1}{2}\frac{(mv)^2}{m}$

$$KE = \frac{1}{2}\left(\frac{p^2}{m}\right)$$

$(KE)_1 \propto p^2$

Given

$$\frac{(KE)_2}{(KE)_1} = \left(\frac{p_2}{p_1}\right)^2 = \left(\frac{3p}{p}\right)^2$$

$KE_2 = 9\ KE_1$

126. What does the raised hammer have?

(a) Kinetic energy
(b) Mechanical energy
(c) Muscular energy
(d) Potential energy

RRB ALP. & Tec. 09-08-2018(Shift-III)

Ans : (d) A raised hammer have potential energy. A raised hammer possesses gravitational potential energy by virtue of its height above ground level.

127. If the velocity of an object becomes twice that of its initial velocity, then its kinetic energy become n times of its initial kinetic energy. Then what would be the value of n?

(a) 3 (b) 4
(c) 1/2 (d) 6

RRB ALP. & Tec. 13-08-2018(Shift-II)

Ans : (b) When velocity of an object becomes twice that of its initial velocity.

$$n.(K.E) = \frac{1}{2}m.(2v)^2$$

$$n.(K.E) = 4 \times \frac{1}{2}mv^2$$

$$n.(K.E) = 4 \times K.E.$$

$n = 4$

128. Which type of energy is there in a stretched rubber band?

(a) Chemical energy (b) Potential energy
(c) Kinetic energy (d) Heat energy

RRB ALP. & Tec. 14-08-2018(Shift-III)

Ans : (b) A stretched rubber band has potential energy stored in it, when it is releases the potential energy gets converted into kinetic energy. Because it is an elastic material, the kind of its potential energy is called as elastic potential energy.

129. What type of energy does a stretched rubber band have?

(a) Potential energy (b) Heat energy
(c) Kinetic energy (d) Chemical energy

RRB Group-D 12-11-2018(Shift-III)

Ans : (a) See the explanation of above question.

130. When you stretched a rubber band, the energy stored in it?

(a) Potential energy
(b) Muscular energy
(c) Mechanical energy
(d) Kinetic energy

RRB Group-D 10-10-2018(Shift-I)

Ans : (a) See the explanation of above question.

131. Which of these can neither be created nor destroyed?

(a) Energy (b) Power
(c) Velocity (d) Speed

RRB ALP. & Tec. 14-08-2018(Shift-III)

Ans : (a) The first law of thermodynamics, also known as Law of Conservation of Energy states that energy can neither be created nor destroyed, it can only be transferred or changed from one form to another. For example, conversion of electrical energy into heat energy and light energy.

132. Which of the following can not be created nor be destroyed ?

(a) Power (b) Velocity
(c) Energy (d) Force

RRB Group-D 16-10-2018(Shift-III)

Ans : (c) See the explanation of above question.

133. If the kinetic energy of an object becomes 256 times that of its initial value, then the new linear momentum will be ?

(a) 8 times its initial value
(b) 16 times its initial value
(c) Same as its initial value
(d) 32 times its initial value

RRB ALP. & Tec. 14-08-2018(Shift-I)

Ans : (b) Relation between kinetic energy and linear momentum is given by ,

$K.E = \frac{P^2}{2m}$

where K.E is kinetic energy , m is mass of body and P is linear momentum.

if m remains constant.

then,

$K.E \propto P^2$

$\frac{K.E_1}{K.E_2} = \frac{P_1^2}{P_2^2}$

According to question,

Kinetic energy of body becomes 256 times of its initial value.

Let initial kinetic energy is K

then, final kinetic energy is 256K.

now,

$\frac{1}{256} = \frac{P_1^2}{P_2^2}$

$\frac{P_1}{P_2} = \sqrt{\frac{1}{16^2}} = \frac{1}{16}$

$P_2 = 16\ P_1$

Hence, final linear momentum will be 16 times of its initial value

134. The energy received by an object by its position and configuration is called ?

(a) Kinetic energy (b) Nuclear energy
(c) Potential energy (d) Electric energy

RRB ALP. & Tec. 1-08-2018(Shift-I)

Ans : (c) The potential energy possessed by the object is the energy present in it by virtue of its position or configuration that means potential energy is a stored energy in the object when work is done on the object but there is no change in the velocity or speed of the object.

135. An object with mass 'M' moves with speed 'V' and has kinetic energy 'A'. If its velocity is doubled, So what will be its kinetic energy –

(a) K/2 (b) 2K
(c) 4K (d) K/4

RRB ALP. & Tec. 20-08-2018(Shift-I)

Ans : (c) If velocity is doubled, kinetic energy increases by 4 times. Kinetic energy of a body is the energy possessed by virtue of its motion if the body is moving with any velocity it will always have kinetic energy i.e. become 4K.

136. A compressed spring possesses more energy than a spring of normal length because the compressed spring has–

(a) Chemical energy (b) Potential energy
(c) Kinetic energy (d) Heat energy

RRB ALP. & Tec. 20-08-2018(Shift-I)

Ans : (b) A compressed spring possesses more energy than a spring of normal length because the compressed spring has potential energy.

137. When a bullet is fired from a gun, its potential energy is converted into?

(a) Kinetic energy
(b) Mechanical energy
(c) Heat energy
(d) Chemical energy

RRB ALP. & Tec. 29-08-2018(Shift-III)

Ans : (a) A bullet stores chemical potential energy in its gunpowder. When the bullet is fired, this chemical potential energy is converted into kinetic energy and heat.

138. Two steel balls of mass 5 kg and 10 kg have same kinetic energy, which ball is moving fast.

(a) Kinetic energy does not depend on the speed of the system.
(b) 5 kg ball is moving fast
(c) Both balls are moving at the same speed
(d) 10kg ball is moving fast

RRB ALP. & Tec. 30-08-2018(Shift-I)

Ans : (b) Let, velocity of 5kg ball $=v_1$

And, velocity of 10 kg ball $=v_2$, $\left[\because K.E = \frac{1}{2}mv^2\right]$

$\frac{1}{2}m_1v_1^2 = \frac{1}{2}m_2v_2^2$

$\frac{1}{2}\times 5v_1^2 = \frac{1}{2}\times 10v_2^2$

$v_1^2 = 2v_2^2$

$\Rightarrow v_1 > v_2$

$\therefore$ 5 kg ball is moving fast.

139. The energy contained in an object due to the change in position and shape is called.

(a) Kinetic energy (b) Chemical energy
(c) Nuclear energy (d) Potential energy

RRB ALP. & Tec. 29-08-2018(Shift-I)

Ans : (d) Potential energy is the energy in a body due to change in its position and shape.

The formula for potential energy depends on the force acting on that objects. For the gravitational force the formula is P.E. = mgh, where m is the mass in kilograms, g is the acceleration due to gravity (9.8 m / s^2 at the surface of the earth) and h is the height in meters.

140. The energy possessed by a body due to its change in position or shape is called -

(a) Nuclear energy (b) Potential energy
(c) Kinetic energy (d) Chemical energy

RRB Group-D 30-10-2018 (Shift-I)

Ans : (b) See the explanation of above question.

141. At the time of releasing an arrow in a drawn bow, the potential energy of the bow change
(a) Chemical energy (b) Kinetic energy
(c) Sound energy (d) Thermal energy

RRB ALP. & Tec. 30-08-2018(Shift-I)

Ans : (b) At the time of releasing an arrow from a drawn bow, the potential energy of the bow change in to the kinetic energy.

142. Which of the following is not an example of potential energy?
(a) A compressed spring
(b) Flowing water
(c) A raised hammer
(d) Water stored in a dam

RRB ALP. & Tec. 30-08-2018(Shift-II)

Ans : (b) The energy stored in a compressed spring is elastic potential energy. The flowing water is not an example of potential energy because the flowing water has kinetic energy.

143. There is a body falling from a mountain has?
(a) Both Kinetic energy and Potential energy
(b) Only Kinetic energy
(c) Only Friction energy
(d) Only Potential energy

RRB Group-D 17-09-2018(Shift-III)

Ans : (a) Body falling from a mountain has both kinetic energy and potential energy.

144. What will be the value of the kinetic energy of an object moving along the mass of 'm' if its speed is changed from 'v' to 2v '?
(a) $E_k/2$
(b) $4E_k$
(c) there will be no change in E_k
(d) $2E_k$

RRB ALP. & Tec. 09-08-2018(Shift-III)

Ans : (b) If, $E_k = \frac{1}{2}\ mv^2$

and $KE = \frac{1}{2} m\ (2v)^2$, $KE = \frac{1}{2} m\ 4v^2$

$KE = 4 \times \frac{1}{2} m\, v^2$, Or $KE = 4E_k$

So kinetic energy become 4 times.

145. An object with the mass of 2 kg is thrown upward with the initial velocity 20 m/s after 2 seconds its kinetic energy will be -
(a) 100J (b) 0J
(c) 400J (d) 200J

RRB ALP. & Tec. 09-08-2018(Shift-II)

Ans : (b) According to Newton's first law
$v = u - gt$
Given,
$u = 20$ m/s , $t = 2$ sec $g = 10$ m/s^2
$v = 20 - 10 \times 2$, $v = 0$
So, after 2 second kinetic energy also be zero.

146. What will be the kinetic energy of an object weighing 22 kg moving at a speed of 5 m / s?
(a) 275J (b) 110J
(c) 1100J (d) 2750J

RRB ALP. & Tec. 09-08-2018 (Shift-II)

Ans : (a)
$K.E. = \frac{1}{2} mv^2$, $m = 22$ Kg, $v = 5$ m/s
$E_k = \frac{1}{2} \times 22 \times 5 \times 5 = \frac{1}{2} \times 550 = \boxed{275J}$

147. Falling coconut has –
(a) Nuclear energy (b) Sound energy
(c) Kinetic energy (d) Chemical energy

RRB Group-D 24-09-2018(Shift-II)

Ans : (c) Falling coconut has kinetic energy.

148. When an object of 11 kg is at a height of 5 m from the ground, then find the energy contained in it ?($g=9.8ms^{-2}$)
(a) 539J (b) 528J
(c) 588J (d) 520J

RRB Group-D 11-10-2018(Shift-III)

Ans : (a) Given,
$m = 11$ kg, $h = 5$ m, $g = 9.8$ m/s^2
P.E. = mgh = $11 \times 9.8 \times 5 = 55 \times 9.8 = 539$J

149. When an object of 14 kg is at a height of 5 m from the ground, then find the energy contained in it ? ($g=9.8ms^{-2}$)
(a) 528J (b) 686m
(c) 686J (d) 668J

RRB Group-D 15-10-2018(Shift-II)

Ans : (c) Given,
$m = 14$ kg, $h = 5$ m, $g = 9.8$ m/s^2
P.E= mgh= $14 \times 9.8 \times 5 = 686$ J

150. When an object of 15 kg is at a height of 10 m from the ground, then find the energy contained in it ? ($g=10ms^{-2}$)
(a) 1500Pa (b) 1500N
(c) 1500ms^{-2} (d) 1500J

RRB Group-D 31-10-2018(Shift-III)

Ans : (d) Given,
$m = 15$ kg, $h = 10$ m, $g = 10$ m/s^2
$P = mgh = 15 \times 10 \times 10 = 1500$ J

151. The kinetic energy of an object is 120J and its mass is 15 kg Find the velocity of the object-
(a) 4 ms (b) 4 ms^{-1}
(c) 4 ms^{-2} (d) 4 ms^2

RRB Group-D 09-10-2018(Shift-II)

Ans : (b)
$K.E. = \frac{1}{2} mv^2$
$120 = \frac{1}{2} \times 15 \times v^2 \Rightarrow v^2 = \frac{120 \times 2}{15}$
$\Rightarrow v^2 = 16 \Rightarrow v = 4\,ms^{-1}$

152. What is the kinetic energy of an object of mass 15 kg moving at the velocity of 8ms^{-1}?
(a) 480J (b) 180.5J
(c) 480ms (d) 187.5J

RRB Group-D 09-10-2018(Shift-II)

Ans : (a)
$(K.E) = \frac{1}{2} m.v^2$
$m = 15$ kg, $V = 8$ m/s
$\therefore$ K.E. $= \frac{1}{2} \times 15 \times 8 \times 8 = 480$ J

153. When an object of 11 kg is at a height of 6 m from the ground, then find the energy contained in it? ($g=9.8ms^{-2}$)

(a) 539J (b) 646.8J
(c) 528J (d) 520J

RRB Group-D 15-10-2018(Shift-III)

Ans : (b) Given,

$m = 11$ kg, $h = 6$ m, $g = 9.8$ m/s^2

P.E. = mgh

$= 11 \times 9.8 \times 6 = 646.8$ J

154. The bullet fired from the gun goes deep inside the target because it has –

(a) Heat energy (b) Potential energy
(c) Chemical energy (d) Kinetic energy

RRB Group-D 10-10-2018(Shift-III)

Ans : (d) The bullet fired from the gun goes deep inside the target because it contains kinetic energy. The velocity of the bullet fired from the gun is very high and when it hits the target its velocity becomes zero in a very short time. Therefore, the rate of change in momentum of the bullet is very high, so the bullet moves deep within the target.

155. By the turbines flowing water and air are used for change in.....?

(a) Potential energy into electric energy
(b) Nuclear energy into electric energy
(c) Kinetic energy into electric energy
(d) Chemical energy into electric energy

RRB Group-D 16-11-2018(Shift-III)

Ans : (c) The water flowing through the turbine are used to convert kinetic energy into electrical energy. The turbine operates on the basis of Newton's third law (the law of action-reaction).

156. What is the kinetic energy of a bullet when a bullet is fired from a gun?

(a) Less than gun (b) Infinite
(c) More than gun (d) equivalent to gun

RRB Group-D 22-09-2018(Shift-I)

Ans : (c) Gun mass = m_1, velocity = v_1

Bullet mass = m_2, velocity = v_2

$\because m_1 > m_2$ .....(i)

By the rule of principle of conservation of momentum-

$m_1 v_1 = m_2 v_2$

Multiplying by 1/2 and squaring on both sides -

$$\Rightarrow \frac{1}{2}(m_1 v_1)^2 = \frac{1}{2}(m_2 v_2)^2$$

$$\Rightarrow E_1 . m_1 = E_2 m_2$$

$$\Rightarrow \frac{E_2}{E_1} = \frac{m_1}{m_2}$$

$$\Rightarrow \frac{E_2}{E_1} > 1 \quad \text{from (i) equation}$$

$$\Rightarrow E_2 > E_1$$

When a bullet is fired from a gun, the kinetic energy of the bullet is higher than that of the gun.

157. Mechanical energy – kinetic energy = ?

(a) Chemical energy (b) Potential energy
(c) Electric energy (d) Nuclear energy

RRB Group-D 19-09-2018(Shift-III)
RRB Group-D 12-10-2018(Shift-II)
RRB Group-D 16-11-2018(Shift-III)

Ans : (b) Mechanical energy is due to the position or movement of an object. The formula for mechanical energy is,

Mechanical energy = kinetic energy + potential energy

Mechanical energy - kinetic energy = potential energy

158. What does mechanical energy equal ?

(a) Kinetic energy+ chemical energy
(b) Kinetic energy+ potential energy
(c) Kinetic energy+ heat energy
(d) Kinetic energy + electric energy

RRB ALP. & Tec. 30-08-2018(Shift-I)

Ans : (b) See the explanation of the above question.

159. Mechanical energy is a combination of kinetic energy and –

(a) Heat energy (b) Chemical energy
(c) Potential energy (d) Nuclear energy

RRB ALP. & Tec. 10-08-2018(Shift-II)
RRB ALP. & Tec. 13-08-2018(Shift-III)

Ans : (c) See the explanation of the above question.

160. What is the sum of the kinetic energy and potential energy of an object is called ?

(a) Gravitational energy
(b) Mechanical energy
(c) Electric energy
(d) Kinetic energy

RRB Group-D 16-11-2018(Shift-I)

Ans : (b) See the explanation of the above question.

161. What is the sum of the kinetic energy and potential energy of an object is called ?

(a) Mechanical energy
(b) Latent energy
(c) Chemical energy
(d) Muscular energy

RRB Group-D 15-10-2018(Shift-I)

Ans : (a) See the explanation of the above question.

162. Mechanical energy is ?

(a) Energy released by a moving object
(b) Energy emitted during mechanical work
(c) The sum of the kinetic energy and potential energy of an object
(d) Equal to the rate of work done.

RRB Group-D 19-09-2018(Shift-I)

Ans : (c) See the explanation of the above question.

163. . . . . has two types of energy ?

(a) Mechanical (b) Electric
(c) Chemical (d) Sound

RRB Group-D 01-10-2018(Shift-I)

Ans : (a) See the explanation of the above question.

164. Potential energy and kinetic energy are the type of... ?

(a) Mechanical energy (b) Nuclear energy
(c) Electric energy (d) Chemical energy

RRB Group-D 12-11-2018(Shift-II)

Ans : (a) See the explanation of the above question.

165. An object of mass 15 kg is moving with uniform velocity that of 7 ms^{-1}. What is the kinetic energy of that object ?

(a) 367.5ms (b) 17.5J
(c) 367.5J (d) 180.5J

RRB Group-D 08-10-2018(Shift-III)

Ans : (c) According to question,
Mass (m) = 15 kg
Velocity (v) = 7 ms^{-1}
Thus, the kinetic energy of the object

$$\text{K. E.} = \frac{1}{2}mv^2$$

$$= \frac{1}{2} \times 15 \times 7 \times 7$$

$$= \frac{1}{2} \times 735 = 367.5 \text{ J}$$

166. An object of 12 kg is placed at a certain height from the ground. If the potential energy of the object is 600 J, find the height of the object with respect to ground. (g = 10 ms^{-2})

(a) 5 ms^2 (b) -5 m
(c) 5 ms^{-2} (d) 5 m

RRB Group-D 04-10-2018(Shift-I)

Ans : (d) Given,
Mass (m) = 12 kg
Potential Energy (P.E.) = 600 J
Acceleration due to gravity (g) = 10 m/s^2
Potential energy (P.E) = mgh
$600 = 12 \times 10 \times h$

$$\therefore h = \frac{600}{120} = 5 \text{ m}$$

167. In which of the following energy is kinetic energy ?

(A) A bullet fired by a gun
(B) A fast moving railway engine
(C) Speed of a simple pendulum

(a) A and C (b) B and C
(c) A and B (d) A , B and C

RRB Group-D 25-10-2018(Shift-II)

Ans : (d) Examples of kinetic energy–
- A bullet fired by a gun
- A fast moving railway engine
- Speed of a simple pendulum

168. The kinetic energy of an object of mass 10kg moving at a speed of 6ms^{-1} is –

(a) 18J (b) 180J
(c) 1.80J (d) 360J

RRB Group-D 28-09-2018(Shift-III)

Ans : (b) Kinetic energy is directly proportional to the mass of the object and to the square of its velocity.

$$\text{K.E.} = \frac{1}{2}mv^2$$

Here, m = 10 kg and v = 6ms^{-1}
Then, K.E. = 10×6×6/2 = 180 J

169. Which of the following statement regarding energy is not true ?

(a) Energy is not a physical substance
(b) Energy is the measure of the ability to perform a task
(c) Energy can be stored and measured in many ways
(d) The energy released during conversion goes into vacuum

RRB Group-D 23-10-2018(Shift-II)

Ans : (d) The energy released during conversion goes into vacuum. It is not true about energy.

170. An object of 20kg mass is moving at speed of 10m/s. What is the kinetic energy obtained by the object?

(a) 1000Pa (b) 1000J
(c) 1000Nm^{-2} (d) 1000N

RRB Group-D 05-10-2018(Shift-III)

Ans : (b) Kinetic energy is directly proportional to the mass of the object and to the square of its velocity.

$$\text{K.E.} = \frac{1}{2}mv^2$$

Here, m = 20 kg and v = 10ms^{-1}
K.E. = 20×10×10/2 = 1000J

171. Calculate the potential energy obtained by a 20kg hammer, when it is raised to a height of 10m?

(a) 3000Pa (b) 2000J
(c) 3000W (d) 3000N

RRB Group-D 05-10-2018(Shift-III)

Ans : (b) Potential energy = m×g×h
Here, P.E. =?, m =20 kg, h = 10 m and g = 10 m/s^2
P.E. = 20 ×10 × 10
= 2000J

172. An object of 13kg mass is moving with constant speed of 5m/s ,what will be kinetic energy contained in the object ?

(a) 187.5J (b) 17.5J
(c) 162.5J (d) 162.5ms

RRB Group-D 11-10-2018(Shift-I)

Ans : (c) Kinetic energy is directly proportional to the mass of the object and to the square of its velocity:

$$\text{K.E.} = \frac{1}{2}mv^2$$

Here, m = 13 kg and v = 5ms^{-1}
Then, K.E. = 13×5×5/2 = 162.5 J

173. What will be the kinetic energy of an object of mass 20kg moving at a speed of 5ms^{-1}?

(a) 250kg (b) 250J
(c) 250N (d) 250Pa

RRB Group-D 11-12-2018(Shift-II)

Ans : (b) Kinetic energy is directly proportional to the mass of the object and to the square of its velocity:

$$\text{KE} = \frac{1}{2}mv^2$$

Here, m = 20 kg and v = 5ms^{-1}
Then, K.E. = 20×5×5/2 = 250 J

174. Formula for gravitational potential energy is -
(a) $U=mgh_1h_2$ (b) $U=mgh$
(c) $U=mhG$ (d) $U=1/2\ mv^2$

RRB Group-D 23-10-2018(Shift-III)

Ans : (b) The equation for gravitational potential energy is U = mgh, where m is the mass in kilograms, g is the acceleration due to gravity (9.8 m/s^2 on Earth), and h is the height above the ground in meters

175. What is wrong statement about kinetic energy?
(a) During static state the energy contained in the object is called kinetic energy
(b) The energy received by an object based on its speed is known as kinetic energy
(c) K.E.=1/2(mv^2)
(d) Moving objects have kinetic energy

RRB Group-D 12-11-2018(Shift-II)

Ans : (a) The energy contained in the static state is called potential energy. So, option (a) is incorrect. The kinetic energy is the additional energy of a body due to its linear velocity or angular velocity, or both. The kinetic energy is a scalar quantity, it has no direction. The kinetic energy of the body is expressed by K.E.

$$KE = \frac{1}{2}mv^2$$

176. An object moving with the uniform velocity of 4m/s has a kinetic energy of 120J. Find the mass of the object?
(a) 15N (b) 15kg
(c) 19Pa (d) 15W

RRB Group-D 01-10-2018(Shift-I)
RRB Group-D 01-10-2018(Shift-III)

Ans : (b) Kinetic energy is directly proportional to the mass of the object and to the square of its velocity:

$$K.E. = 1/2\ m\ v^2$$

Here, m = ? and v = 4 ms^{-1} and K.E. = 120J
Then, $120 = m\times4\times4/2$
$m = 15$ kg

177. The kinetic energy of an object of mass m moving at a speed of 5 ms^{-1} is 25J. What will be its kinetic energy when its speed will be double?
(a) 100J (b) 50J
(c) 100N (d) 50N

RRB Group-D 01-10-2018(Shift-II)

Ans : (a) Mass of object = m kg
Velocity of object = 5 m/s
Kinetic energy = 25 J

$$\therefore \quad \text{Kinetic energy} = \frac{1}{2}\times m.v^2$$

$$25 = \frac{1}{2}\times m\times 5^2$$

$\therefore$ m = 2 kg
New velocity = 2 × Initial velocity =2 × 5 = 10 m/s

$$\therefore \text{ New kinetic energy} = \frac{1}{2}\times2\times10\times10 = 100\ J$$

178. When an object of 12kg is at a height of 5m from the ground, then the energy contained in it will be ? ($g=9.8ms^{-2}$)
(a) 539J (b) 520J
(c) 528J (d) 588J

RRB Group-D 12-10-2018(Shift-I)

Ans : (d) According to question,
mass (m) = 12 kg
height (h) = 5 m
acceleration due to gravity (g) = 9.8 m/s^2
Energy stored in the object is potential energy = mgh
$= 12\times5\times9.8 = 588$ J

179. What is the change in the total energy of a body falling freely towards the earth ?
(a) Does not change
(b) Initially there will be decrease and after there will be increase
(c) It will increase
(d) It will decrease

RRB Group-D 13-12-2018(Shift-II)

Ans : (a) There is no change in the total energy of the body that is falling freely towards the Earth.

180. An object of 10kg is moving at a speed of 5m/s. what will be the kinetic energy of object?
(a) 125J (b) 2J
(c) 25J (d) 50J

RRB Group-D 10-10-2018(Shift-I)
RRB Group-D 19-09-2018(Shift-I)

Ans : (a) Kinetic energy is directly proportional to the mass of the object and to the square of its velocity.

$$K.E. = \frac{1}{2}mv^2$$

here, m = 10 kg, v = 5 m/s

$$\text{Kinetic energy} = \frac{1}{2}\times10\times(5)^2 = 5\times25 = 125 \text{ Joule}$$

181. Just before hitting the earth, the kinetic energy of an object of mass 2 kg is 400 J. At which height it was dropped?
(a) 10m (b) 25m
(c) 20m (d) 15m

RRB Group-D 04-12-2018(Shift-II)

Ans : (c) From conservation of energy,
Kinetic energy of body before striking (hitting) the ground = potential energy of body at height h from the ground, P.E. = mgh
here, m = 2 kg, P.E = 400 J & g = 10 m/s^2
$400 = mgh$
$400 = 2\times10\times h$
$\Rightarrow h = 20$ m.

182. Which of the following contains potential energy?
(a) Dam water (b) Flying Aeroplane
(c) A falling Aeroplane (d) Running runner

RRB Group-D 30-10-2018(Shift-II)

Ans : (a) Potential energy is the energy in a body due to its position or shape.
Dam water has potential energy.

183. Which of the following objects will have potential energy?
(a) Moving bullet (b) Flowing air
(c) A rolling stone (d) Raised hammer

RRB Group-D 03-10-2018(Shift-II)

Ans : (d) The raised hammer has potential energy.

184. What is the kinetic energy of the bicycle having 10kg weight moving at a speed of 20m/s ?

(a) 4000J (b) 400J
(c) 200J (d) 2000J

RRB Group-D 28-09-2018(Shift-II)

Ans : (d)

$KE = \frac{1}{2}mv^2$

(here, $m = 10kg, v = 20m/s$)

$= \frac{1}{2} \times 10 \times (20)^2 = \frac{1}{2} \times 10 \times 400 = \frac{4000}{2} = 2000$ J

185. An object of mass 14kg is moving at the velocity of 5m/s. Find the kinetic energy contained in an object?

(a) 180.5J (b) 17.5J
(c) 175m (d) 175J

RRB Group-D 11-10-2018(Shift-II)

Ans : (d)

$KE = \frac{1}{2} m \times v^2$

$= \frac{1}{2} \times 14 \times 5^2$

$= \frac{1}{2} \times 14 \times 25$

$= 175$ J

186. Which of the following does not have kinetic energy?

(a) A rolling stone (b) Falling coconut
(c) Raised hammer (d) Moving car

RRB Group-D 08-10-2018(Shift-II)

Ans : (c) Kinetic energy is the energy that is caused by the motion of an object, such as the energy of a rolling stone, the energy of a falling coconut and, the energy of a moving body, etc. The raised hammer has potential energy. Potential energy is due to the specific position or the shape of an object.
Mechanical energy = Kinetic energy + Potential energy

187. Which of these objects does not have kinetic energy?

(a) Flowing wind (b) Raised hammer
(c) Falling stone (d) Moving bullet

RRB Group-D 05-10-2018(Shift-II)

Ans : (b) See the explanation of the above question.

188. The energy of 9800J was used to lift the 70kg weight at which height the weight was lifted ?

(a) 14m (b) 140m
(c) -140m (d) -14m

RRB Group-D 17-09-2018(Shift-III)

Ans : (a) PE = mgh
here, PE = 9800 J, m = 70 kg & g = 10 m/s^2)
$9800 = 70 \times 10 \times h$
$9800 = 700 \times h$
$h = \frac{9800}{700} = 14$m

189. What is the potential energy of an object of mass 40 kg when it is lifted at a height of 5m above the ground?

(a) 200W (b) 2000J
(c) 2000W (d) 200J

RRB Group-D 15-11-2018(Shift-I)

Ans : (b) (U) = mgh
here, m = 40 kg, h = 5 m & g = 10 m/s^2
Potential energy , (U) = $40 \times 10 \times 5 = 2000$ J

190. During the free falling of an object –

(a) The kinetic energy increase
(b) The potential energy increase
(c) The kinetic energy decrease
(d) There is no change in kinetic energy

RRB Group-D 15-11-2018(Shift-I)

Ans : (a) When an object is in a static state, it has potential energy but when it is dropped down freely, the energy generated due to its motion is called kinetic energy. But as the body moves downwards, the force of gravity acts on it, which increases the kinetic energy as its speed increases.

191. If the velocity of an object moving at a certain height is increase 4 times, then what will be the change in the potential energy of the object?

(a) Potential energy will be constant
(b) Potential energy will be half of its original value
(c) Potential energy will be doubled
(d) Potential energy will be 4 times of its original value

RRB Group-D 15-11-2018(Shift-II)

Ans : (a) The energy that exists in each object due to its position or shape is called potential energy. According to the question, increasing the velocity of an object moving at a certain height four times will change its kinetic energy and not the potential energy. Therefore, potential energy of that object will remain constant.

192. How would energy be converted while cycling ?

(a) Potential energy is converted into muscular energy
(b) The chemical energy is converted into muscular energy then kinetic energy
(c) Chemical energy is converted into mechanical energy
(d) Mechanical energy is converted into kinetic energy

RRB Group-D 05-11-2018(Shift-II)

Ans : (b) While cycling, chemical energy is converted into muscular energy and then kinetic energy.

193. A compressed spring has ..... energy compared to a normal spring.

(a) Less (b) Zero
(c) Equal (d) Greater

RRB Group-D 12-11-2018(Shift-III)

Ans : (d) A compressed spring has more energy than a normal spring. A spring is made up of an elastic materials and in which (mechanical) energy is stored. Compressed springs have more energy than normal springs due to the greater mechanical energy accumulated.

194. An object is dropped from a certain height to the ground. When it touches the ground it will contain-

(a) Thermal energy (b) Chemical energy
(c) Kinetic energy (d) Potential energy

RRB Group-D 18-09-2018(Shift-II)

Ans : (c) The energy that is generated due to the motion of an object is called kinetic energy. If an object of mass m is moving at a velocity v, then the kinetic energy of that object will be K.E. = 1/2 m v^2 such as - when an object is dropped to the ground from a certain height, it has kinetic energy when it touches the ground.

195. .....is known as the strength of an object.

(a) Energy (b) Pressure
(c) Inertia (d) Force

RRB Group-D 27-09-2018(Shift-I)

Ans : (a) Energy is known as the strength of an object. The ability of an object to do the work is called energy. The unit of energy is 'joule'.

196. What would be the energy contained at a height of 6m by a body of mass 50kg?

(a) 3000J (b) 30J
(c) 300J (d) 3×10^4J

RRB Group-D 22-09-2018(Shift-III)

Ans : (a) Here, m = 50 kg, h = 6 m
(P.E.) = mgh
= 50 × 10 × 6 = 3000 J

197. Find the potential energy of an object mass m raised from the ground level at a height of 4h-

(a) 4 mgh (b) 8 mgh
(c) 0.4 mgh (d) ¼ mgh

RRB Group-D 16-10-2018(Shift-II)

Ans : (a) From, (P.E.) = mgh'
= mg(4h) (∵ h' = 4h)
= 4 mgh

198. When an object of 11kg is placed at a height of 7m from the ground, how much energy it will contained?

(a) 528J (b) 520J
(c) 588J (d) 754.6J

RRB Group-D 22-10-2018(Shift-II)

Ans : (d) Here, m = 11 kg, h = 7 m & g = 9.8 m/s^2
P.E = m × g × h
= 11 × 7 × 9.8
= 77 × 9.8 = 754.6 J

199. When an object of 10kg is placed at a height of 7m from the ground, how much energy it will contained -

(a) 528J (b) 686J
(c) 520J (d) 588J

RRB Group-D 22-10-2018(Shift-I)

Ans : (b) Here, m = 10 kg, h = 7 m & g = 9.8 m/s^2
PE = mgh
E = 10 × 9.8 × 7 = 686 J

200. What type of energy changes during the rain ?

(a) Mechanical energy is converted into kinetic energy
(b) Muscular energy is converted into mechanical energy
(c) Chemical energy is converted into kinetic energy
(d) Potential energy is converted into kinetic energy

RRB Group-D 24-10-2018(Shift-II)

Ans : (d) During the rain potential energy is converted into kinetic energy.

201. Which of the following increase or decrease with height ?

(a) Nuclear energy (b) Chemical energy
(c) Potential energy (d) Mechanical energy

RRB Group-D 03-10-2018(Shift-III)

Ans : (c) Potential energy (P.E) = mgh
Potential energy $\propto$ h
Therefore, it is clear from the above equation that the potential energy will increase as the height increases and the energy will decrease as the height decreases.

202. The energy contained in an object is 1500J and its mass is 15kg. Find the height of the object above the ground.

(a) 10m (b) 10N
(c) 10Pa (d) 10 cm

RRB Group-D 02-11-2018(Shift-I)

Ans : (a) here, PE = 1500 J, m = 15 kg
(PE) = mgh
15 × 10 × h = 1500
h = 10 m

203. Potential energy is equal to-

(a) m(-g)h (b) mgh
(c) Fs (d) 1/2mv^2

RRB Group-D 18-09-2018(Shift-III)

Ans : (b) The energy that is accumulated due to the position or distorted state in an object is called potential energy. If a mass of m kg is raised to h height above the earth, the gravitational potential energy contained in the object is- $\boxed{U = mgh}$

204. Potential energy=?

(a) Fs (b) mgh
(c) $mv^2/2$ (d) $mu^2/2$

RRB Group-D 20-09-2018(Shift-I)

Ans : (b) - See the explanation of above question.

205. If an object of 10kg mass is moving at a speed of 2m/s, then kinetic energy of the object is-

(a) 5J (b) 40J
(c) 10J (d) 20J

RRB Group-D 27-09-2018(Shift-I)

Ans : (d) Kinetic energy is directly proportional to the mass of the object and to the square of its velocity:
K.E. = 1/2 m v^2
$= \frac{1}{2}\times 10 \times 2 \times 2 = 20$ Joule

206. What is the formula for finding the kinetic energy of an object ?

(a) ma (b) 1/2mv^2
(c) mgh (d) 1/2mv^{-2}

RRB Group-D 10-10-2018(Shift-II)

Ans : (b) Kinetic energy of an object is directly proportional to the mass of the object and to the square of its velocity:
K.E. = 1/2 m v^2
Where m is mass and v is velocity.

207. What does the kinetic energy equal ?

(a) $1/2mv^2$ (b) mgh
(c) mv (d) Ma

RRB ALP. & Tec. 17-08-2018(Shift-II)

Ans : (a) See the explanation of above question.

208. An object of mass 11kg is moving at a velocity of 5m/s. How much the energy is contained in that object ?

(a) 137.5 ms (b) 137.5J
(c) 180.5J (d) 17.5J

RRB Group-D 10-10-2018(Shift-II)

Ans : (b) Kinetic energy is directly proportional to the mass of the object and to the square of its velocity:

$$K.E = \frac{1}{2}mv^2$$

$$= \frac{1}{2}\times 11\times 5^2 = \frac{1}{2}\times 11\times 25 = \frac{1}{2}\times 275 = 137.5\ J$$

209. An object of mass 15kg is moving at the uniform velocity as 5m/s. Find the kinetic energy contained in an object ?

(a) 187.5J (b) 17.5J
(c) 180.5J (d) 187.5ms

RRB Group-D 08-10-2018(Shift-II)

Ans : (a) Kinetic energy is directly proportional to the mass of the object and to the square of its velocity:

K.E. = 1/2 m v^2

here, m = 15 kg, v = 5 m/s

$$KE = \frac{1}{2}\times 15\times 5^2$$

$$= \frac{375}{2} = 187.53$$

210. An object of mass 12kg is placed at a certain height from the ground. If the potential energy of the object is 480J, find the height from the ground of an object ?

(a) 6m (b) 5m
(c) 4m (d) 8m

RRB Group-D 03-10-2018(Shift-II)

Ans : (c) Here, m = 12 kg, PE = 480 J, g = 10 m/s^2

P = mgh

480 = mgh

480 = 12 × 10 × h

h = 4 m

211. Which of the following is an example of potential energy?

A. Bricks placed on the roof of the house
B. Spring of a clock when it rotates
C. Compressed spring
D. Stored water in an elevated reservoir under the water supply system

(a) A, D (b) C, D
(c) A, B and C (d) A, B, C, D

RRB Group-D 31-10-2018(Shift-II)

Ans : (d) The energy that is genrated due to a particular state or position of an object is called potential energy. Examples of potential energy are, a brick placed on the roof of the house, a clock spring when it rotates, compressed spring or spring energy and the energy stored in the elevated reservoir under the water supply system.

212. An object capable of performing a work has.....

(a) Force (b) Energy
(c) Momentum (d) Power

RRB Group-D 15-11-2018(Shift-III)

Ans : (b) An object capable of performing a work has energy. The ability of any worker to do the work is called energy. There are different forms of energy. It can be converted from one form to another.

213. The water flowing in a hydroelectric power station can run the turbine because it containes.

(a) Electric energy (b) Chemical energy
(c) Kinetic energy (d) Potential energy

RRB Group-D 02-11-2018(Shift-II)

Ans : (c) The water flowing in a hydroelectric power station can run the turbine because it containes kinetic energy. The kinetic energy is the excess energy of a body due to its linear velocity or angular velocity, or both. Its value is equal to the work done in accelerating that body from rest to motion.

$$\boxed{K.E = \frac{1}{2}mv^2}$$

214. Which of the following statements is false?

(a) Compressed spring has potential energy
(b) The raising hammer has potential energy
(c) Dam water has kinetic energy
(d) A moving car has kinetic energy

RRB Group-D 01-12-2018(Shift-II)

Ans : (c) Dam water has potential energy.

215. An object of mass 20kg is moving at a velocity of 6m/s. What is the kinetic energy of the object?

(a) 3600J (b) 360J
(c) 36J (d) 3.6J

RRB Group-D 05-12-2018(Shift-III)

Ans : (b) Kinetic energy is directly proportional to the mass of the object and to the square of its velocity:

K.E. = 1/2 m v^2

here, m = 20 kg, v = 6 m/s

$$K.E = \frac{1}{2}\times 20\times (6)^2$$

$$= \frac{1}{2}\times 20\times 36 = 10\times 36 = 360\ J$$

216. What can be predicted with respect to the energy in the given figure?

(a) Both vehicles have gravitational potential energy
(b) Both vehicles are moving in forward direction using maximum energy.
(c) Both vehicles are converting mechanical energy into musculer energy
(d) Both vehicles have kinetic energy

RRB Group-D 05-11-2018(Shift-I)

Ans : (d) According to the given figure, both vehicles are in the state of motion, so both vehicles will have kinetic energy. Thus, the ability to do the work due to the motion of the object is called kinetic energy.

217. The water raised at a certain height has..... energy.
(a) Kinetic (b) Potential
(c) Electric (d) Chemical

RRB Group-D 15-11-2018(Shift-II)

Ans : (b) The water raised at a certain height has potential energy. In potential energy, if an object is placed at a height above the earth surface the gravitational force of the Earth is applied in raising it, that is, it has to work against the gravitational force of the Earth in raising an object from the Earth.

218. If a boy leaves a gas-filled balloon that goes upward direction, its potential energy will be?
(a) Decrease (b) Remains constant
(c) It is infinite (d) Increase

RRB Group-D 07-12-2018(Shift-I)

Ans : (d) The potential energy in an object increases with increasing height. When a boy leaves a balloon filled with gas that goes upward direction the value of 'h' increases, thereby increasing the potential energy.
Potential energy = mass × gravitational acceleration × height

$$\text{Potential energy} \propto h.$$

Therefore, it is clear from the above equation that the potential energy will increases as the height increases and the potential energy will decrease as the height decreases.

219. If the speed of the cycle is doubled then the kinetic energy will be?
(a) 16 time (b) 8 time
(c) 4 time (d) 2 time

RRB Group-D 22-09-2018(Shift-III)

Ans : (c) $(E_k) = \frac{1}{2}mv^2$

$$E_k \propto V^2$$

$$\frac{E_{k_2}}{E_{k_1}} = \frac{V_2^2}{V_1^2} = \frac{(2V_1)^2}{V_1^2} = 4$$

$$\frac{E_{k_2}}{E_{k_1}} = 4$$

$$E_{k_2} = 4E_{k_1}$$

220. An object of mass 30 kg is being transferred by 10 m/s uniform velocity. What is the kinetic energy of an object?
(a) -150J (b) 1500J
(c) -1500J (d) 150J

RRB Group-D 26-09-2018(Shift-III)

Ans : (b) Kinetic energy is directly proportional to the mass of the object and to the square of its velocity:

$$\text{K.E.} = 1/2\ m\ v^2$$

here, m = 30 kg, v = 10 m/s

$$= \frac{1}{2} \times 30 \times 10 \times 10 = 1500\ \text{J}$$

221. An object of mass 30 kg is moving at a uniform velocity of 5 m/s. What is the kinetic energy of the object?
(a) 375 N (b) 375 Joule
(c) 375 kg m/s (d) 375 Pascal

RRB Group-D 25-09-2018(Shift-I)

Ans : (b) Kinetic energy is directly proportional to the mass of the object and to the square of its velocity.
here, m = 30 kg, v = 5 m/s

$$\text{K.E.} = 1/2\ m\ v^2$$

$$\text{K.E.} = \frac{1}{2} \times 30 \times 5 \times 5$$

K.E. = 15 × 5 × 5=375 Joule

222. An object has a potential energy of 400J with a mass of 20kg and a gravity of 10 m/s^2, what is the height of that object?
(a) 0.5m (b) 4m
(c) 1m (d) 2m

RRB Group-D 28-09-2018(Shift-I)

Ans : (d) Here, PE = 400 J, m = 20 kg, g = 10 m/s^2
PE = mgh
400 = 20 × 10 × h
400 = 200 × h

$$h = \frac{400}{200} = 2\ \text{m}$$

223. When the hammer of 15kg is raised to a height of 10m, find the potential energy obtained by it?
(a) 1500J (b) -150J
(c) -1500J (d) 150J

RRB Group-D 05-10-2018(Shift-I)

Ans : (a) Potential energy = m×g×h
Here, m =15 kg, h = 10m and g = 10 m/s^2
= 15×10×10 = 1500J

224. What is the kinetic energy of a ball of mass 2kg moving at a speed of 30ms^{-1}?
(a) 900N (b) 900J
(c) 900W (d) 900Pa

RRB Group-D 04-10-2018(Shift-II)

Ans : (b) Kinetic energy is directly proportional to the mass of the object and to the square of its velocity.

$$\text{K.E.} = 1/2\ m\ v^2$$

here, m = 2 kg, v = 30 m/s

$$= 2 \times 30 \times 30/2 = 900\ \text{J}$$

225. If the velocity of an object is twice that of its initial velocity, how many times will its kinetic energy increase?
(a) 4 (b) 5
(c) 3 (d) 2

RRB Group-D 24-09-2018(Shift-II)

Ans : (a) The energy possessed by a body because of its motion, equal to one half the mass of the body and the product of square of its speed is called its kinetic energy. Hence, when velocity is doubled, kinetic energy becomes 4 times.

$$\text{If } E_k = \frac{1}{2}mv^2$$

$$\text{Then, } E = \frac{1}{2}m(2v)^2 \Rightarrow E = \frac{1}{2}m4v^2$$

$$E = 4\frac{1}{2}mv^2 \Rightarrow \boxed{E = 4E_K}$$

So, kinetic energy becomes 4 times.

226. An object of mass 12kg is placed at a certain height from the ground. If the potential energy of the object is 600J, find the height from the ground of the object?

(a) -5m (b) $5ms^{-2}$
(c) 5m (d) $5ms^{2}$

RRB Group-D 22-10-2018(Shift-I)

Ans : (c) Potential energy = m×g×h
Here, P =600 J, m =12kg, h = ? and g = 10 m/s^2
$600 = 12 \times 10 \times h$
$h = 600/120 = 5$ m

227. Which of the following energy increases with speed ?

(a) Chemical energy (b) Potential energy
(c) Kinetic energy (d) Electrical energy

RRB Group-D 24-10-2018(Shift-I)

Ans : (c) Kinetic energy is related to an object's momentum. For a rigid body travelling in a linear path, kinetic energy increases with the square of velocity. So, if the velocity becomes doubles, the kinetic energy becomes 4 times of the object that of its initial velocity.

228. Following given example represent-

1. A high speed pebble can hurt a person or break a window glass.
2. Energy of a moving vehicle
3. Fast moving air can damage many homes
4. Wind can drive the wind mill

(a) Kinetic energy
(b) Very fast speed
(c) Gravitational stretch
(d) Frictional force

RRB Group-D 24-10-2018(Shift-I)

Ans : (a) All the given example represents kinetic energy.

229. Find the potential energy of an object 3m mass raised from the ground at a height of h-

(a) 6 mgh (b) 9 mgh
(c) 3 mgh (d) 1/3 mgh

RRB Group-D 27-11-2018(Shift-I)

Ans : (c) Potential energy = m×g×h
Here, mass = 3m
Then, P = 3m×h×g = 3 mgh

230. If a bullet is fired from the gun, comes backwards, what will be the kinetic energy of the gun?

(a) Equivalent to bullet
(b) Zero
(c) More than the bullet
(d) Less than the bullet

RRB Group-D 16-10-2018(Shift-I)

Ans : (d) When a bullet is fired from a shotgun and the gun strikes backwards, the gun's kinetic energy is less than the bullet.

231. A mobile was dropped from a balcony if the mass of the mobile phone is 0.5kg and the mobile phone was dropped from a height of 100m, g=10m/s^2. So what is the potential energy of mobile phone?

(a) 5000J (b) 5 J
(c) 50 J (d) 500 J

RRB Group-D 24-09-2018(Shift-II)

Ans : (d) Potential energy = m×g×h
Here, m = 0.5kg, h = 100m and g = 10 m/s^2
$= 0.5 \times 100 \times 10 = 500$ J

232. When an object of 11kg is placed at a height of 8m from the ground, then how much energy it will contains?

(a) 520 J (b) 539 J
(c) 588 J (d) 862.4 J

RRB Group-D 16-10-2018(Shift-I)

Ans : (d) Potential energy = m×g×h
Here, m =11kg, h = 8m and g = 9.8m/s^2
$= 11 \times 9.8 \times 8$
$= 862.4$ J

233. When an object of 15kg is at a height of 5m from the ground, then how much energy it will contains?

(a) 520 J (b) 528 J
(c) 725 J (d) 735 J

RRB Group-D 15-10-2018(Shift-I)

Ans : (d) Potential energy = m×g×h
Here, m =15kg, h = 5m and g = 9.8m/s^2
$= 15 \times 9.8 \times 5$
$= 735$ J

234. An object of mass 10kg is placed at the height of 6 meter from the ground. Calculate the potential energy stored in it. (g=9.8 m/sec^2)

(a) 578 J (b) 588 J
(c) 578 W (d) 588W

RRB Group-D 31-10-2018(Shift-II)

Ans : (b) Potential energy = m×g×h
here, m = 10 kg, h = 6 m, g = 9.8 m/s^2
$= 10 \times 9.8 \times 6$
$= 98 \times 6$
588J

235. An object was thrown vertically upwards and it reached a maximum height 'h' from the ground. While going over it, the object at 1/4 of height 'h' will have ……

(a) Less potential energy and more kinetic energy
(b) Only potential energy
(c) Equal potential and kinetic energy
(d) More potential energy and less kinetic energy

RRB Group-D 28-11-2018 (Shift-I)

Ans : (a) An object was thrown vertically upwards and it reached a maximum height 'h' from the ground. While going over it, the object at 1/4 of the height 'h' will have less potential energy and more kinetic energy.

236. Fill in the blank with the correct option.
An object is thrown vertically upward during their rise up potential energy and kinetic energy is –

(a) Increases ,decreases
(b) Decreases , increases
(c) Increases, increases
(d) Remains the same, remains the same

RRB Group-D 20-09-2018(Shift-II)

Ans : (a) The ability of an object to work due to its motion is called kinetic energy while potential energy is the ability to the work due to a particular state or condition of an object.
When an object is thrown vertically upward, then its potential energy increases gradually and the kinetic energy decreases and at time when the object reaches the last point, then its kinetic energy becomes zero, i.e. decreases.

237. During the free fall of an object, which of following energy increases at one point in its path?
(a) Mechanical energy
(b) Kinetic energy
(c) Potential energy
(d) Chemical energy

RRB Group-D 19-09-2018(Shift-II)

Ans : (b) Kinetic energy increases at any point in its path during the free fall of an object.

238. What is the kinetic energy of a bullet when a bullet is fired from a gun ?
(a) Less than that of a gun
(b) Infinite
(c) More than that of a gun
(d) Equivalent to a gun

RRB Group-D 22-09-2018(Shift-I)

Ans : (c) Law of conservation of momentum, states that a free recoiling gun and bullet will have equal momentum in opposite direction. Since the gun is always heavier, it will have lower velocity. but the bullet has higher velocity because the mass of bullet is less than as compare to the gun. When calculating kinetic energy, the kinetic energy of the bullet will be always higher.

239. A block of 2 kg slides on a parallel surface at a speed of 4 m/s. It falls on an uncompress spring and presses it until the block becomes completely motionless. The value of kinetic friction is 15N and the spring constant is 10000N/m. spring presses –
(a) 8.5m (b) 8.5cm
(c) 5.5m (d) 5.5cm

RRB Group-D 10-12-2018(Shift-I)

Ans : (d) Let, spring's x part is pressed
m = 2 kg, k = 10000 N/m and v= 4m/sec.
According to question,
$Mv^2/2=kx^2/2$
$0.5\times2\times4^2 = 10000\times x^2\times0.5$
$x^2=32/10000$, x = 0.056 m
x = 5.5 cm (approx)

240. What is the form of energy that is not generated when riding a bicycle?
(a) Chemical energy (b) Heat energy
(c) Mechanical energy (d) Kinetic energy

RRB ALP & Tec. (10-08-18, Shift-I)

Ans : (a) Chemical energy is the energy stored in the chemical compounds. This energy is released when a chemical reaction takes place. Usually, once chemical energy has been released from a substance, that substance is transformed into a completely new substance, so it is not generated by riding a bicycle.

(iv) Mass

241. Which of the following quantity does not change even after changing place?
(a) Mass
(b) Force due to friction
(c) Weight
(d) Gravity

RRB ALP & Tec. (30-08-18 Shift-I)

Ans : (a) Mass is the amount of matter in the body which does not depend on the value of g. Weight of a body is the gravitational force on it. Thus, weight is dependent on gravitational acceleration (g).
Hence, weight of a body will change from one place to another place because the value of g is different in different places. As mass is independent of g, so it will not change from place to place.

242. Which one of the following is not related to this group?
(a) Speed (b) Time
(c) Mass (d) Acceleration

RRB NTPC 31.03.2016 (Shift-I) Stage Ist

Ans : (c) Time, acceleration, and speed are variables of linear motion while mass is not included in this group.

243. Which of the following quantity measures the inertia of a body?
(a) Mass
(b) Density
(c) Temperature
(d) Volume

RRB Group-D 26-10-2018 (Shift-III)

Ans : (a) Inertia is that quality of things, due to which objects try to maintain their state of rest or state of motion. Due to inertia, the object opposes its state of change. Mass quantity of measures the inertia of an object.

244. Inertia of an object is measured in which of the following?
(a) Velocity (b) Colour
(c) Weight (d) Mass

RRB Group-D 31-10-2018 (Shift-III)

Ans : (d) See the explanation of above question.

245. Measurement of mass of an object is called measurement of
(a) Acceleration (b) Inertia
(c) Momentum (d) Speed

RRB Group-D 11-10-2018 (Shift-II)

Ans : (b) Expressing the magnitude of a physical amount in quantity is called 'measurement'. The property that opposes any change in the state of motion of an object is called inertia. Inertia is the property that causes an object to move at the same velocity in a straight line without changing direction. Measurement of mass of an object called measurement of inertia.

246. What is the definition of mass?

(a) The mass of an object is directionless. Therefore it is a scalar quantity.
(d) Mass can be determined based on chemical equilibrium.
(c) The mass of an object remains constant at any place and is not affected by the change in height.
(d) The amount of matter contain in an object is called the mass of that object.

RRB Group-D 24-10-2018 (Shift-III)

Ans : (d) Mass is defined as the amount of the matter inside a body. All the objects have a matter inside them and the measurement of the matter is the mass.

247. Mass / Volume =?

(a) Density (b) Momentum
(c) Inertia (d) Force

RRB Group-D 01-10-2018 (Shift-II)

Ans : (a) The density of a substance is the measure of how much matter that an object has in a unit volume. The symbol ρ represents it or it can also be represented by letter D.
Mathematically, the density of an object is expressed as follows

$$\text{Density} = \frac{\text{Mass}\,(\text{m})}{\text{Volume}\,(\text{V})}$$

* S.I. unit of density is kg/m^3

248. The mass density of an object is defined as its _____.

(a) Mass per unit length
(b) Mass per cubic area
(c) Mass per unit volume
(d) Mass per unit ampere.

ALP Stage -II 22.01.2019 (shift - I)

Ans : (c) The mass density or density of a substance is defined as, its mass per unit volume.

249. What is the mass per unit volume of a substance called?

(a) Energy (b) Mass
(c) Density (d) Matter

RRB Group-D 05-10-2018 (Shift-I)

Ans : (c) Mass per unit volume of substance is called density. Density is denoted by ρ or d. Its unit is kg per cubic meter.

$$\text{Density} = \frac{\text{mass}}{\text{volume}}$$

$$\boxed{\rho = \frac{m}{v}}$$

250. What is the mass of a unit volume of substance called?

(a) Density (b) Pressure
(c) Buoyancy (d) Force

RRB-JE 30.08.2019, Ist Shift

Ans : (a) See the explanation of above question.

251. If the weight of an object is 200 N, find its mass. ($g = 10\ ms^{-2}$)

(a) 20 N (b) 20W
(c) 20 Pa (d) 20 kg

RRB Group-D 22-10-2018 (Shift-III)

Ans : (d) According to the question -

$W = 200\ N$
$g = 10\ ms^{-2}$
$m = ?$

According to formula -

$W = m.g$
$200 = m \times 10$
$m = \frac{200}{10} = 20kg$

252. Force/acceleration ?

(a) Momentum (b) Speed
(c) Mass (d) Pressure

Ans : (c) From Newton's Second Law,

$F = ma$
$\Rightarrow m = \frac{F}{a}$

Mass = force/acceleration

253. Which of the following does not affect the value of acceleration due to gravity?

(a) Mass (b) Vertically
(c) Size of earth (d) Depth

RRB Group-D 24-09-2018 (Shift-I)

Ans : (a) The value of acceleration due to gravity 'g' is affected by
(i) Altitude above the earth's surface.
(ii) Depth below the earth's surface.
(iii) The shape of the earth.
(iv) Rotational motion of the earth.
If a body is located on the surface of earth then acceleration due to gravity is given by –

$$g = \frac{GM}{R^2}$$

Where,
G = Universal gravitational constant
M = Mass of earth
R = Radius of earth
The above equation gives acceleration due to gravity at the surface of earth. Clearly 'g' is independent of mass 'm' of the body.

254. Density of pure water is __ that of saline water.

(a) Less than
(b) Equal to
(c) More than
(d) Negligible compared to

ALP Stage -II 22.01.2019 (shift - I)

Ans : (a) Density of pure water is less than that of saline water.

255. What will be the mass of the girl weighing 450 N?

(a) 450 kg (b) 45 kg
(c) 459 kg (d) 45.9 kg

RRB Group-D 20-09-2018 (Shift-II)

Ans : (d) Girl's weight (W) = 450 N

$\because$ $W = m \times g$

{m = mass, W = weight, g = acceleration due to gravity}

$450 = m \times 9.8$ $(g = 9.8\ m/s^2)$

$$m = \frac{450}{9.8} = 45.9\ kg$$

256. The weight of an object is 980 N. If the gravitational acceleration is 9.8 ms^{-2}, find the mass of the object -

(a) 100 kg (b) 8.8 kg

(c) 10 kg (d) 1 kg

RRB Group-D 28-11-2018 (Shift-I)

Ans : (a) Weight of object (W) = 980 N

Acceleration due to gravity (g) = 9.8 ms^{-2}

Mass of object (m) = ?

from , W = mg

$$m = \frac{980}{9.8} = 100\ kg$$

257. The ..... of an object is fixed and does not change when it is moved -

(a) Velocity (b) Mass

(c) Speed (d) Weight

RRB Group-D 20-09-2018 (Shift-III)

Ans : (b) The amount of matter in a body or object is called the mass of the object whereas the force with which the earth pulls the object towards itself is called the weight of that object. The mass is always fixed and unchanging while the weight is variable depending on the gravitational acceleration. The mass remains unchanged when the object is moved to any place.

258. The momentum of a body is 50 Kg.ms^{-1} and the velocity is 5ms^{-1}. What is the mass of that body?

(a) 250 N (b) 250 Kg

(c) 10 N (d) 10 Kg

RRB Group-D 29-10-2018 (Shift-III)

Ans : (d) Momentum (p) = 50 kg m/s

Velocity (v) = 5 m/s

We know that,

Momentum (p) = mv

$$m = \frac{p}{v} = \frac{50}{5} = 10\ Kg.$$

259. If force (F) and acceleration (a) are given, then the formula for finding the mass (m) of an object is …….

(a) F – a (b) F/a

(c) F×a (d) a/F

RRB Group-D 02-11-2018 (Shift-III)

Ans : (b) The force (F) exerted on an object is equal to the product of mass (m) of the object and the acceleration (a) produced in the direction of the force on it. i.e, F = m.a

Similarly, if the force (F) and acceleration (a) are given, then the formula shown in the mass (m) of the object is-

From, F = m.a.

$$\boxed{m = \frac{F}{a}}$$

(v) Newton's Laws of Motion

260. The rate of change of momentum of an object is proportional to the applied unbalanced force in the direction of the force. This rule is known as :

(a) Newton's First Law of Motion

(b) Newton's Fourth Law of Motion

(c) Newton's Second Law of Motion

(d) Newton's Third Law of Motion

RRB NTPC 15.02.2021 (Shift-II) Stage Ist

Ans : (c) Newton's second law is a quantitative description of the changes that a force can produce on the motion of a body. It states that the rate of change of the momentum of a body is equal to both magnitude and direction of the force imposed on it. The momentum of a body is equal to the product of its mass and its velocity. Momentum, like velocity, is a vector quantity, having both magnitude and direction. Example: Pulling the hands gradually in the direction of the ball while catching helps in reducing the impact of force applied by the ball on the hands of the cricketer as the relative velocity of the ball with respect to hands of the player is decreased and hence reduces the momentum of the ball gradually.

261. If we move the tree branch fast then some of the leaves get detached from the tree due to –

(a) Acceleration (b) Velocity

(c) Inertia (d) Impulse

RRB Group-D 04-12-2018 (Shift-II)

Ans : (c) When the tree's branch is moved fast the branch attain motion but the leaves stay at rest.

Due to inertia of rest, the leaves tend to remain in its position and hence detaches from the tree to fall down.

262. Which of the following examples illustrates Newton's first law of motion?

(a) When we stop pedaling, the cycle starts to slow down.

(b) While catching a fast approaching cricket ball, the fielder slowly moves his hand backwards with the moving ball.

(c) When a bus starts abruptly, the passengers are jerked backwards.

(d) Rocket launching

RRB Group-D 05-11-2018 (Shift-III)

Ans : (c) Newton's First Law of Motion - If an object is in rest position, it will remain in the rest position until an external force is applied on it.

When the bus is not moving the passengers are in the state of rest and they have inertia of rest. When the bus starts moving suddenly, the lower part of the body of passengers, which is in contact with the bus, come in motion, but upper part of their body tends to be in the state of rest and the passengers fall backward or jerked backwards.

263. How many law of motion did Isaac Newton formulate?

(a) Three (b) Four

(c) Two (d) Five

RRB NTPC 01.04.2021 (Shift-II) Stage Ist

Ans : (a) Sir Issac Newton formulated his three laws of motion in his book "Mathematical Principles of Natural Philosophy" first published in 1687. The laws form the basis for classical mechanics. He also proposed the law of Gravity and formulated the theory of Universal Gravitation as well.

264. The three laws of motion were proposed by:

(a) Aristotle (b) Galileo
(c) Newton (d) Edison

RRB NTPC 08.01.2021 (Shift-II) Stage Ist

Ans : (c) Sir Isaac Newton proposed the three Laws of Motion, which is first Law, Second Law and Third Law explain the relationship between motion of an object and forces acting on object.

Newton's three laws of motion are:–

1. Every object in a state of uniform motion will remain in that state of motion unless an external force acts on it.
2. Rate of change of momentum is proportional to the applied force.
3. For every action there is an equal and opposite reaction.

The first law is also called as the law of inertia.

265. What is the equation for Newton's second law of motion?

(a) $F = mc^2$ (b) $F = ma$
(c) $F = AP$ (d) $F = \frac{1}{2}mv^2$

RRB NTPC 12.02.2021 (Shift-I) Stage Ist

Ans : (b) Second law of motion expressed by Newton as follows:

The rate of change of momentum of a body is directly proportional to the applied force on the body and in the direction in which the force acts. This statement is expressed in equation form as,

$$F = ma$$

where,

F = force
m = mass of object
a = acceleration

The unit of force is $kg.m.s^{-2}$ or Newton, which is represented by symbol N. The second law of motion gives us a method to measure the force acting on an object as a product of its mass and acceleration.

266. What is the other name of Newton's first law of motion?

(a) Law of momentum
(b) Law of movement
(c) Law of inertia
(d) Law of displacement

RRB NTPC 04.01.2021 (Shift-II) Stage Ist

Ans : (c) The first law of Newton is also termed as Law of Inertia. It states that a body in rest or motion continues to be in such state, untill and unless an external force is applied on it.

The second law of Newton says that force applied on a body is equal to product of its mass and acceleration.

$F = m \times a$

The third law of Newton mentions about action-reaction process.

267. Second law of motion is related to. . . . . .

(a) Pressure (b) Inertia
(c) Thrust (push) (d) Momentum

RRB Group-D 30-10-2018 (Shift-I)

Ans : (d) The second law of motion is related to momentum. According to the second law of motion, "the change in momentum of an object is proportional to the force exerted on that object and occurs in the same direction."

From Newton's second law of motion,

$$\vec{F} = \frac{d\vec{p}}{dt}$$

Here, F is the force, p is momentum and t is time.

268. Newton's second law of motion:

(a) Explains the relationship between forces on two mutually effective objects.
(b) Also known by the law of inertia.
(c) It is helpful to understand the effects of force.
(d) Also known by the law of conservation of energy.

RRB Group-D 27-11-2018 (Shift-III)

Ans : (c) The rate of change of momentum of an object is proportional to the force exerted on that object. The momentum changes in the direction of the force.

In the second law, the force on an object is equal to product of its mass and its acceleration.

$\therefore F = ma$

where, m = mass and a = acceleration.

Hence Newton's second law of motion is helpful to under stand the effects of force.

269. The equation F = ma, is given by Newton's …….. law of motion:

(a) II (b) III
(c) I (d) IV

RRB Group-D 05-12-2018 (Shift-I)

Ans : (a) The equation F = ma, is given by Newton's II law of motion.

270. Which of the following Newton's Law of Motion provides an explanation for why a ball thrown on the wall collides and returns?

(a) First law of motion (b) Second law of motion
(c) Third law of motion (d) None of the rules

RRB NTPC Stage Ist 26.04.2016 (Shift-II)

Ans. : (c) The ball thrown on the wall bounces back which explains the third law of motion. When in the interaction of two objects, the force of one object exerts the same force on the other object, the second object also exerts the same force on the first object in the opposite direction, one of these forces is called action and the other force is called reaction. The rule is also called Newton's Third Law of Motion.

271. Which of the following statements is true for Newton's Third Law of Motion.

(a) The force is applied to the same body.
(b) The force is applied on the same body in the opposite direction.
(c) The force is applied on different body in opposite direction.
(d) Force is dependent on distance.

RRB Group-D 12-10-2018 (Shift-I)

Ans : (c) Newton's Third Law of Motion : According to this law, to every action, there is an equal and opposite reaction.
When one objects exert a force (action) on another object, then the second object also exert a force (reaction) on the first object. These two forces are always equal in magnitude but opposite in direction.

272. The famous law of motion is given by-
(a) Dalton (b) Newton
(c) Galileo (d) Thomson

Group-D 26-10-2018 (Shift-II)

Ans : (b) Newton gave three laws of motion, which are as follows :
(i) Law of Inertia
(ii) Law of Force, Mass and Acceleration
(iii) Law of Action-Reaction

273. The rate of change in momentum of a body is proportional to ———.
(a) Applied displacement
(b) Applied force
(c) Applied potential energy
(d) Applied pressure

RRB Group-D 22-09-2018 (Shift-III)

Ans : (b) The rate of change in momentum of an object is proportional to the force applied on it and in the direction of force. It is also called Newton's second law of motion.

274. The second law of motion shows-
(a) Every object will remain in a state of constant or uniform motion, unless it is forced to change its state by the action of pure force.
(b) When pure force is applied, each object will move in the same speed.
(c) The rate of change in the speed of the object will change with the applied net force.
(d) The rate of change of momentum of an object is proportional to the net force applied to the object in the direction of net force.

RRB Group-D 22-09-2018 (Shift-II)

Ans : (d) Second Law of Motion - The rate of change of momentum is directly proportional to the applied force. The larger the force acting on a body, greater is the change in its momentum. Since change in momentum is equal to the product of mass and the acceleration and the mass of the body remains constant, so the rate of change of momentum is directly proportional to the rate of change of velocity i.e., acceleration. Hence force (F) is directly proportional to mass (m) and acceleration (a)

$$\boxed{F \propto ma}$$

Rate of change of momentum =

$$\frac{\text{Change of momentum}}{\text{Time taken}} = \frac{m(v-u)}{t} = ma$$

$$\left[\because \frac{v-u}{t} = a\right]$$

where, a is the acceleration of the body.

275. Which of the following statements is false
(a) When a bus stops suddenly, a passenger sitting in the bus is jerked backwards.
(b) When a person jumps from a moving bus, he falls.
(c) When a rotating fan stops, it rotates for some time.
(d) When a bus stops suddenly, a passenger sitting in the bus gets a shock in the front

RRB Group-D 07-12-2018 (Shift-I)

Ans : (a) 1. When a moving bus stops, the lower part of our body in contact with the bus comes to rest while the upper part of our body tends to keep moving due to inertia of motion. Hence, we fall (or forwards)
2. When the bus accelerates from rest, the lower part of our body comes into motion along with the bus while the upper part of body tends to remain at rest due to inertia of rest. Hence we fall backwards.

276. 1 Kg × 1 ms^{-2} , It is said.....
(a) 1 newton (b) 1 coulomb
(c) 1 pascal (d) 1 joule

RRB Group-D 15-11-2018 (Shift-II)

Ans : (a) From Newton's Second Law -
Force = mass × acceleration
= 1 Kg × 1 m/s^2 = 1 Newton
The unit of force is Newton.

277. What was the year of publication of Newton's laws of motion?
(a) 1678 (b) 1778
(c) 1787 (d) 1687

RRB Group-D 27-11-2018 (Shift-III)

Ans : (d) Newton published the laws of motion in his book Principia in 1687 AD. Newton gave three physical laws of motion. These laws indicate the relationship between the force exerted on an object and the motion of that object generated from it.

278. Why does a fielder turn his arms backwards while catching a fast approaching cricket ball?
(a) Because he is nervous.
(b) Because it helps to aim the ball.
(c) Because he experiences less force over a longer period of time.
(d) Because it gives him vigilance.

RRB Group-D 15-11-2018 (Shift-I)

Ans : (c) The fielder turns his arm backwards while catching a fast approaching cricket ball. It follows Newton's second law of motion. i.e. the rate of momentum changes in the ball decreases due to which it experiences less force over a longer time. Therefore, the impact of the ball is less on the arm.

279. Shot from a rifle. What will be the kinetic energy of the rifle if the rifle comes backwards without stopping?
(a) More than the kinetic energy of the bullet
(b) Less than the kinetic energy of the bullet
(c) Equal to the kinetic energy of the bullet
(d) Zero

RRB Group-D 07-12-2018 (Shift-I)

Ans : (b) According to Newton's third law, when we apply force on a body, it exerts the same force back, it is also called action-reaction force. This is why if the gun pushes the gunner backwards, then the kinetic energy of the gun will be less than the kinetic energy of the bullet.

280. The product of mass and acceleration is called.
(a) Pressure (b) Impulse
(c) Thrust (d) Force

RRB Group-D 12-10-2018 (Shift-I)

Ans : (d) The rate of change of momentum is directly proportional to the applied force. The larger the force acting on a body, greater is the change in its momentum. Since change in momentum is equal to the product of mass and the rate of change in velocity and the mass of the body remains constant, so the rate of change of momentum is directly proportional to the rate of change of velocity i.e., acceleration. Hence force (F) is directly proportional to mass (m) and acceleration (a)

$$\boxed{F = ma}$$

281. Which of the following examples explains Newton's third law of motion?
(a) Rocket launching
(b) On the sudden move of the bus, the passengers get jerked backwards.
(c) When we stop pedaling, the cycle starts to slow down.
(d) While catching a fast approaching cricket ball, the fielder slowly moves his hand backwards with the moving ball.

RRB Group-D 02-11-2018 (Shift-III)

Ans. : (a) According to the Newton's third law of motion, if an object exerts a force on another object, the second object exerts the same force on the first object in the opposite direction. It is also called the law of action reaction. For example –
• Pushing the gun backwards when firing from the gun.
• Rocket launching etc.

282. When a sailor jumps in the forward direction, the boat drifts backwards. Which law of Newton represent the example -
(a) Second law of motion
(b) First and second law of motion
(c) Third law of motion
(d) First law of motion

RRB ALP & Tec. (31-08-18 Shift-III)

Ans : (c) Newton's Third Law of Motion : According to this law, to every action, there is an equal and opposite reaction.
When a sailor jumps out of a rowing boat, the boat moves backwards. As the sailor jumps forwards, he applies a backward force (action) on boat and the boat moves backwards due to the force of reaction.

283. Rocket launching is based on which law?
(a) Newton's third law of motion
(b) Newton's first law of motion
(c) Thermodynamic law
(d) All of Newton's laws of motion

RRB Group-D 15-10-2018 (Shift-III)

Ans : (a) Rocket launching is based on Newton's third law of motion.
Newton stated in his third law that every action has an equal and opposite reaction.

284. The force between the two objects is always equal and opposite. Which Newton's law gives idea about the statement:
(a) Third law of motion
(b) Second law of motion
(c) First and second law of motion
(d) First law of motion

RRB ALP & Tec. (31-08-18 Shift-I)

Ans : (a) Newton's Third Law of Motion - According to this law, to every action, there is an equal and opposite reaction.
When one objects exerts a force (action) on another object, then the second object also exerts a force (reaction) on the first. These two forces are always equal in magnitude but opposite in direction.

285. When a stationary bus starts moving, the people standing in it fall in the back direction. Which of the following law explains this situation?
(a) Newton's first law of motion
(b) Newton's third law of motion
(c) Newton's second law of motion
(d) Law of momentum conservation

RRB ALP & Tec. (30-08-18 Shift-II)

Ans : (a) Newton formulated three laws of motion– According to the first law, any object tries to maintain its state of motion or rest. It is also called the law of inertia. The statement in question is based on this law.

286. A man is standing in a boat in still water. If he tries to walk towards the shore, the boat will
(a) move away from the shore
(b) remain stationary
(c) sink
(d) move towards the shore

RRB J.E. (14.12.2014, Green paper)

Ans : (a) A man is standing on a boat in still water. If he walks towards the shore, the boat will move away from the the shore. This is according to Newton's Third Law of Motion, to every action there is equal and opposite reaction.

287. When bullet is fired from the gun, the gun pushes in the opposite direction. This is an example of Newton's law.
(a) First and second laws of motion
(b) Third law of motion
(c) Second law of motion
(d) First law of motion

RRB ALP & Tec. (13-08-18 Shift-II)

Ans : (b) According to Newton's third law of motion, when an object exerts a force on another object, the second object also exerts the same force on the first object, i.e. each action has its equal and opposite reaction. It is also called the Law of action-reaction. The example in question also follows Newton's third law of motion (action-reaction rule). For example, when a person jumps from the boat to the river, the boat goes backwards, launching of rockets, etc.

288. Newton's Third Law of Motion applies to which of the following situations?

(a) When a person jumps from the boat to the river, the boat goes backwards

(b) Passengers standing in a bus fall in the back direction, when the stationary bus suddenly moves

(c) When a person falls on the cement floor, he gets hurt

(d) While catching a fast moving cricket ball, a fielder puts his hands backwards

RRB Group-D 24-10-2018 (Shift-I)

Ans : (a) See the explanation of the above question.

289. Which of the following is an example of Newton's third law of motion:

(a) While catching a fast approaching cricket ball, the fielder slowly moves his hand backwards with the moving ball.

(b) When we stop paddling, the cycle slows down

(c) When a bus moves suddenly, the passengers are jerked backwards

(d) Rocket launching

RRB Group-D 17-09-2018 (Shift-I)

Ans : (d) See the explanation of the above question.

290. On what basis can the definition of force be interpreted?

(a) Newton's second law of motion

(b) Newton's first law of motion

(c) Newton's third law of motion

(d) Newton's law of gravity

RRB ALP & Tec. (20-08-18 Shift-III)

Ans : (b) Newtons' First Law of Motion– Anybody at rest or in uniform motion will remains at rest or in uniform motion unless an external force is applied to change that state. On basis Newton's first law of motion the definition of force be interpreted.

291. At any moment, the acceleration of a rocket is proportional to the n^{th} power of the velocity of the released gases. The value of 'n' should be–

(a) 1 (b) 2

(c) –1 (d) –2

RRB Group-D 31-10-2018 (Shift-II)

Ans : (a) Solid or liquid fuel is ignited in the presence of oxygen in a chamber within the rocket. Which produces gas at high pressure. This gas flows backwards with rapid velocity.

Thus, the speed of the escaping gas is in the opposite direction as the speed of the rocket.

At any moment, the acceleration of a rocket is proportional to the n^{th} power of the velocity of the released gases. The value of 'n' should be 1.

Rocket speed $\propto$ (gas speed)^n

where n = 1

292. A 70 kg man pushes a 50 kg man with the force of 50N. How much force has a 50 kg man pushed the other person?

(a) 50N (b) 30N

(c) 100N (d) 60N

RRB Group-D 24-09-2018 (Shift-II)

Ans : (a) According to Newton's Third Law (action-reaction), every action has an equal but opposite reaction. Therefore a 70 kg man pushes a 50 kg man with the force of 50N then the 50 kg man will push another person with the same force of 50N.

293. Newton's laws do not hold good for particles-

(a) at rest

(b) moving slowly

(c) move with high velocity

(d) move with velocity comparable to the velocity of light

RRB Group-D 20-09-2018 (Shift-III)

Ans : (d) Newton's laws of motion are applicable for matter which occupy some space and have some mass. It is not possible for any matter to travel with speed of light. Secondly the mass charges as the speed approaches speed of light. Newton's law is applicable only when mass is constant.

294. In the absence of gravitational force of attraction, propulsion on the rocket is:

(a) stable at the rate of exhaust gas is constant

(b) stable for short range rockets

(c) not stable

(d) stable

RRB Group-D 16-11-2018 (Shift-II)

Ans : (d) Rockets are based on Newton's third Law of motion (action-reaction). Solid or liquid fuel is ignited in a chamber within the rocket in the presence of oxygen, which produces gas at high pressure.

In the absence of gravitational force the Propulsion on the rocket is stable.

295. The tendency of an object to resist change in static or dynamic condition is called –

(a) momentum (b) force

(c) velocity (d) inertia

RRB Group-D 20-09-2018 (Shift-II)

Ans : (d) Inertia – Inertia is the natural tendency of a body to resist any change in its state of rest or uniform motion in a straight line. For example, a book lying on a table will remain there until an external force is applied on it to remove or displace it from that position.

Inertia is of three type :

(i) inertia of rest,

(ii) inertia of motion

(ii) inertia of direction.

296. The tendency of an object at rest stays at rest and an object in motion stays in motion is called–

(a) velocity (b) force

(c) momentum (d) inertia

RRB JE 02.06.2019 (Shift-I)

RRB ALP & Tec. (17-08-18 Shift-I)

Ans : (d) See the explanation of above question.

297. An athelete runs for some time before the high jump so that the inertia of the ——— helps him take the long jump.

(a) rest (b) direction

(c) size (d) speed

RRB ALP & Tec. (31-08-18 Shift-II)

Ans : (d) Inertia of Motion – The tendency of a body to remain in its state of uniform motion in a straight line, is called 'Inertia of Motion' .
Example
(i) An athelete runs for certain distance before taking a jump so that his inertia of motion or speed help him to take a longer jump.
(ii) If a horse running fast suddenly stops, the rider is thrown forward if he is not firmly seated.

298. The stock of books lying on the table does not move due to .....
(a) inertia (b) speed
(c) magnetism (d) gravity
RRB NTPC Stage Ist 26.04.2016 (Shift-II)

Ans : (a) Inertia – It is the inability of a body to change by itself its state of rest or of uniform. So the stack of books lying on the table does not move due to inertia.

299. The tendency of stationary objects to remains at rest or in motion at the constant velocity is called -
(a) force (b) inertia
(c) momentum (d) energy
RRB ALP & Tec. (10-08-18 Shift-I)

Ans : (b) According to Newton's First Law of Motion, a body by itself is not able to change its state of rest or of uniform motion. This property of a body is called 'inertia'. That is why the Newton's first law of motion is also called 'Law of Inertia'.
The Law of Inertia was formulated by Galileo. The inertia of an object is the measurement of its mass.

300. Why does a runner continues to run after crossing the finish line?
(a) Friction between his shoes and the ground causes him to move beyond the line
(b) Inertia of motion drives it forward
(c) Inertia of stability takes some time to stop it
(d) He wants to make sure that he crosses the line
RRB ALP & Tec. (20-08-18 Shift-II)

Ans : (b) A runner continues to run even after crossing the finish line as the inertia of momentum drives him forward. It takes some time to stabilize at a rapid pace.

301. The law of inertia was propounded by
(a) Isaac Newton (b) Albert Einstein
(c) John Dalton (d) Stephen Hawking
RRB NTPC 05.04.2016 (Shift-I) Stage Ist

Ans : (a) Inertia is the quality of an object which causes the object to resist any change in its state of motion or state of rest. The Law of Inertia was formulated by sir Isaac Newton. Newton's First Law of Motion is called the Law of Inertia.

302. When the car turns on a curved road, the passengers sitting in it feel a force on themselves in the opposite direction of the center, this force is due to …….
(a) centrifugal force (b) inertia
(c) centripetal force (d) gravitational force
RRB Group-D 16-11-2018 (Shift-I)

Ans : (b) The object in the inertia stops at rest until an external force is applied to it. It is necessary to exert force (Centrifugal force) on the object to move it, so when the car turns on a curved road, the passengers sitting in it feel a force in the opposite direction to the center, this force is due to inertia.

303. When the cardboard placed on the glass tumbler is flicked away with a finger a coin placed on it fall in the glass.
Which law defines the above statement –
(a) Principle of conservation of energy
(b) Law of inertia
(c) Newton's third law of motion
(d) Principle of conservation of momentum
RRB Group-D 17-09-2018 (Shift-II)

Ans : (b) Inertia is that quality of objects, due to which objects try to maintain their state of rest or state of motion, that is, they resist their change. When a card placed on a glass is pushed with a finger, the coin placed on it falls into the glass due to inertia. When the card is pushed, it enters a state of motion while the coin remains in a steady state due to inertia.

304. Among which of the following is the maximum value of inertia?
(a) Same size of rubber ball and stone
(b) Scooter and bus
(c) Ten rupee coins and five rupee coins
(d) Trains and aeroplanes
RRB Group-D 16-10-2018 (Shift-I)

Ans : (d) The inertia of a body depends upon the quantity of mass.
Among the following, trains and aeroplanes have the maximum mass. Hence, it posses maximum inertia.

(vi) Force

305. If two forces of 10 N and 5 N are applied in the same direction on an object, what will be the total force acting on the object?
(a) 10N (b) 25N
(c) 15N (d) 50N
RRB Group-D 18-09-2018(Shift-III)

Ans : (c) Resultant Force,

$$F = \sqrt{(F_1)^2 + (F_2)^2 + 2F_1 \times F_2 \cos\theta}$$

$\because$ both forces are acting in the same direction, so ,

$\theta = 0^0$, $\cos 0^0 = 1$

$$F = \sqrt{F_1^2 + F_2^2 + 2F_1F_2} \qquad F = \sqrt{(F_1 + F_2)^2}$$

So, $F = F_1 + F_2 = 10\ N + 5N = 15\ N$

306. If an object of mass m is raised to height h from the ground, force is required for this action. The minimum force required to lift an object is the same as ————.
(a) Distance from the ground
(b) Weight of the object
(c) Force applied
(d) Height of object
RRB Group-D 15-10-2018 (Shift-III)

Ans : (b) If an object of mass 'm' is raised to height h from the ground, force is required for this action. The minimum force required to lift an object is equal to the weight of the object.

307. What will be the force applied on an object of mass 'm' which is moving with acceleration 'a'?

(a) a/m (b) m/a
(c) m × a (d) a + m

RRB Group-D 12-10-2018 (Shift-II)

Ans : (c) If an object of mass 'm' is moving with acceleration 'a', the force applied on it = mass × acceleration.

$$F = m \times a$$

308. When a repulsive force 'F' is applied in the opposite direction, the angle between the two directions will be -

(a) 30° (b) 90°
(c) 180° (d) 60°

RRB Group-D 20-09-2018 (Shift-III)

Ans. : (c) When an repulsive force 'F' is applied in the opposite direction, there will be an angle of 180° between the two directions.

309. Which of the following physical units changes or tends to change the state of rest or uniform motion of an object?

(a) momentum (b) mass
(c) force (d) inertia

RRB ALP & Tec. (21-08-18 Shift-II)

Ans : (c) Force – It may be defined as a push or pull which changes or tends to change the state of rest or uniform motion or direction of motion of a body.

310. An object moves at a constant speed when there is no ..... on it.

(a) impulse (b) inertia
(c) force (d) pressure

RRB Group-D 04-10-2018 (Shift-I)

Ans : (c) An object moves at a constant speed when there is no external force on it. Force is a vector quantity. Its SI unit is Newton.

311. Which of the following is never alone in nature?

(a) inertia (b) force
(c) momentum (d) velocity

RRB ALP & Tec. (09-08-18 Shift-II)

Ans : (b) Force is a vector quantity that is never found alone in nature.
According to Newton's Third Law of Motion– To every action (force) there is an equal and opposite reaction (reactive force).
This indicates that there is atleast one reaction to the applied force that makes a pair of forces.

312. ..... is never alone in nature -

(a) force (b) velocity
(c) speed (d) pressure

RRB Group-D 20-09-2018 (Shift-II)

Ans : (a) See the explanation of above question.

313. In the force equation F is equal to-

(a) ma (b) mgh
(c) mv (d) u + at

RRB ALP & Tec. (13-08-18 Shift-III)

Ans : (a) Force is the external factor that changes or attempts to change the initial state of an object. Force is a vector physical quantity and its S.I. unit is 'Newton'.
If the mass of an object is 'm' and the force, applying F, accelerates under 'a', then –

$$F = m \times a$$

According to Newton's second law of motion, the force applied on an object is equal to the rate of change in momentum of that object.

314. Which of the following is the effect of balanced force applied on an object?

(a) Change in shape of an object
(b) Change in steady state of an object
(c) Change in the direction of speed of an object
(d) Change in the speed of an object

RRB Group-D 04-12-2018 (Shift-III)

Ans : (a) If the resultant force of all the forces on the object is zero, then the force acting on the object is called balanced force. The shape of the object always changes under the influence of a balanced force applied to an object.

315. Force = …….

(a) mass × acceleration
(b) mass × volume
(c) mass × pressure
(d) mass × velocity

RRB Group-D 28-11-2018 (Shift-I)
RRB Group-D 04-10-2018 (Shift-I)

Ans : (a) Force is the external factor that changes or tries to change the initial state of an object. Force is a vector quantity. Its SI unit is Newton.
From Newton's Second Law–
Newton's Second Law states that the acceleration of an object is dependent upon two variables– the net force acting upon the object and the mass of the object.

$$\text{Force} = \text{mass} \times \text{acceleration}$$

316. Mass × acceleration =?

(a) force (b) inversion
(c) velocity (d) pressure

RRB Group-D 25-09-2018 (Shift-II)

Ans : (a) See the explanation of the above question.

317. The effect of stress depends on which of the following?

(a) weight (b) volume
(c) mass (d) area

RRB Group-D 26-09-2018 (Shift-II)

Ans : (d) When the deforming force is applied to an object. The object deforms in order to bring the object back to the original shape and size, there will be an opposing force generated inside the object.
This restoring force will be equal in magnitude and opposite in direction to the applied deforming force. The measure of this restoring force generated per unit area of the material is called stress

Thus, stress is defined as **"The restoring force per unit area of the material".** It is a vector quantity. Denoted by Greek letter σ. Measured using **Pascal** or **N/m^2.**
Mathematically expressed as–

$$\sigma = \frac{F}{A}$$

where,
F is the restoring force measured in Newton or N.
A is the area of cross-section measured in m^2.

318. Which of the following statements will be applicable when an object of 10 kg mass capable of free to move can exert a force of 10 Newton?
(a) The body will move at a speed of 1 m / s.
(b) The body will accelerate with an acceleration of 10 ms^{-2}.
(c) The body will accelerate with an acceleration of 1 ms^{-2}.
(d) The body will move at a speed of 1 km / s.

RRB ALP & Tec. (29-08-18 Shift-III)

Ans : (c) Given, mass of the object = 10 kg
Force on object = 10 Newton
If the object is able to move freely, then
Force on object = mass of object × acceleration achieved by the object
$F = m \times a$
$10 = 10 \times a$
or $a = 1\ m/sec^2$

319. If an object is grabbed by both the ends and the force applied on it is called _____
(a) impulse (b) friction
(c) momentum (d) stretch

RRB Group-D 16-10-2018 (Shift-I)

Ans : (d) Force is the push or pull that is exerted by one body on another. Or when any one object is grabbed by both ends, the force applied on it is called stretch.

320. A constant force acts on an object of mass 5 kg for a period of 2 seconds. This increases the velocity of the object from 4 ms^{-1} to 7 ms^{-1}. Find the amount of force used.
(a) 5.5 N (b) 8.5 N
(c) 7.5 N (d) 4.8 N

RRB Group-D 28-09-2018 (Shift-III)

Ans : (c) Let the mass of the object (m) = 5 kg
Initial velocity of the object (u) = 4 ms^{-1}
Final velocity of object (v) = 7 ms^{-1}
And the time taken in it (t) = 2 seconds
Force on the object (F) =?
$\because F = ma$

$$\therefore a = \frac{v-u}{t}$$

$$F = \frac{m(v-u)}{t}$$

$$= \frac{5(7-4)}{2} = \frac{15}{2} = 7.5\,N$$

Thus, the quantity of force (F) on an object is 7.5N.

321. A cricket ball of mass 100g moving with a velocity of 30 m / s is stopped by a player in 0.05 seconds. The average force exerted by the player is –
(a) 15 N (b) 40 N
(c) -60 N (d) 60 N

RRB Group-D 23-10-2018 (Shift-II)

Ans : (c) Initial velocity (u) = 30 m/sec
mass (m) = 100 g = 0.1 kg
time (t) = 0.05 sec
Change of momentum = m(v-u)
= 0.1 (0–30)
= – 3.0
Change of momentum = impulse = -3.0
Impulse (I) = Average Force (F) × Time
Average force = impulse /time

$$F = \frac{I}{t} = \frac{-3}{0.05}$$

$\boxed{F = -60N}$

322. A 2 kg object is moving at an acceleration of 4 m / s^2. The total force applied to it is-
(a) 2.0 N (b) 4.0 N
(c) 0.5 N (d) 8.0 N

RRB Group-D 22-09-2018 (Shift-II)

Ans : (d) Force = mass (m) × acceleration (a)
$F = ma$ $\{\because m = 2\ kg, a = 4\ m/s^2\}$
$F = 2 \times 4 = 8\ N$

323. The speed of a body of mass 100 kg is increases 5 ms^{-1} to 15 ms^{-1} in 5 s and a uniform acceleration is imposed on it. Calculate the force exerted on the body.
(a) 200 Pa (b) 200 J
(c) 200 kg (d) 200 N

RRB Group-D 01-10-2018 (Shift-II)

Ans : (d) Let the mass of the body (m) = 100 kg
Initial velocity of the body (u) = 5 ms^{-1}
final velocity of the body (v) = 15 ms^{-1}
Time (t) = 5 s
Force (F) = ma

$$a = \frac{v-u}{t}$$

$$F = \frac{m(v-u)}{t} = \frac{100(15-5)}{5}$$

$$= \frac{100 \times 10}{5} = 200N$$

Hence the force exerted on the body is 200N.

324. An object of mass 20 kg is moved with an acceleration of 4m / s^2. Calculate the amount of force applied to it.
(a) 80N (b) 5N
(c) 10N (d) 25N

RRB Group-D 26-10-2018 (Shift-II)

Ans : (a) Given,
Mass (m) = 20 kg
Acceleration (a) = 4 m/s^2
Force (F) = mass (m) × acceleration (a)
= 20×4 = 80 N

325. Calculate the acceleration produced when a force of 100 N is applied to an object of mass 50 kg.

(a) 2 ms^{-2} (b) 2 ms^{2}
(c) 0.2 ms^{2} (d) 0.2 ms^{-2}

RRB Group-D 10-12-2018 (Shift-I)

Ans : (a) ∵ Force (F) = mass (m) × acceleration (a)

$F = m \times a$

$100 = 50 \times a$

$a = 2\ ms^{-2}$

326. A constant force acts on an object of mass 5 kg for a period of 2 seconds. This increases the velocity of the object from 6 ms^{-1} to 8 ms^{-1}. Find the amount of force applied.

(a) 5 N (b) 8 N
(c) 7 N (d) 4 N

RRB Group-D 28-09-2018 (Shift-I)

Ans : (a) Let the mass of the object is (m) = 5 kg.
Initial velocity of object (u) = 6 ms^{-1}
Final velocity of object (v) = 8 ms^{-1}
And the time taken t = 2 seconds
The force (F) =?

∵ F = ma

$$\therefore a = \frac{v-u}{t}$$

$$F = \frac{m(v-u)}{t} = \frac{5(8-6)}{2} = \frac{10}{2} = 5\,N$$

327. If an object with a mass of 25 kg is moving with the same acceleration as 8ms^{-2}, then the force exerted by the object is ———.

(a) 200 N (b) 200 J
(c) 200 ms^{-2} (d) 200 ms^{-2}

RRB Group-D 28-09-2018 (Shift-II)

Ans : (a) Mass (m) = 25 kg
Acceleration (a) = 8ms^{-2}
Force exerted by the object (F) = m.a
$= 25 \times 8 = 200$ N

328. Despite.....working on a substance, the quality to not change in shape is called.....

(a) external volume, rigidity
(b) external force, size
(c) external force, rigidity
(d) external area, rigidity

RRB Group-D 05-10-2018 (Shift-I)

Ans : (c) Despite external force working on a substance, the quality to not change in shape is called rigidity. External force is the factor that changes or tries to change the basic state of a body and due to the rigidity, that body opposes that force and it remains in its original state or tries to remain.

329. 15 kg mass is moving with an acceleration of 5ms^{-2}. So the force applied on it will be…

(a) 75 J (b) –75 N
(c) –75 J (d) 75 N

RRB Group-D 26-10-2018 (Shift-III)

Ans : (d) Here, Mass (m) = 15 kg
Acceleration (a) = 5m/s^2

$\boxed{F = ma}$

$F = 15 \times 5 = 75$ N

330. 10 kg ms^{-1} changes in the momentum of an object in 0.02 seconds, then the force acting on the object is:

(a) 200 N (b) 550 N
(c) 500 N (d) 100 N

RRB Group-D 05-11-2018 (Shift-II)

Ans : (c) Given -
t = 0.02 second
Momentum = 10 kg ms^{-1}
Force (F) = change in momentum/ time

$$= \frac{10}{0.02} = \frac{1000}{2} = 500\ N$$

331. Which of the following is not an effect of unbalanced force applied to an object?

(a) Change in the speed of an object
(b) Change in the direction of motion of an object
(c) Does not cause change in the speed of the object
(d) Change in the steady state of an object

RR B Group-D 06-12-2018 (Shift-III)

Ans : (c) Unbalanced force does not cause change in the speed of object it is not an effect of unbalanced force. The resultant force of all the forces exerted on an object is not zero, so such force is called unbalanced force. If an unbalanced force is applied on an object, there is a change in the speed, motion, steady state, etc. of the object.

332. When two equal forces are acting on a body and in the opposite direction, the force acting on the body becomes ——.

(a) two times (b) zero
(c) four times (d) three times

RRB Group-D 28-09-2018 (Shift-II)

Ans : (b) When two equal forces are acting in opposite directions on a body, the resultant force acting on the body becomes zero, as both opposite forces balance each other, hence no force acts upon the object.

333. When a continuous force acts on an object of 8 kg mass for 2 seconds, it increases the velocity of the object from 4 ms^{-1} to 9 ms^{-1}. What is the magnitude of the applied force?

(a) 21 N (b) 28 N
(c) 20 N (d) 22 N

RRB Group-D 24-09-2018 (Shift-II)

Ans : (c) Mass of object (m) = 8kg
Velocity of object (u) = 4 ms^{-1} increased by velocity (v) = 9 ms^{-1}
Time (t) = 2 sec.
F = ma

$$\Rightarrow a = \frac{v-u}{t}$$

$$F = \frac{m(v-u)}{t}$$

$$= \frac{8(9-4)}{2}$$

$$\Rightarrow \frac{8\times 5}{2} = \frac{40}{2} = 20\ N$$

Thus, the force applied on the object will be 20 N.

334. What is called pushing or pulling an object to move it?

(a) pressure (b) force
(c) friction (d) inertia

RRB Group-D 10-10-2018 (Shift-II)

Ans : (b) In science, a push or a pull on an object is called a force. Example - open or close the door its example of push or pule of an object.

335. Force between two bodies, always …….

(a) Used in the same and opposite directions
(b) Used in same direction
(c) Used in uneven and opposite directions
(d) Are separate forces

RRB Group-D 16-10-2018 (Shift-III)

Ans : (a) The force between two bodies is always used in the same and opposite direction.

336. . . . . is the interaction between two objects.

(a) inertia (b) momentum
(c) pressure (d) force

RRB Group-D 05-12-2018 (Shift-III)

Ans : (d) Whenever there is an interaction between two object, there is a force upon each of the objects. Force is a vector quantity. The SI unit of force is Newton.

337. In which of the following situations is the work done by negative force?

(a) When an object moves in a direction perpendicular to the direction of force.
(b) When the object moves at an angle in the direction of force.
(c) When an object moves in the opposite direction of force.
(d) When an object moves in the direction of force.

RRB Group-D 01-12-2018 (Shift-II)

Ans : (c) Force is the factor that changes or attempts to change the state of movement or motion of an object. Negative force is when an object moves in the opposite direction to the force.

338. What is the force exerted on any object by a solid surface in the normal direction?

(a) normal force (b) frictional force
(c) contact force (d) field force

RRB Group-D 01-12-2018 (Shift-II)

Ans : (a) The force exerted on any object by a solid surface in a normal direction is called normal force.

339. An example of pulling is -

(a) Hoisting the flag (b) Opening the door
(c) Lifting the curtain (d) Pushing the boy

RRB Group-D 27-11-2018 (Shift-III)

Ans : (a) Pulling is a type of force that brings an object closer to the subject.
Such as flag hoisting, gravity etc.

340. All forces have:

(a) both magnitude and direction
(b) density
(c) direction
(d) magnitude

RRB Group-D 27-11-2018 (Shift-I)

Ans : (a) Force is the external factor that changes or attempts to change the initial state of an object. It has both magnitude and direction.

341. A car is running at a speed of 72 km / h. It takes 4 seconds to stop after applying the brakes. If the mass of the car is 1000 kg. What is the magnitude of the force exerted by the brake?

(a) 4.0×10^3 N (b) 3.0×10^2 N
(c) 2.0×10^2 N (d) 5.0×10^3 N

RRB Group-D 27-11-2018 (Shift-I)

Ans : (d) Mass (m) = 1000 kg = 10^3 kg,
Initial velocity (u) = 72 km/hr
Time (t) = 4 s, Final velocity (v) = 0, Force (F) = ?
On changing the initial velocity to m/ s

$$u = \frac{72 \times 1000}{3600} = 20\ m/s$$

$$\because \quad a = \frac{v - u}{t}$$

$$= \frac{0 - 20}{4} = -5\ m/s^2$$

(Negative sign denotes 'retardation')

$\therefore$ from, F = ma ,
$= 10^3 \times 5$
$= 5.0 \times 10^3$ N

342. A force of 20 N is applied to an object and it accelerates with an acceleration of 2 m/sec^2. Calculate the mass of the object.

(a) 200 kg (b) 40 kg
(c) 20 kg (d) 10 kg

RRB Group-D 28-11-2018 (Shift-I)

Ans : (d) Force (F) = 20 N
Acceleration (a) = 2 m/sec^2
Mass (m) = ?
F = ma
20 = m× 2 = 10 kg

343. The force of gravity acting on an object is known as…

(a) mass (b) acceleration
(c) impulse (d) weight

RRB Group-D 17-09-2018 (Shift-I)

Ans : (d) A weight is a type of force applied by the earth to an object. It is related to the force of gravity. Earth pulls every object due to gravity, which causes a force to act on it, which is called the gravitational force. In this way, the gravitational force exerted on an object is called its weight. If mass of any object is 'm' then weight,

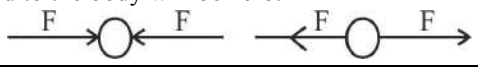
w = mg

344. When two equal forces are applied against a body in the opposite direction, the total force used on the body will be .....

(a) two times (b) four times
(c) three times (d) zero

RRB Group-D 16-10-2018 (Shift-III)

Ans : (d) Both the forces on the given body are same but due to being against each other, they will cancel each other's effect to zero. Thus the total resultant force applied to the body will be zero.



345. An object moves at a constant speed when no acting on it.

(a) impulse
(b) inertia
(c) force
(d) pressure

RRB Group-D 04-10-2018 (Shift-I)

Ans : (c) An object moves at a constant speed when there is no external force acting on it. Force is a vector quantity. Its SI unit is Newton

346. When a constant force acts on an object with a mass of 8 kg for a period of 3 seconds, it increases the velocity of the object from 4 ms^{-1} to 6 ms^{-1}. What is the gravity of the force used?

(a) 5.33 Newton
(b) 6.33 Newton
(c) 4.33 Newton
(d) 3.33 Newton

RRB Group-D 27-09-2018 (Shift-I)

Ans : (a) Accleration = change in velocity/ time

$$a = \frac{v-u}{t} = \frac{6-4}{3} = \frac{2}{3}\ m/sec^2$$

$$F = 8 \times \frac{2}{3} \Rightarrow F = 16/3\ N$$

F = 5.33 N

347. An object with a mass of 100 kg is accelerated uniformly with a velocity of 5 ms^{-1} to 17 ms^{-1} in 6s. The magnitude of the force exerted on an object is. . . . . .

(a) 200 ms^{-1} (b) 200 N
(c) 200 Pa (d) 200 ms^{-2}

RRB Group-D 26-09-2018 (Shift-I)

Ans : (b) Given,

m = 100 kg t = 6 sec
v_1 = 5 m/s v_2 = 17 m/s

acceleration (a) = change in velocity / time

$$a = \frac{v-u}{t}\ m/sec^2$$

$$a = \frac{17-5}{6} = \frac{12}{6}\ m/sec^2$$

$a = 2m/s^2$

Resultant force on object

F = ma

= 100 × 2 = 200 N

(vii) Linear Momentum

348. What is the momentum of an object having mass of 14 kg and velocity 28 m/s?

(a) 0.5 kg-m/s (b) 392 kg-m/s
(c) 1/392 kg-m/s (d) 2 kg-m/s

RRB NTPC 08.01.2021 (Shift-II) Stage Ist

Ans : (b) Momentum is the measure of velocity of a moving object. Higher the velocity, higher the momentum and higher the mass of object, higher the momentum.

Momentum = mass of body × velocity of body

$$\vec{P} = \vec{m}\vec{v}$$

So, Momentum of 14 kg mass and 28 m/s velocity will be

P = mv

P = 14×28

= 392 kg-m/s

349. What is the product of mass and velocity called?

(a) force (b) momentum
(c) pressure (d) inversion

RRB Group-D 25-09-2018 (Shift-II)

Ans : (b) The product of mass and velocity of an object is called the momentum of that object. i.e.,

Momentum = mass ×velocity

It is a vector quantity. Its SI unit is kg. m/sec.

350. Which of the following equations calculates momentum?

(a) momentum = mass / volume
(b) momentum = mass × velocity
(c) momentum = mass × acceleration
(d) momentum = mass × volume

RRB Group-D 16-11-2018 (Shift-III)

Ans : (b) See the explantion of above question.

351. The product of mass and velocity is …….

(a) stress (b) momentum
(c) force (d) pressure

RRB Group-D 26-09-2018 (Shift-III)

Ans : (b) See the explantion of above question.

352. Momentum = ————

(a) mass × velocity (b) mass / volume
(c) mass × density (d) mass × acceleration

RRB Group-D 23-10-2018 (Shift-II)

Ans : (a) See the explantion of above question.

353. The product of mass and velocity is called:

(a) buoyancy force (b) momentum
(c) pressure (d) force

RRB Group-D 23-10-2018 (Shift-III)

Ans : (b) See the explantion of above question.

354. Linear momentum is equal to ————.

(a) force × height (b) mass × velocity
(c) speed × weight (d) mass × volume

RRB Group-D 05-11-2018 (Shift-III)

Ans : (b) See the explantion of above question.

355. The mass of an object is 85 kg and the velocity is 60 ms^{-1}. Find the momentum of the object.

(a) 5,700kg ms^{-1} (b) 5,100kg ms^{-1}
(c) 51,000 kg ms^{-1} (d) 510kg ms^{-1}

RRB Group-D 12-12-2018 (Shift-I)

Ans : (b) Mass (m) = 85 kg
Velocity (v) = 60 ms^{-1}
Momentum (p) = ?
According to formula-
p = m . v = 85 × 60
Momentum (p) = 5100 kg ms^{-1}

356. What will be the momentum of an object of mass $\frac{m}{2}$ and whose velocity is 2v?

(a) mv^2 (b) mv

(c) $\frac{1}{2}mv$ (d) $(mv)^2$

RRB Group-D 24-09-2018 (Shift-I)

Ans : (b) Given–

$$\text{Mass} = \frac{m}{2}$$

$$\text{Velocity} = 2v$$

$$\boxed{\text{Momentum (p)} = \text{mass} \times \text{velocity}}$$

$$p = \frac{m}{2} \times 2v$$

$$\boxed{p = mv}$$

357. An object with a mass of 80 kg is moving with a velocity of 60 ms^{-1}. What will be the momentum generated in the object?

(a) 4800 $kgms^{-2}$ (b) 4800 $kgms^{-1}$

(c) 4800 $kgms^{1}$ (d) 4800 $kgms^{2}$

RRB Group-D 22-09-2018 (Shift-II)

Ans : (b) Momentum = mass ×velocity

{∵ m = 80 kg, v = 60 m/s}

$= 80 \times 60 = 4800\ kgms^{-1}$

358. An object of mass 50 kg is moving at a fixed velocity of 6 ms^{-1}. Calculate the momentum of the object.

(a) 300kg ms^{-2} (b) 300 kg ms^{-1}

(c) 30kg ms^{-1} (d) 30kg ms^{-2}

RRB Group-D 02-11-2018 (Shift-I)

Ans : (b) According to question,

m = 50 kg, v = 6 ms^{-1}, P = ?

According to formula- $\vec{P} = m\vec{v}$

Momentum (p) = 50 × 6 = 300kg ms^{-1}

359. The momentum of a moving object depends on some factors. Which of the following statements is most appropriate?

(a) The momentum of a moving object depends on its mass.

(b) The momentum of a moving object depends on its mass and velocity.

(c) The momentum of a moving object depends on its volume and velocity.

(d) The momentum of a moving object depends on its velocity.

RRB Group-D 01-12-2018 (Shift-II)

Ans : (b) The momentum of a moving object depends on its mass and velocity. The product of mass and velocity of an object is called the momentum of that object.

$$\boxed{\text{Momentum} = \text{mass} \times \text{velocity}}$$

360. If the velocity is doubled, then

(a) The momentum increases 3 times and the kinetic energy increases 4 times

(b) The momentum increases 4 times and the kinetic energy increases 3 times.

(c) Momentum increases 2 times and kinetic energy increases 4 times

(d) Momentum increases 4 times and kinetic energy increases 2 times

RRB Group-D 05-11-2018 (Shift-I)
RRB Group-D 26-11-2018 (Shift-III)

Ans : (c) If the speed of a moving object is doubled, the momentum (p) increases 2 times and the kinetic energy (E_k) increases by 4 times. Because kinetic energy is proportional to the square of the velocity of the object.

Kinetic energy $(E_k) = \frac{1}{2}mv^2$

$\because E_k \propto v^2$ and momentum = m.v.

Momentum $(P_1) = mv$ ..... (i)

v = 2 v [when velocity becomes double]

$p_2 = m(2v)$ ..... (ii)

From equation (i) and (ii)

$$\frac{p_1}{p_2} = \frac{1}{2}$$

Or $\boxed{p_2 = 2p_1}$

Kinetic energy = $E_1 = \frac{1}{2}mv^2$ ..... (iii)

Putting (v = 2v)

$$E_2 = \frac{1}{2}m\left(4v^2\right) \quad \text{..... (iv)}$$

From equation (iii) and (iv), we get-

$$\frac{E_1}{E_2} = \frac{1}{4}$$

Or $\boxed{E_2 = 4E_1}$

361. What will be the momentum of a body of mass 50 kg moving at a speed of 20 ms^{-1}?

(a) 25 kg ms^{-1} (b) 40 kg ms^{-1}

(c) 100 kg ms^{-1} (d) 1000 kg ms^{-1}

RRB Group-D 12-11-2018 (Shift-III)

Ans : (d) Given –

$v = 20ms^{-1}$, m = 50 kg

momentum (p) = mv

$= 50 \times 20 = 1000\ kg\ ms^{-1}$

362. If the speed of a moving object is doubled . . . . .

(a) Its potential energy is doubled.

(b) Its acceleration is doubled.

(c) Its momentum is doubled.

(d) Its kinetic energy is doubled.

RRB Group-D 05-12-2018 (Shift-I)

Ans : (c) If mass of the body= m

Initial velocity = v

Final velocity = 2v

Initial momentum of the object $(p_1) = m.v$

Final momentum $P_2 = m.(2v)$

$$\frac{p_1}{p_2} = \frac{mv}{2mv}$$

$$\boxed{p_2 = 2p_1}$$

Therefore, when the speed of the body is doubled, its momentum is doubled

363. In a collision, always saving of . . . . .
(a) pressure (b) force
(c) momentum (d) thrust

RRB Group-D 05-12-2018 (Shift-I)

Ans : (c) In a collision, always saving of momentum. According to the principle of momentum conservation, if no external force is applied on any particles, then the total momentum of this body remains constant i.e the momentum before and after collision is equal.

364. The momentum of an object depends on…
(a) Force on object
(b) Mass of the object
(c) Both mass and velocity of the object
(d) Velocity of object

RRB Group-D 04-10-2018 (Shift-II)

Ans : (c) The product of mass and velocity of an object is called momentum.
$\vec{p} = m\vec{v}$.
This is a vector quantity. The momentum of an object depends on both the mass and velocity of that object.

365. Product of momentum expressed as?
(a) mass and force (b) mass and acceleration
(c) mass and velocity (d) mass and inertia

RRB ALP & Tec. (09-08-18 Shift-I)

Ans : (c) See the explanation of above question.

366. An object with 200 g mass will have momentum with its 10 J kinetic energy –
(a) 2 kgm/s (b) 5 kgm/s
(c) 3 kgm/s (d) 0.33 kgm/s

RRB Group-D 26-09-2018 (Shift-II)

Ans : (a) Kinetic energy (K.E) = 10 J

$\frac{1}{2} \times mv^2 = 10$ (200g = 0.2kg)

$\frac{1}{2} \times 0.2 \times v^2 = 10$ (200gm/1000 gm = 0.2 kg)

$v^2 = 100$

v = 10 m/sec

Momentum = mass × velocity

= 0.2 × 10 = 2 kg m/s

367. Choose the most appropriate option - The momentum consists of ……
(a) no direction
(b) direction
(c) magnitude and direction
(d) magnitude

RRB Group-D 24-09-2018 (Shift-III)

Ans : (c) Momentum has both magnitude and direction because momentum is a vector quantity.

368. If momentum (p) and velocity (v) are given, the formula used to find mass (m) will be:
(a) p × v (b) p / v
(c) v / p (d) p + v

RRB Group-D 22-10-2018 (Shift-III)

Ans : (b) The product of mass and velocity of an object is called the momentum (p) of that object.

$p = v \times m$

$v = p/m$ and $m = \frac{p}{v}$

369. An object of mass 10 kg is moving with a velocity of 2 ms^{-1}. The momentum contained in the object is –
(a) 5 $kgms^{1}$ (b) 20 $kgms^{-1}$
(c) 5 $kgms^{-1}$ (d) 20 $kgms^{1}$

RRB Group-D 26-09-2018 (Shift-II)

Ans : (b) Given–

Momentum = mass × velocity {m=10 kg v= 2 m/s}

= 2 ×10 = 20 $kgms^{-1}$

370. The kinetic energy of a light and a heavy body is the same. Which of the following will have greater momentum?
(a) None
(b) Light body
(c) Heavy mass
(d) Both have same momentum.

RRB Group-D 12-12-2018 (Shift-III)

Ans : (c) Let the mass of the heavy body will be m_1 and the mass of the light body will be m_2.

$\because\ m_1 > m_2$

$\because\ \frac{m_1}{m_2} > 1$.....(i)

The kinetic energy of a heavy body = The kinetic energy of a light body

$\frac{1}{2} m_1 v_1^2 = \frac{1}{2} m_2 v_2^2$

$= \frac{(m_1 v_1)^2}{m_1} = \frac{(m_2 v_2)^2}{m_2}$

$\frac{P_1^2}{m_1} = \frac{P_2^2}{m_2}$

$\left(\frac{P_1}{P_2}\right)^2 = \frac{m_1}{m_2}$ .....(ii)

From equation (i) and (ii),

$\left(\frac{P_1}{P_2}\right)^2 > 1$

$P_1^2 > P_2^2$

$P_1 > P_2$

(viii) Principle of Conservation of Momentum

371. Body A whose mass is 2 kg and body B whose mass is 3 kg are moving towards each other at a velocity of 4 m / s and 2 m / s respectively, at the time of collision the elastic impact will be –
(a) forward towards B
(b) in the direction of A
(c) perpendicular to the direction of motion of both bodies
(d) in the opposite direction

RRB Group-D 22-09-2018 (Shift-I)

Ans : (d) Law of Conservation of Momentum– This law states that if a number of bodies are interacting with each other (i.e., exerting forces on each other), their total momentum remains conserved before and after the interaction, provided there is no external force acting on them.
Hence during the collision elastic impact will be in opposite direction.

372. A 40 gm bullet is fired horizontally from a gun of mass 3 kg has velocity of 180 m/s. Find the recoil velocity of gun?
(a) -1.8 ms^{-1} (b) -1.25 ms^{-1}
(c) – 2.4 ms^{-1} (d) – 3.0ms^{-1}

RRB Group-D 08-10-2018(Shift-III)

Ans : (c) $MV = -mv$
$3000 \times V = -40 \times 180$

$$V = -\frac{40\times180}{3000} = -\frac{24}{10} \qquad \left\{\begin{array}{l}\because v = 180 m/s \\ m = 40g \\ M = 3000g\end{array}\right\}$$

$V = –2.4$ m/s Or $V = –2.4$ ms^{-1}

373. Rockets work on the principle of _____ conservation.
(a) momentum (b) mass
(c) energy (d) velocity

RRB NTPC 31.01.2021 (Shift-I) Stage Ist

Ans : (a) Rocket works on the principle of conservation of momentum. Rocket emits gases in backward direction which creates momentum of the gases backward direction and thus by conservation of momentum, the rocket gets motion in the forward direction making it to move forward.

374. In a system when there is a collision between two nonelastic bodies, it consists of:
(a) Both momentum and kinetic energy are changed.
(b) The kinetic energy is changed but the momentum is conserved.
(c) The momentum is changed but the kinetic energy is conserved.
(d) Both momentum and kinetic energy are conserved.

RRB Group-D 16-11-2018 (Shift-I)

Ans : (b) In a system, when a collision occurs between two inelastic bodies, their kinetic energy is changed due to the force exerted on them, but the momentum is conserved.

375. A cube of mass 0.5 kg is moving at a speed of 2.0 m/s on a smooth surface. It collides with another object of 1.0 kg and both move together as a single object. What will be the energy loss during the collision?
(a) 0.16J (b) 1J
(c) 0.67J (d) 0.32J

RRB Group-D 10-12-2018(Shift-III)

Ans : (c) After the collision, the combined velocity of both object is V m/s.
By the principle of conservation of momentum,
$m_1v_1 + m_2v_2 = (m_1 + m_2) \times v$
$0.5 \times 2.0 = (0.5 + 1.0) \times v$

$$v = \frac{1}{1.5} = \frac{2}{3} m/s$$

$\therefore$ Energy loss = decrease in kinetic energy

$$= \frac{1}{2}\times0.5\times(2)^2 - \frac{1}{2}\times(0.5+1.0)\times\left(\frac{2}{3}\right)^2$$

$$= 1 - \frac{1}{3} = \frac{2}{3} = 0.67 \text{ Joule}$$

376. Flying a rocket can be understood by…
(a) Energy-conservation law
(b) Momentum-conservation law
(c) First law of motion
(d) Second law of motion

RRB Group-D 12-11-2018 (Shift-II)

Ans : (b) Flying of rockets – When a rocket is fired, it throws a stream of burnt gases in the vertically downward direction with a large velocity. So the outgoing gases have large momentum in the downward direction. According to the law of conservation of momentum, the rocket gets an equal and opposite momentum which causes it to fly up.

377. According to which of the following principles does a rocket works in space?
(a) Principle of conservation of momentum
(b) Principle of conservation of mass
(c) Principle of conservation of energy
(d) Principle of conservation of speed

RRB Group-D 01-10-2018 (Shift-II)

Ans : (a) See the explanation of above question.

378. After a shell explodes, many pieces fly off in different directions. What is conserved in this situation?
(a) potential energy (b) force
(c) work (d) momentum

RRB Group-D 17-09-2018 (Shift-III)

Ans : (d) After the explosion of a single shell many pieces fly away in different directions, then at this position the value of the resultant force is zero then momentum is conserved in it.

379. A 30 gram bullet is fired horizontally with a velocity of 150 ms^{-1} from a 2 kg pistol. What is the expected velocity of the pistol?
(a) –2.25 ms^{-1} (b) –1.5 ms^{-1}
(c) –1.25 ms^{-1} (d) –1.0 ms^{-1}

RRB Group-D 05-10-2018 (Shift-III)
RRB Group-D 08-10-2018 (Shift-I)

Ans : (a) Pistol momentum = bullet momentum
Bullet momentum = $m_2v_2 = 0.03 \times 150 = 4.5$
[$m_2 = 30$ g
$= \frac{30}{1000}$ kg = 0.03 kg]
Law of Conservation of Momentum,
$m_1v_1 = m_2v_2$
$2 \times v_1 = 4.5$
$v_1 = 2.25$ m/sec
$\because$ This velocity will be in the opposite direction of the fired bullet. Therefore, the expected velocity will be – 2.25 ms^{-1}.

380. A gun of mass 5 kg fires a bullet of mass 0.01 kg. If the initial velocity of bullet is 250 m/s then find the recoil velocity of gun.

(a) – 0.50 m/s (b) + 0.50 m/s
(c) – 0.25 m/s (d) + 0.25 m/s

RRB J.E. (14.12.2014, Yellow paper)

Ans : (a) Mass of bullet, $m_1 = 0.01$ kg
Mass of gun, $m_2 = 5$ kg
Initial velocity of bullet, $u_1 = 0$
Initial velocity of gun, $u_2 = 0$
Final velocity of bullet, $v_1 = 250$ m/s
Final velocity of gun, $v_2 = ?$
According to law of conservation of momentum,
Total momentum after the fire = Total momentum before the fire

$m_1v_1 + m_2v_2 = m_1u_1 + m_2u_2$

$m_1v_1 + m_2v_2 = 0$

$m_1v_1 = -m_2v_2$

$$v_2 = -\frac{m_1v_1}{m_2} = -\frac{0.01\times 250}{5}$$

$v_2 = -0.5$ m/s

The negative sign indicates that the direction in which the gun would recoil is opposite to that of the bullet.

381. A ball of mass 2 kg, moving with a velocity of 5m/s collides with another body of mass 4 kg at rest. What will be the velocity of both balls after the collision?

(a) 2.66 and 3.33 (b) 1.66 and 4.22
(c) 1.66 and 3.33 (d) 1.6 and 1.33

RRB Group-D 26-11-2018 (Shift-III)

Ans : (c) As per the rules of momentum conservation-

$m_1u_1 + m_2u_2 = (m_1+m_2)\ v$

$2 \times 5 + 4 \times 0 = (m_1 + m_2) \times v$

$10 + 0 = (2 + 4) \times v$

$10 = 6v$

or $v_1 + v_2 = v = \frac{10}{6} = 1.66$ m/sec.

again, $m_1u_1 + m_2u_2 = m_1v_1 + m_2v_2$

$2 \times 5 + 4 \times 0 = m_1 v_1 + m_2v_2$

$10 = 2 v_1 + 4 v_2$

$5 = v_1 + 2v_2$

now-

$v_1 + 2v_2 = 5$

$v_1 + v_2 = 1.66$

$v_2 = 3.33$m/sec

382. A 20g bullet is fired horizontally at a velocity of 150 ms^{-1} with a 3 kg pistol. What is the regressive velocity of the pistol?

(a) $-1.25ms^{-1}$ (b) $-1.0ms^{-1}$
(c) $-1.5ms^{-1}$ (d) $-2.0ms^{-1}$

RRB Group-D 05-10-2018 (Shift-I)

Ans : (b) From the principle of momentum conservation,

$mv = -MV$

$$\therefore -V = \frac{mv}{M}$$

where m= 0.02 kg, M = 3 kg, v = 150 m/s, -V = ?

$$-V = \frac{0.02\times 150}{3}$$

$-V = 1$

$V = -1$ m/s

Therefore, the regressive velocity of the pistol will be 1 ms^{-1}.

383. A 2,000 kg truck travelling at 10 m / s collides with a car parked at a traffic light. After the collision, both move together at a speed of 8m / s. Mass of car is. . . . . .

(a) 100 kg (b) 250 kg
(c) 500 kg (d) 750 kg

RRB Group-D 22-09-2018 (Shift-I)

Ans : (c) $m_1 =$ 2000kg.
$v_1 = 10$m/s.
$v = 8$m/s., $v_2 = 0$
$m_2 = m$ (mass of car)
From the principle of conservation of momentom,

$m_1v_1 + m_2v_2 = (m_1 + m_2)\ v$

$20000 + 0 = (2000 + m_2)\ 8$

$8m_2 = 20000 - 16000 = 4000$

$m_2 = 500$ kg

384. A bullet of mass 12 g is fired from a rifle. The bullet takes 0.006 second to move through its barrel and leaves it with a velocity of 300 m/s. What is the force exerted on the bullet by the rifle?

(a) 720 Newton (b) 180 Newton
(c) 900 Newton (d) 600 Newton

RRB Group-D 25-09-2018 (Shift-I)

Ans : (d) Mass of bullet = 12 grams

$$= \frac{12}{1000} = 0.012 \text{ kg}$$

Final velocity of bullet = 300 m / s.
Time = 0.006 seconds
From Newton's Second Law -

$F = ma$

$$F = m\times\left(\frac{v-u}{t}\right) \qquad \left\{\begin{matrix} v = u + at \\ a = \left[\frac{v-u}{t}\right] \end{matrix}\right\}$$

$$F = .012\times\left(\frac{300-0}{0.006}\right)$$

$$F = \frac{.012\times 300}{.006}$$

$\boxed{F = 600N}$

(ix) Distance and Displacement

385. ..... is a physical quantity amount that can never be negative.
(a) distance (b) force
(c) acceleration (d) velocity
RRB Group-D 12-10-2018 (Shift-II)

Ans : (a) Distance is a scalar quantity because it has only magintude and no direction. Distance covered is always positive or zero. It can never be negative. Force, acceleration and velocity are vector quantities that can have positive, negative, and zero values.

386. ..... is used to describe the overall motion of an object and to find its final position in terms of its initial position at a given time.
(a) Distance and speed
(b) Velocity and speed
(c) Distance and displacement
(d) Displacement and velocity
RRB Group-D 10-12-2018 (Shift-III)

Ans : (c) When an object moves along any path from one point 'P' to another point 'Q', the magnitude of its displacement will be the lowest distance between those two points. 'Distance' and 'displacement' are used to describe the overall motion of an object and to find its final position in terms of its initial position at a given time.

387. The product of velocity and time provides.
(a) distance (b) displacement
(c) momentum (d) speed
RRB Group-D 25-09-2018 (Shift-I)

Ans : (b) The product of velocity and time is called displacement. Displacement is the shortest distance travelled by an object between two points in a certain direction. This is the vector quantity. Its S.I. unit is meter.

388. If the distance travelled by an object is zero, what will be the displacement of the object?
(a) negative (b) zero
(c) positive (d) may or may not be zero
RRB ALP & Tec. (14-08-18 Shift-III)

Ans : (b) Distance can include linear or non-linear measures between two points; but displacement includes only a linear measure between two points.
For example
If a person runs 100 m, in straight line then both the distance and displacement are 100 m.
If a person runs around a circular track once (400 m) assuming that in the one round the distance covered is 400 m but the displacement is 0 m.
Hence, if the distance travelled by an object is zero, then the displacement of the object is also zero.

389. An object is thrown upwards. It reaches a height of 100 meters and then returns to the thrower. so .....
(a) The actual displacement of the object is 50 m
(b) The total distance travelled by the object is zero
(c) The actual displacement of the object is 100 m
(d) The actual displacement of the object is zero
RRB Group-D 10-12-2018 (Shift-III)

Ans : (d) When an object moves along any path from one point P to another point Q, the magnitude of this displacement will be the minimum distance between those two points. Displacement is a vector amount. When an object is thrown upwards, it reaches a height of 100 m and then returns to the thrower, then the actual displacement of the object is zero. Since minimum distance between final position and initial position is zero.

390. When the position of an object is continuously changing with time relative to an observer,
(a) It is said to be he is at zero velocity
(b) It is said to be he is dynamic condition.
(c) It is said to have covered some distance
(d) It is said that it is in a state of rest
RRB Group-D 31-10-2018 (Shift-III)

Ans : (b) When an object's position is continuously changing over time relative to an observer, it can be said that the object is moving or dynamic condition.
OR
We can say that object is in a state of motion, because object's position changes with time.

(x) Speed/Velocity

391. A driver drives his car at the constant speed and covers a distance of 288 m in 60 s. Find the speed
(a) 4.8 m/s (b) 3.8 m/s
(c) 5.8 m/s (d) 8.8 m/s
RRB Group-D 23-10-2018 (Shift-III)

Ans : (a) Speed = Distance / Time

$$= \frac{288}{60} = 4.8 \text{ m/s}$$

392. Kiran swims in a 90 m long pool. She covers 360 m in two turns by swimming from one end to the other and back along the same position of straight path. Find the average velocity of Kiran.
(a) 0 ms^{-1} (b) 3 ms^{-1}
(c) 5 ms^{-1} (d) 4 ms^{-1}
RRB Group-D 03-10-2018 (Shift-II)

Ans : (a) Since Kiran is coming back from where she swimming. Hence its displacement will be zero. Therefore the average velocity will be = 0 ms^{-1}.
Since average velocity = displacement per unit time

$$= \frac{\text{displacement}}{\text{time}} = 0$$

393. The acceleration of an object is the change in its …… per unit time.
(a) velocity (b) force
(c) momentum (d) displacement
RRB Group-D 13-12-2018 (Shift-II)

Ans : (a) Acceleration – It is defined as the rate of change of velocity with respect to time.

$$\text{Acceleration} = \frac{\text{Change in velocity}}{\text{Time taken}},$$

$$a = \frac{v - u}{t}$$

The SI unit of acceleration is m/s^2.

394. What is rate of change of position of an object with respect to a frame of reference, which is a function of time called?

(a) mechanics (b) vector

(c) velocity (d) magnitude

RRB NTPC 03.04.2016 (Shift-II) Stage I[st]

Ans : (c) The rate of change of position of an object with respect to a frame of reference which is a function of time is called velocity.

395. A graph showing the velocity of an object over time is called:

(a) velocity-time graph

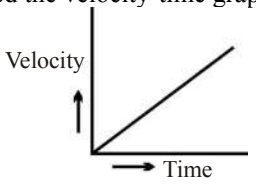
(b) velocity-displacement graph

(c) velocity-speed graph

(d) velocity-distance graph

RRB Group-D 22-10-2018 (Shift-I)

Ans : (a) A graph showing the velocity of an object over time is called the velocity-time graph.



The acceleration of a body can be determined by the ratio of the velocity-time graph.

$$a = \frac{dv}{dt},$$

a → Acceleration

The SI unit of acceleration is m/sec^2

396. Average speed and average velocity indicate the speed of the object:

(a) at a particular stage of time

(b) long distance

(c) in short distance

(d) during the given interval

RRB Group-D 09-10-2018 (Shift-I)

Ans : (d) Average speed = $\frac{\text{Total path length}}{\text{Time interval}}$

Average velocity = $\frac{\text{Displacement}}{\text{Time interval}}$

When an object moves along a straight line in the same direction, its total path length is equal to the magnitude of displacement. Therefore average speed and average velocity indicate the speed of the object during the given interval.

397. The speed of a bus on a crowded road is an example of …….

(a) uneven (b) uniform

(c) circular (d) linear

RRB Group-D 24-10-2018 (Shift-I)

Ans : (a) A bus moving on a crowded road is an example of uneven speed. In uneven speed, velocity changes with time. Its value varies at different time points.

398. The correct relation of speed, distance and time is .....

(a) S = T/D (b) S = D/T

(c) S = D × T (d) S = D – T

RRB Group-D 31-10-2018 (Shift-I)

Ans : (b) Speed - The distance travelled by an object per unit time is called speed. i.e.,

Speed (S) = Distance (D)/Time (T)

It is a scalar quantity. Its S.I. unit is meter / second.

399. The instantaneous velocity and average velocity are equal when the object ……..

(a) has uniform acceleration

(b) moving in a circle

(c) has variable acceleration

(d) has zero acceleration

RRB Group-D 02-11-2018 (Shift-II)

Ans : (d) The instantaneous velocity and average velocity are equal when the object has zero acceleration or velocity. The rate of change of velocity of an object is called acceleration. Its unit is meters per second^2. This is a vector quantity.

400. The rate of change of displacement is called–

(a) speed (b) momentum

(c) displacement (d) velocity

RRB Group-D 05-12-2018 (Shift-III)

RRB Group-D 03-10-2018 (Shift-I)

RRB ALP & Tec. (29-08-18 Shift-I)

Ans : (d) The rate of change of displacement is called velocity.

It is a physical quantity that gives both the speed and direction of motion of the body.

Velocity of a body is defined as the displacement produced per unit time. It is also defined as the speed of a body in a given direction

$$\text{Velocity} = \frac{\text{Displacement}}{\text{Time}}$$

S.I. unit of velocity is ms^{-1}.

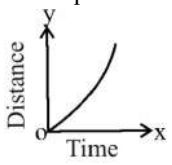
401. If an object covers an uneven distance in the same time interval, it is called ——.

(a) uneven speed (b) transformed speed

(c) equal speed (d) rotational speed

RRB Group-D 30-10-2018 (Shift-III)

Ans : (a) If an object covers an uneven distance in the same time interval, it is called uneven speed. When an object does not cover the same distance in the same time interval, this motion is called unequal motion. The distance time graph of unequal motion is a curve.



402. The motion of an object in a specified direction is called.

(a) speed (b) displacement

(c) velocity (d) speed

RRB Group-D 01-11-2018 (Shift-II)

Ans : (c) When an object travels the distance in a certain direction in unit time, it is called velocity of that object. Velocity is a vector quantity whose unit is m / s.

403. Which of the following quantities specifies its motion with direction?

(a) momentum (b) displacement

(c) velocity (d) force

RRB Group-D 04-12-2018 (Shift-II)

Ans : (c) Velocity is a physical quantity that specifies its motion with direction. The rate of displacement of a moving object, i.e the displacement in one second, is called the velocity of the object. Velocity is a vector quantity. Its unit is meter / second.

404. The speed of an object moving in a certain direction is known as which term in scientific terminology?

(a) velocity (b) speed

(c) acceleration (d) time

RRB Group-D 11-10-2018 (Shift-I)

Ans : (a) The speed of an object moving in a certain direction is called velocity in scientific terminology. This is a vector quantity, it depends on the displacement. While speed is a scalar quantity, it depends on the distance. The unit of velocity is meter / second.

405. The rate of change in displacement over time is called:

(a) acceleration (b) force

(c) velocity (d) speed

RRB Group-D 22-09-2018 (Shift-I)

Ans : (c) Velocity of a body is defined as the displacement produced per unit time. It is also defined as the speed of a body in a given direction

$$\text{Velocity rate of change in} = \frac{\text{Displacement}}{\text{Time}}$$

The S.I. unit of velocity is ms^{-1}

(xi) Projectile Motion

406. For maximum range, the angle of projection should be-

(a) 60^o (b) 75^o

(c) 30^o (d) 45^o

RRB Group-D 16-11-2018 (Shift-III)

Ans : (d) When an object is projected at 45^0 on the projectile path, it gets the maximum range (distance)

$$\text{Range} = \frac{u^2 \sin 2\theta}{g}$$

For maximum range, $2\theta = 90^0$

$= \theta = 45^0$

407. The trajectory (or path) of a projectile is ……

(a) straight line (b) parabola

(c) circle (d) hyperbola

RRB Group-D 16-11-2018 (Shift-III)

Ans : (b) Projectile motion is the form of motion by which a particle or object is projected at an angle from the horizontal near the surface of the Earth. The path of the projectile motion is called the projectile curve. The projectile path is 'parabolic'.

(xii) Acceleration

408. Change in velocity / time taken =

(a) impulse (b) speed

(c) acceleration (d) displacement

RRB Group-D 15-10-2018 (Shift-II)

Ans : (c) Acceleration is the rate of change in velocity of a body. This is a vector quantity. Its unit is meter per second square i.e m / sec^2. Its dimensional formula is $[LT^{-2}]$.

Acceleration = change in velocity/time

409. If the velocity of a car increases from 5 meters per second to 10 meters per second in 5 seconds, then what is its acceleration?

(a) 5 meters per square second

(b) 10 meters per square second

(c) 0.1 meter per square second

(d) 1 meter per square second

RRB ALP & Tec. (17-08-18 Shift-III)

Ans : (d) Acceleration =

(Final velocity - Initial velocity)/time

$$= \frac{10-5}{5}$$

$= 1$ m/sec^2

410. Applying a force of 5 newtons on a wooden plank with mass m_1 kg, it accelerates with an acceleration of 10 ms^{-2}. Another plank of mass m_2 kg accelerates with an acceleration of 20 ms^{-2} when the same force is applied. If both the planks are tied with each other and the same force is applied on them, what will be the acceleration?

(a) 6.67 ms^{-2} (b) 1.67 ms^{-2}

(c) 5.67 ms^{-2} (d) 4.67 ms^{-2}

RRB ALP & Tec. (30-08-18 Shift-I)

Ans : (a) In the first position,

From, $F = m \times a$

$5 = m_1 \times 10$

$$m_1 = \frac{5}{10} = \frac{1}{2} \text{ kg.}$$

In the second position,

From, $F = m \times a$

$5 = m_2 \times 20$

$$m_2 = \frac{5}{20} = \frac{1}{4} \text{ kg.}$$

When the two masses are combined,

$$m_1 + m_2 = \frac{1}{2} + \frac{1}{4} = \frac{6}{8} \text{ kg.}$$

From, $F = m \times a$ (Since the force is same in all situations)

$$5 = \frac{6}{8} \times a$$

Or, $a = 6.67 m/s^2$

411. When a force of 21 N is applied to an object of mass 3 kg, what will be the acceleration generated?

(a) 0.007 ms^{-2} (b) 0.7 ms^{-2}

(c) 7ms^{-2} (d) 70 ms^{-2}

RRB ALP & Tec. (21-08-18 Shift-I)

Ans : (c) F = 21N
m = 3kg.
a = ?
According to Newton's Second law of motion–
$F = ma$
$21 = 3 \times a$
$a = \frac{21}{3}$
$a = 7 m/s^2$

412. The rate of change of velocity is called?
(a) momentum (b) acceleration
(c) speed (d) force

RRB ALP & Tec. (17-08-18 Shift-III)

Ans : (b) The rate of change of velocity of an object is called acceleration. Acceleration is a vector quantity whose SI unit is m /s^2. Its dimensional formula is [LT^{-2}].

413. If 20 N force is applied on an object of mass 10 kg, what will be the acceleration?
(a) 100m/sec^2 (b) 200m/sec^2
(c) 5m/sec^2 (d) 2m/sec^2

RRB ALP & Tec. (29-08-18 Shift-I)

Ans : (d) According to Newton's Second Law of Motion – Force (F) = mass (m) × acceleration (a)
where, F = 20 N, m = 10 kg
Therefore, $a = \frac{F}{m}$
$a = \frac{20}{10}$
Acceleration, a = 2m/sec^2

414. An object of mass 150 kg is accelerated in 5 seconds with a velocity of 6 ms^{-1} to 16 ms^{-1}. Find the acceleration.
(a) 10 ms^{-2} (b) -2 ms^{-2}
(c) 2 ms^{-2} (d) - 10 ms^{-2}

RRB Group-D 12-10-2018 (Shift-II)

Ans : (c) Acceleration = change in velocity/time
i.e., $\frac{\text{Final velocity} - \text{Initial velocity}}{\text{Time}}$
$a = \frac{16-6}{5} = \frac{10}{5} = 2$ m/sec^2

415. Negative acceleration is opposite to which of the following direction?
(a) velocity (b) momentum
(c) force (d) distance

RRB ALP & Tec. (09-08-18 Shift-I)

Ans : (a) Negative acceleration is opposite to the velocity direction.
When the velocity of body decreases, its acceleration is negative. Negative acceleration is called 'retardation' or 'deacceleration'. When a stone is thrown upwards, it is under retardation. Similarly, when a bus approaches a bus-stop, its motion gets retarded.

416. Which of the following statements is true with respect to a car running at constant acceleration on a straight road with a flat plane?
(a) The acceleration of the car is zero.
(b) The velocity of the car is zero.
(c) The acceleration of the car is constantly changing.
(d) The velocity of the car is constantly changing.

RRB NTPC Stage Ist 19.01.2017 (Shift-III)

Ans : (d) If a body (car) is moving at a fixed acceleration, its velocity will change continuously, if the body is moving at a fixed speed, its acceleration will be zero because rate of change of velocity/unit time is called acceleration.

417. When an object is moving at the same speed, what will be its acceleration?
(a) negative (b) positive
(c) zero (d) variable

RRB Group-D 01-10-2018 (Shift-II)

Ans : (c) The rate of change in velocity of an object is called acceleration. Its unit is meters per second^2, and it is a vector quantity. When an object is moving at the same speed, its acceleration is always zero, because the speed of the object remains constant relative to time.

418. The velocity of a car increases uniformly from 18 kmh $^{-1}$ to 36 kmh $^{-1}$ in 5sec. Calculate the acceleration of the car.
(a) 4ms^{-2} (b) 1ms^{-2}
(c) 4ms^2 (d) 1ms^2

RRB Group-D 04-10-2018 (Shift-I)

Ans : (b) Acceleration = velocity change / time interval
$a = \frac{v_2 - v_1}{\Delta t}$, $\left[1\,km/hour = 1 \times \frac{5}{18}\,m/sec\right]$
$= \frac{(36-18) \times \frac{5}{18}}{5} = 1\ ms^{-2}$

419. The velocity of a car increases uniformly from 18 $kmhr^{-1}$ to 72 $kmhr^{-1}$ in 10 s. Calculate the acceleration of the car.
(a) 1.5 ms^{-2} (b) 15 ms^{-2}
(c) 1.5 ms^2 (d) 15 ms^{-1}

RRB Group-D 08-10-2018 (Shift-II)

Ans : (a) t= 10 sec,
$v_1 = 18 kmhr^{-1} = 18 \times \frac{5}{18} = 5\,m/s$,
$v_2 = 72 kmhr^{-1} = 72 \times \frac{5}{18} = 20\,m/s$
Acceleration = change in velocity/time interval
$= \frac{v_2 - v_1}{\Delta t} = \frac{20-5}{10} = \frac{15}{10} = 1.5\,m/s^2$

420. An iron sphere of mass 30 kg has the same diameter as an aluminium sphere of mass is 10.5 kg. Both spheres are dropped simultaneously from a tower. When they are 10 m above from the ground, they have the same –
(a) momentum (b) acceleration
(c) kinetic energy (d) potential energy

RRB Group-D 10-12-2018 (Shift-III)

Ans : (b) Mass of iron sphere (m_1 = 30 kg)

Mass of aluminium sphere ($m_2 = 10.5$ kg).
$\because m_1 > m_2$
So we can say that momentum $\rightarrow m_1v_1 > m_2v_2$,
Kinetic energy $\rightarrow \frac{1}{2}m_1v_1^2 > \frac{1}{2}m_2v_2^2 \quad (v_1 = v_2)$
Potential energy $\rightarrow m_1gh > m_2gh$
Therefore, it is clear that the acceleration of both the spheres will be the same. OR
The iron sphere and the aluminium sphere have different masses yet both will fall under the acceleration due to gravity $g = 9.8\ m/s^2$.
In a free fall, the accelerarion due to gravity does not depend on the mass of the object.

421. Zero acceleration means …….
(a) The velocity of the object is constant.
(b) The velocity of the object is low.
(c) The velocity of the object is zero.
(d) The velocity of the object increases.

RRB Group-D 12-12-2018 (Shift-I)

Ans : (a) The rate of change of velocity is called acceleration.
Acceleration = change in velocity/time
According to question,,
$\because a = 0$
Therefore, $0 = \frac{v-u}{t}$
$0 = u - v$
$v = u$
Or final velocity = initial velocity
Hence, in case of zero acceleration the velocity is constant.

422. Positive acceleration means ……. ….
(a) The velocity of the object is low.
(b) The velocity of the object is constant.
(c) The velocity of the object increases.
(d) The velocity of the object is zero.

RRB Group-D 04-12-2018 (Shift-II)

Ans : (c) Acceleration is the increase in the velocity of a moving object in one second, that is, the positive rate of change of velocity. If the velocity increases then the acceleration is considered positive.

423. Acceleration of an object moving at uniform velocity is -
(a) unequal (b) positive
(c) negative (d) zero

RRB Group-D 12-12-2018 (Shift-III)

Ans : (d) The rate of change of velocity of an object is called acceleration. Since the object is moving at the same velocity and there is no change in the velocity of the object, the acceleration of the object will be zero.

424. The dimension of acceleration is …….
(a) $L^1M^oT^{-2}$ (b) $L^1M^1T^2$
(c) $L^1M^2T^{-2}$ (d) $L^1M^0T^2$

RRB Group-D 18-09-2018 (Shift-III)

Ans : (a) Acceleration = $\frac{\text{change in velocity}}{\text{time}}$
Dimension of acceleration = $\frac{\text{dimension of velocity}}{\text{dimension of time}}$
$= \frac{\left[LT^{-1}\right]}{\left[T\right]} = [LT^{-2}]$

425. Starting from rest, Sunil's car attains a speed of 20 m/s in 10 sec. Find the acceleration of the car?
(a) $2\ ms^2$ (b) $2\ ms^{-2}$
(c) $2\ ms^1$ (d) $2\ ms^{-1}$

RRB Group-D 10-10-2018 (Shift-II)

Ans : (b) Acceleration = change in velocity/time
$\Rightarrow \frac{(20-0)}{10} = 2\ ms^{-2}$

426. Meaning of retardation is …… acceleration.
(a) negative
(b) positive
(c) All of the above options
(d) Zero

RRB Group-D 03-12-2018 (Shift-II)

Ans : (a) Retardation means negative acceleration. The rate of change of velocity is called acceleration. In the case of negative acceleration, the velocity of the object decreases, while in the case of positive acceleration there is a positive increase in the velocity of the object or vehicle.

427. The velocity of an object is proportional to the time elapsed. The object has –
(a) uneven acceleration
(b) uniform acceleration
(c) uniform speed
(d) uneven speed

RRB Group-D 07-12-2018 (Shift-III)

Ans : (b) The velocity of an object is proportional to the time elapsed, then the object has **uniform acceleration.** It means that the acceleration is constant. Non-uniform acceleration means that the acceleration is changing continously.

$$\boxed{a = \frac{v-u}{t}}$$

Uniform acceleration is change of equal velocity in equal intervals of time. Non-uniform acceleration is change of non-equal velocity in equal intervals of time.

428. Force / mass =. . ....
(a) momentum (b) acceleration
(c) displacement (d) velocity

RRB Group-D 06-12-2018 (Shift-III)

Ans : (b) Acceleration - The rate of change of velocity is called acceleration. Its SI unit is m/s^2, and it is a vector quantity.
Acceleration = change in velocity/time and
Force (f) = mass (m) × acceleration (a)
Then Acceleration = force/mass
i.e., $a = \frac{f}{m}$

429. A force of 350 N is applied to a mass of 500 kg. In this case what will be the acceleration generated in the object?

(a) $0.7ms^{2}$ (b) $0.7ms^{-2}$

(c) $0.7ms^{1}$ (d) $0.7ms^{-1}$

RRB Group-D 19-09-2018 (Shift-III)

Ans : (b) Given-−

F = 350 N, m = 500 kg, a = ?

According to Newton's second law of motion,

$$F = ma$$

$$\text{Acceleration} = \frac{F}{m}$$

$$= \frac{350}{500} = 0.7ms^{-2}$$

430. When acceleration is negative, the velocity of a body

(a) will increase (b) will be zero

(c) will decrease (d) will remain fixed

RRB Group-D 19-09-2018 (Shift-III)

Ans : (c) The rate of change in velocity of an object is called 'acceleration'. This is a vector quantity. If the velocity of the object decreases with time, the acceleration is negative which is called retardation.

431. ..... is the measure of change in velocity per unit time of an object.

(a) displacement (b) speed

(c) acceleration (d) momentum

RRB Group-D 05-12-2018 (Shift-II)

Ans : (c) Acceleration is the measure of change in velocity per unit time of an object.

432. A car accelerates uniformly from 18 kmh $^{-1}$ to 72 kmh $^{-1}$ in 5 seconds. The acceleration of the car is -

(a) $3ms^{-2}$ (b) $10.8ms^{-2}$

(c) $10.8ms^{2}$ (d) 3ms

RRB Group-D 27-09-2018 (Shift-I)

Ans : (a) Initial velocity = 18 km/hr $= 18 \times \frac{5}{18} = 5\,m/s$

Final velocity = 72 km/hr $= 72 \times \frac{5}{18} = 20\,m/s$

Time = 5 s

$$\text{Acceleration} = \frac{\text{change in velocity}}{\text{time}}$$

$$\text{Acceleration (a)} = \frac{v-u}{t}$$

$$a = \frac{20-5}{5} = 3ms^{-2}$$

433. The speed of an object falling freely is an example of :

(a) rectangular motion

(b) uneven accelerated motion

(c) uniform acceleration motion

(d) circular motion

RRB Group-D 25-09-2018 (Shift-III)

Ans : (c) When a body falls freely towards the earth, the acceleration due to gravity acts in its direction of motion (downward).

A body falling freely towards the earth has a uniform acceleration of 9.8 ms^{-2}.

434. Which of the following pairs always have the same direction?

(a) force, velocity

(b) force, acceleration

(c) force, displacement

(d) force, momentum

RRB Group-D 15-11-2018 (Shift-III)

Ans : (b) The direction of force and acceleration are always the same. Physical quantities, which have both magnitude and direction, are called vector quantities. Examples- force, acceleration, velocity, momentum, etc. Physical quantities that require only magnitude, but not direction, are called scalar quantities. Such as speed, distance, mass, volume etc.

435. Starting from a fixed position, Sony catches a speed of 60 ms^{-1} in 30s by bicycle. Calculate the acceleration of the bicycle?

(a) 0.2 ms^{-2} (b) 2 ms^{-2}

(c) 0.2 ms^{2} (d) 2 ms^{2}

RRB Group-D 05-12-2018 (Shift-I)

Ans : (b) Time (t) = 30 sec. Initial velocity (u) = 0

Final velocity (v) = 60 m/s

According to formula ,

Acceleration = Change in velocity/time

$$a = \frac{v-u}{t}$$

$$a = \frac{60-0}{30}$$

$$= \frac{60}{30} = 2\,m/s^{2}$$

436. What does the slope of velocity-time graph represent?

(a) distance (b) momentum

(c) acceleration (d) force

RRB Group-D 12-11-2018 (Shift-I)

Ans : (c) The rate of change of velocity is called acceleration. Its unit is meter / second^2, and it is a vector quantity. The slope of the line on the velocity-time graph is called acceleration.

437. Retardation means an object operates from.....

(a) fixed velocity (b) decreasing velocity

(c) increasing velocity (d) uniform velocity

RRB Group-D 07-12-2018 (Shift-I)

Ans : (b) Retardation is rate of decrease of velocity with time. In other words, it is negative acceleration.

(xiii) Equation of Linear Motion

438. A car starts from rest runs for 2 minutes with an uniform acceleration of 1 ms^{-2} . Find the speed obtained by car.

(a) 120 ms^{-2} (b) 120 ms^{-1}

(c) 120 ms^{1} (d) 120 ms^{2}

RRB Group-D 22-10-2018 (Shift-II)

Ans : (b) Here, u = 0
a = 1 m/sec^2
t = 2 minute = 60 × 2 = 120 sec
From first equation of motion
v = u + at
v = 0 +1 × 120
= 120 ms^{-1}

439. A boat starting from rest on a lake in a straight line at a constant acceleration rate of 3.0 m/s^2 for 8 second. How far does the boat travel during this time?
(a) 96 ms (b) 96 ms^{-1}
(c) 96 m (d) 96 ms^{-2}

RRB Group-D 23-10-2018 (Shift-II)

Ans : (c) From the second equation of motion,

$S = ut + \frac{1}{2}at^2$ $\{\because u = 0, a = 3\ m/s^2, t = 8\ sec\}$

$= 0 + \frac{1}{2} \times 3 \times 64$

S = 96 m

440. Third law of motion provides a relation between .... and velocity.
(a) position (b) force
(c) momentum (d) time

RRB Group-D 12-12-2018 (Shift-III)

Ans (a) According to Newton's Third Law of Motion, every action has an equal, but opposite reaction. The third law of motion shows the relationship between the position and velocity of an object.
$\boxed{v^2 - u^2 = 2as}$

441. If a trolley is moving at an acceleration of 2m/s^2 from rest, then after 4 seconds its velocity will be:
(a) 8 m/s (b) 2 m/s
(c) 8 m/s^2 (d) 2 m/s^2

RRB J.E. (14.12.2014, Green paper)

Ans : (a) Given –
a = 2 m/s^2
t = 4 sec.
Initial velocity (u) = 0,
Final velocity (v) = ?
From first equaiton of motion,
v = u +at
v = 0 + 2 × 4
v = 8 m/sec

442. In rectilinear motion, the objects move along-
(a) Straingt line (b) Ellipse
(c) Parabola (d) Circle

RRB JE. Stage - II 01-09-2019 (Shift - III)

Ans : (a) The movement of an object along straight line is known as rectilinear motion.

443. Starting from rest a train attains a speed of 90 km/hr in 5 minutes. Assuming that the acceleration is the same, then the distance travelled by the train at the same time will be
(a) 1.5 km (b) 3.25 km
(c) 2.25 km (d) 3.75 km

RRB ALP & Tec. (13-08-18 Shift-III)

Ans : (d) Given-–
Initial speed of train, u = 0 m/s
Final speed, v= $90 \times \frac{5}{18} = 25$ m/s
Time, t = 5 × 60 = 300 s
First equation of motion, v = u +at
25 =0 + a × 300
Acceleration $a = \frac{25}{300}$ m/s^2
Now from the second equation of motion,
$s = ut + \frac{1}{2}at^2$
Distance covered by train
$S = 0 + \frac{1}{2} \times \frac{25}{300} \times 300 \times 300$ m
S = 3750m
or S = 3.75 km.

444. An object, starting from rest, moves with constant acceleration of 4 m/s^2. After 8 second, its speed is :
(a) 16 meters per second
(b) 8 meters per second
(c) 32 meters per second
(d) 4 meters per second

RRB ALP & Tec. (21-08-18 Shift-III)

Ans : (c) From the first law of motion-
v= u+at
$v = 0 + 4 \times 8$ $\left\{\begin{array}{l}\because u = 0 \\ a = 4 m/s^2 \\ t = 8 sec\end{array}\right\}$
$v = 32 m/s$

445. The first equation of motion shows the relationship between:
(a) position and time
(b) position and velocity
(c) velocity and time
(d) velocity and acceleration

RRB ALP & Tec. (10-08-18 Shift-II)

Ans : (c) The equations of motion are mainly of three types.
v = u + at ..... (1)
$s = ut + \frac{1}{2}at^2$ ..... (2)
$v^2 = u^2 + 2as$ ..... (3)
where u = initial velocity, v = final velocity, s = distance and a = acceleration and t = time
The above equation (1) shows the relation between velocity and time.
Equation (2) shows the relation between position and time.
And equation (3) shows the relation between position and velocity.

446. Which of the following equations represents the velocity – time relation?

(a) $s = ut + \frac{1}{2}at^2$ (b) $2as = v^2 - u^2$

(c) $v = u + at$ (d) $v = u - at$

RRB Group-D 24-09-2018 (Shift-I)
RRB Group-D 29-10-2018 (Shift-III)
RRB Group-D 12-10-2018 (Shift-III)

Ans : (c) See the explanation of above question.

447. Which of the following equation shows the relation of position-velocity?

(a) $v = u + at$ (b) $2as = v^2 - u^2$

(c) $s = ut + 1/2\ at^2$ (d) $v = u + at$

RRB Group-D 23-10-2018 (Shift-III)
RRB Group-D 11-10-2018 (Shift-III)

Ans : (b) See the explanation of above question.

448. The second equation of motion indicates a relationship between position and _____.

(a) momentum (b) velocity

(c) displacement (d) time

RRB Group-D 04-12-2018 (Shift-II)

Ans : (d) See the explanation of above question.

449. The second equation of motion gives the relation between …… and time:

(a) momentum (b) acceleration

(c) velocity (d) position

RRB Group-D 22-09-2018 (Shift-I)
RRB Group-D 28-09-2018 (Shift-I)

Ans : (d) See the explanation of above question.

450. The relationship between which is shown by the second equation of motion:

(a) velocity and time

(b) position and time

(c) position and velocity

(d) velocity and acceleration

RRB ALP & Tec. (10-08-18 Shift-III)

Ans : (b) See the above explanation.

451. A car is running at the uniform acceleration of $1ms^{-2}$ in 5s at a speed of 5 ms^{-1} to 10 ms^{-1}. Find the distance travelled by the car at this time.

(a) 37 m (b) 37.5 m

(c) 30 m (d) 27.50 m

RRB Group-D 07-12-2018 (Shift-I)

Ans : (b) Given that,

$t = 5$ sec.

$a = 1\ m/s^2$

Initial velocity (u) = 5 m/s

Final velocity (v) = 10 m/s

From the second law of motion,

$$s = ut + \frac{1}{2}at^2$$

$$= 5 \times 5 + \frac{1}{2} \times 1 \times 25 = 37.5\ m$$

452. With respect to the equations of motion, which of the following is incorrect?

(a) $2as = u^2 - v^2$ (b) $s = ut + \frac{1}{2}at^2$

(c) $2as = v^2 - u^2$ (d) $v = u + at$

RRB Group-D 26-10-2018 (Shift-III)

Ans : (a) The established relation between the velocity, acceleration, time and distance travelled of an object is called the equation of motion. These are mainly of three types.

(1) $v = u + at \rightarrow$ Velocity-time relation

(2) $s = ut + \frac{1}{2}at^2 \rightarrow$ Position-time relation

(3) $2as = v^2 - u^2 \rightarrow$ Position velocity relation

Where u = initial velocity, a = acceleration

v = final velocity , s = displacement and t = time

453. Which one of the following is the equation of position – time relationship?

(a) $2as = v^2 - u^2$ (b) $V = u + at$

(c) $v = u + at$ (d) $s = ut + 1/2\ at^2$

RRB Group-D 11-10-2018 (Shift-I)
RRB Group-D 01-10-2018 (Shift-III)

Ans : (d) See the explanation of above question.

454. If a car at rest accelerates uniformly to a speed of 144 km / h in 20 seconds, then it covers a distance of-

(a) 400 m (b) 280 m

(c) 800 m (d) 200 m

RRB Group-D 24-10-2018 (Shift-II)

Ans : (a) From first equation of motion,

$v = u + at \ \because u = 0$

here, v = 144 km/hour

$$= 144 \times \frac{5}{18}\ m/sec$$

$$v = 0 + a \times 20$$

$$144 \times \frac{5}{18} = a \times 20$$

$$20 \times a = 40$$

$$a = 2\ m/s^2$$

$$\therefore s = ut + \frac{1}{2}at^2$$

$$s = 0 + \frac{1}{2} \times (2) \times (20)^2$$

$$= \frac{1}{2} \times (2) \times 400$$

$$s = 400\ meters$$

455. A bus starts from a rest and descends from hill with uniform acceleration. If it covers a distance of 200m in 10 sec, what is its acceleration?

(a) $4\ m/s^2$ (b) $6\ m/s^2$

(c) $8\ m/s^2$ (d) $2\ m/s^2$

RRB Group-D 15-10-2018 (Shift-II)

Ans : (a) According to the second equation of motion,

$$S = ut + \frac{1}{2}at^2$$

$$200 = 0 \times 10 + \frac{1}{2} \times a \times 10^2$$

$$200 = \frac{1}{2} \times a \times 100$$

$$a = \frac{200}{50} = 4\ m/s^2$$

456. An object with a mass of 1kg is moving towards east with a uniform velocity of 2m/s. A force of 1.5 N is applied on this towards the north. Find the value of displacement of the object after 2 seconds.

(a) 7 m (b) 4 m
(c) -5 m (d) 3 m

RRB Group-D 23-10-2018 (Shift-I)

Ans : (a) mass (m) = 1 kg
force, F = 1.5 N
velocity, v = 2 m/sec
time, t = 2 sec
displacement, (s) = ?
F = m.a
1.5 = 1.a
a = 1.5 m/sec^2

displacement (s) = $ut + \frac{1}{2}at^2$

$$s = 2\times 2 + \frac{1}{2}\times 1.5 \times 2^2$$

s = 4 + 3 = 7m

457. An object starts moving from its steady state. It achieves a speed of 5 m/s in 2 seconds. What will be its acceleration?

(a) 1 m/s^2 (b) 0.4 m/s^2
(c) 2.5 m/s^2 (d) 2 m/s^2

RRB Group-D 19-09-2018 (Shift-I)

Ans (c) u = 0
v = 5 m/s
t = 2 sec, a = ?
From the first equation of motion,
v = u + at
5 = 0 + 2 ×a

$$a = \frac{5}{2}$$

a = 2.5 m/s^2

458. Which of the following is not an uniform accelerated speed equation?

(a) $v^2 - u^2 = 2as$ (b) $v = u + at$
(c) $v - u = a + t$ (d) $s = ut + \frac{1}{2}at^2$

RRB Group-D 02-11-2018 (Shift-III)

Ans : (c) The Italian scientist Galileo first showed the equation of time, distance, velocity and the reciprocal relation of the same acceleration with respect to an object moving along a straight line. This equation is called the equation of motion.
There are mainly three types of equation of motion
v = u + at .....(i)
$s = ut + \frac{1}{2}at^2$ .....(ii)
$v^2 - u^2 = 2as$ .....(iii)
Where,
u = initial velocity, v = final velocity
s = distance, a = acceleration and
t = represents the time.

459. A child has 1/4 kg of a ball in his hand and he throws it vertically upwards. His hand arises 10 cm upwards and with his hand the ball exits at an upward velocity of 2 ms^{-1}. What is the value of the static force exerted by the child to throw the ball?

(a) 15 N (b) 10 N
(c) 7.5 N (d) 5 N

RRB Group-D 24-10-2018 (Shift-III)

Ans : (d)

Mass of ball (m) = $\frac{1}{4}$kg
h = 10 cm = 0.1 m
and its velocity (v) = 2 ms^{-1}
The force applied to throw the ball,
F = ?
$v^2 = u^2 + 2as$
$(2)^2 = 0 + 2 \times a \times 0.1$
$4 = 0.2 \times a$
a = 20 m/s^2
F = ma

$$= \frac{1}{4}\times 20 = 5 \text{ N}$$

460. Starting from a fixed position, Sony catches a speed of 6 ms^{-1} in 30s by bicycle. Calculate the acceleration of the bicycle?

(a) 0.2 ms^2 (b) 0.2 ms^{-2}
(c) 2 ms^{-2} (d) 2 ms^2

RRB Group-D 03-12-2018 (Shift-II)

Ans : (b)
Final velocity (v) = 6 m/sec
Initial velocity (u) = 0, t = 30 sec.
According to formula- v = u + at

$$6 = 0 + a \times 30 \quad \Rightarrow a = \frac{6}{30} = \frac{1}{5} = 0.2 \text{ m/sec}^2$$

Acceleration (a) = 0.2 m/sec^2

(xiv) Friction

461. Which of the following is not true about friction force?

(a) Friction is the force which opposes motion relative to two surfaces in contact.
(b) The force of friction that acts when a body is moving (sliding) on a surface is called sliding friction.
(c) Friction in machines wastes energy and also causes wear and tear.
(d) Rolling friction is much more than sliding friction, the use of ball bearings in a machine considerably reduces friction.

RRB NTPC Stage Ist 27.04.2016 (Shift-I)

Ans : (d) Sliding friction is friction that acts on objects when they are sliding over a surface. Sliding friction is weaker than static friction. While in case of rolling friction it is the friction that acts on objects when they are rolling over a surface. Rolling friction is much weaker than sliding friction or static friction. In case of ball bearings are another use of rolling friction. The out let parts of a wheel or other machine roll rather than slide over on another. The ball bearings, in this wheel reduce friction between the inner and outer cylinders when they turn.
It found that.
Rolling friction < Sliding friction < Static friction

462. A car stops on applying brakes mainly due to .....force.
(a) gravity (b) centripetal
(c) friction (d) centrifugal

RRB NTPC 19.04.2016 (Shift-I) Stage Ist

Ans : (c) A car stops mainly due to frictional force when applying the breaks. Frictional force refers to the force generated by two surface that contacts and slide against each other. The direction of the force of friction is always opposite to the direction of motion of the object.

463. If no force is applied on a moving object, what will cause to stop it ?
(a) impulse (b) stress
(c) friction (d) speed

RRB Group-D 22-09-2018 (Shift-III)

Ans : (c) If there is no force is applying on a moving object, the object will stop due to friction force. Friction force is always in opposite direction of the motion of object.

464. Which of the following occurs as a result of surface irregularities between two surfaces?
(a) friction (b) impulse
(c) stress (d) force torque

RRB Group-D 18-09-2018 (Shift-III)

Ans : (a) Friction occurs as a result of surface irregularities between two surfaces. This friction is parallel to the contact planes of the bodies. The force of friction acts in the opposite direction of motion of the body.

465. Frictional force applied to -
(a) perpendicular to the direction of force
(b) at an angle in the direction of force
(c) in the direction of force
(d) opposite to the direction of force

RRB Group-D 22-09-2018 (Shift-I)

Ans : (d) The force of friction acts in the opposite direction to the force exerted on the moving object. Due to the force of friction, we can walk on any surface.

466. When a bicycle is driven by constant acceleration then the friction force on the rear wheel is –
(a) zero
(b) in the forward direction
(c) backward direction
(d) all these

RRB SSE 21.12.2014

Ans : (b) When a bicycle is driven by constant acceleration then the friction force on the rear wheel is in the forward direction. When a bicycle is in motion the force of friction exerted by the ground on the two wheels (front and rear) is F_1 and F_2 respectively. Then F_1 is in backward direction and F_2 is in forward direction.

467. The characteristics of ..... is used in the braking pads of cars.
(a) Zero effect of friction
(b) Weight impulse force tension action
(c) Negative effect of friction
(d) Positive effect of friction

RRB ALP & Tec. (14-08-18 Shift-III)

Ans : (d) The brake pads are important component in the braking system of automotive. Material used for brake pads should have stable and reliable frictional and wear properties under varying conditions of load, velocity, temperature and high durability. The lubricant has a positive impact on friction in the case of friction between two bodies. The friction material for making pads must have stable friction.
The positive effect of friction in the braking pads of cars or vehicles is used.

468. The work done by the force of friction is.....
(a) always positive
(b) positive only for small frictional forces
(c) always negative
(d) positive only for large frictional forces

RRB Group-D 04-12-2018 (Shift-III)
RRB Group-D 27-11-2018 (Shift-III)

Ans : (c) Frictional force is always opposite to the relative motion of the body. When a body is dragged along the rough surface, the frictional force will be acting in the direction opposite to the displacement. The angle between the friction force and the displacement of the body will 180^0. Thus, the work done by the frictional force will be negative.

469. Which of the following is difficult without friction?
(a) Moving a heavy box from one place to another
(b) Playing carrom
(c) Holding a glass tumbler
(d) The movement of the door

RPF JE (Electrical) 19.09.2019 (Shift - III)

Ans : (c) Holding a glass tumbler is difficult because frictions get reduced.

470. The work done by friction does not destroy, but it is converted into ..... energy.
(a) thermal (b) nuclear
(c) chemical (d) friction

RRB Group-D 20-09-2018 (Shift-II)

Ans : (a) When an object slides or rolls on a surface, friction force arises between the touching surfaces that acts in the opposite direction of motion of the object. The work done by friction does not decay and gets converted into thermal energy.

(xv) Simple Harmonic Motion/ Rotational Motion

471. The pendulum acts like a harmonic oscillator, so it is used in -
(a) Grandfather's watch
(b) Wrist watch
(c) Sundial
(d) Sand Clock (Avarglass)

RRB NTPC Stage Ist 22.04.2016 (Shift-III)

Ans : (a) The pendulum acts like a harmonic oscillator, so it is used in grandfather's watch. A pendulum is a weight suspended from a pivot so that is can swing freely. When released the restoring force acting on the pendulum's mass causes it to oscillate about equilibrium position, swinging back and front. This phenomenon is called simple harmonic motion.

472. When the car takes a turn, what is the force that pushes us outward?
(a) centripetal force (b) centrifugal force
(c) frictional force (d) tension force

RRB NTPC 06.04.2016 (Shift-I) Stage Ist

Ans : (b) In mechanics the centrifugal force is an inertial force that appears to be moving radially outward from the center of the path of motion on objects moving circularly. When the cars takes turn, the centrifugal force pushes us outward.

473. The process of separating cream from the milk used in dairy is called -
(a) decantation (b) partial distillation
(c) centrifugation (d) crystallization

RRB NTPC Stage Ist 29.04.2016 (Shift-III)

Ans : (c) Centrifugal force is a force that arises from the body's inertia and appears to act on a body that is moving in a circular path which is directed away from the centre around which the body is moving.
Example -
(i) A bike making a turn.
(ii) The devices that separate cream from milk work on this principle.

474. When an object produces uniform circular velocity, which of the following changes?
(a) mass (b) momentum
(c) speed (d) direction

RRB ALP & Tec. (14-08-18 Shift-II)

Ans : (d) The direction of the velocity is directed in the same direction that the object moves. Since an object moving in uniform circular motion the perimeter of the circle with a constant speed, but its direction is continuously changing. Its direction is always tangent to the circle.
Example - Such as the movement of the Earth around the Sun, the movement of the electron around the nucleus, etc.

475. Motion of a spinning top is an example of -
(a) centripetal force (b) centrifugal force
(c) gravitational force (d) frictional force

RRB NTPC 06.04.2016 (Shift-II) Stage Ist

Ans : (a) In circular motion, a force acts on a body whose direction is always towards the center of the circle. This force is called the 'centripetal force'. The rotation of the spinning top is an example of this force. Some other examples of this force being used in daily life - the car turning on the road, mud-guard on wheels, the earth moving around the sun, while turning its bicycle by the cyclist, tilting his body towards the center with the bicycle Take etc.

476. The function of the pendulum clock of a very old model was completely …….
(a) Mechanical (b) Mechanical and Electrical
(c) electrically (d) battery operated

RRB NTPC 11.04.2016 (Shift-II) Stage Ist

Ans : (a) The function of the pendulum clock of a very old model was completely mechanical.
It was invented by Christian Hygens in 1656 AD.

477. What force acts in a rollercoaster ride?
(a) Centrifugal (b) Centripetal
(c) Gravitational (d) Normal

RRB NTPC Stage Ist 28.04.2016 (Shift-I)

Ans : (b) When an object moves in a circle which is roller coaster when it travels through a loop, the moving object is forced toward the centre of rotation. Its push toward the centre by centripetal force that keeps an object moving along curved path.

478. If a body moves on a curved path in transformed motion, this motion will be called.....
(a) simple linear motion
(b) simple periodic motion
(c) rotating motion
(d) curvilinear motion

RRB Group-D 12-11-2018 (Shift-II)

Ans : (d) The motion of an object or particle moving along with curved path is called curvilinear motion. Similarly, when a stone is thrown into the air from an angle, it performs a curvilinear motion.
Example - Throwing a paper airoplanes, motion of snakes, motion of a basket ball into the basket etc.

479. The required fixed force to drive a body in uniform circular motion is called -
(a) centrifugal force (b) gravitational force
(c) centripetal force (d) mechanical force

RRB Group-D 12-11-2018 (Shift-I)

Ans : (c) The required fixed force to drive a body in a uniform circular motion is called centripetal force.
If a body of mass (m) is moving at a circular path with radius (r) and speed (v), then the required centripetal force towards the center of the circle is-

$$\text{Centripetal force } (F_C) = \frac{mv^2}{r}$$

480. When an object rotates at a uniform circular motion. Which of the following change at each point?
(a) pressure (b) velocity
(c) inertia (d) mass

RRB Group-D 03-12-2018 (Shift-III)

Ans : (b) Uniform circular motion involves an object travelling a circular path at constant speed and each point as the direction of velocity changes. The direction of the tangent drawn at a point of the circle is the direction of velocity of the object at that point.

481. If the length of a simple pendulum is increased then its time period:
(a) will increase (b) will decrease
(c) will change (d) will remain the same
RRB J.E. (14.12.2014, Green paper)

Ans : (a) Time period, $T = 2\pi\sqrt{\frac{\ell}{g}}$

Where ℓ= length of pendulum
g = gravitational acceleration
When the length of a simple pendulum is increased, its time period will increases.

482. Which of the following is not true for oscillator?
(a) Signs can be sine wave.
(b) Signs can be square wave.
(c) Signs can be semi-square wave.
(d) Signal oscillation transmitted by radio transmitter is an example of signal.
RRB J.E. (14.12.2014, Green paper)

Ans : (c) An electrical oscillator is an electronic circuit that produces an electronic signal, which can be in the form often a sine wave or a square wave. But it cannot be in a semi-square wave.
Hence, common examples of signals generated by oscillators are the signal transmitted by the radio transmitter to the oscillator signal.

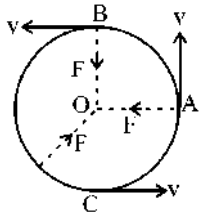
483. What is the motion of a body of constant speed in a circular path?
(a) circulating motion
(b) oscillating motion
(c) non-uniform circular motion
(d) uniform circular motion
RRB Group-D 16-10-2018 (Shift-III)

Ans : (d) The motion of a body moving continuously in a circular path is called uniform circular motion.
For example circular motion of the planets around the Sun, and the Moon or Satellites around the Earth, the motion of clock needles, the motion of electrons in the orbit of an atom, etc.

484. When an object moves along a circular path, the force acting on the rotating object towards the center is called -
(a) Angular force (b) Ordinary force
(c) Centripetal force (d) Gravitational force
RRB Group-D 17-09-2018 (Shift-I)

Ans : (c) An object moves along a circular path, the force acting on the rotating object towards the center is called centripetal force.
This force produces an acceleration in the moving object. The result of which is equal to v^2/r and the tendency is always to change the direction of the object and the direction is always towards the center.

$$F_C = \frac{mv^2}{r} = mr\omega^2$$



485. What is the time taken by a oscillator to complete an amplitude?
(a) amplitude (b) periodic
(c) distance (d) frequency
RRB Group-D 25-09-2018 (Shift-III)

Ans : (b) The time taken by a oscillator to complete an amplitude is called the time period. The amount of time taken for one complete cycle of motion.
Example - Simple pendulum speed, speed of mass hanging from a spring, etc.

486. The gravitational force of attraction between a satellite and the Earth accelerates –
(a) centripetal force (b) stress
(c) planar force (d) centrifugal force
RRB Group-D 18-09-2018 (Shift-II)

Ans : (a) In order to keep an object in circular motion, a force acts toward the center of the circle is called centripetal force.
For example, when Moon revolves around the Earth, the force of gravity between the Moon and the Earth acts as a centripetal force. The force of gravity between a satellite and the Earth accelerates the centripetal force.

487. The speed of the boy sitting on the swing is…
(a) uniform (b) circular
(c) uneven (d) periodic
RRB Group-D 31-10-2018 (Shift-II)

Ans : (d) The speed in which an object or body repeats itself at a fixed time interval and on a certain path is called periodic motion.
Exmaple- The speed of the boy sitting on the swing.

3. Gravitation

(i) Newton's Law of Gravitation

1. The Law of Gravitation was given by_____.
(a) Galileo Galilei (b) Isaac Newton
(c) Albert Einstein (d) Charles Darwin
RRB NTPC 27.02.2021 (Shift-I) Stage Ist

Ans : (b) The universal law of gravitation was given by Sir Issac Newton. According to this law, the attractive force between any two objects in the universe is directly proportional to the product of their masses and inversely proportional to the square of distance between them.

$$\Rightarrow \boxed{F = \frac{Gm_1m_2}{r^2}}$$

Where G is the universal gravitational constant and its value is 6.67×10^{-11} Nm^2/kg^2

2. Gravitational force is defined by the force of attraction between -

(a) two charges (b) two masses
(c) two magnets (d) multiple masses

RRB Group-D 08-10-2018 (Shift-I)

Ans : (b) According to Newton's law of Gravitational Force, the attraction force (F) acting between any two bodies in the universe is directly proportional to the product of their masses (m_1 and m_2) and inversely proportional to the square of the distance between them.

So, $F \propto \frac{m_1 m_2}{r^2}$

or $F = G\frac{m_1 m_2}{r^2}$

where, G is the Universal Gravitational Constant.

The value of (G) = 6.67×10^{-11} Nm^2 / kg^2.

3. Which of the two statements given by A and B is / are true? What is the force of gravitational:

A. Is directly proportional to the multiplication of the mass of two objects.
B. Is directly proportional to the square of the distance between to objects.

(a) Only B is true while A is false.
(b) Both A and B are untrue
(c) Only A is true while B is false.
(d) Both A and B are true.

RRB Group-D 05-11-2018 (Shift-I)
RRB Group-D 05-10-2018 (Shift-I)

Ans : (c) According to Newton's law of gravitational force, the attraction force (F) acting between any two bodies or object in the universe is directly proportional to the product of their masses (m_1 and m_2) and inversely proportional to the square of the distance between them. Thus, only statement (a) will be correct.

So, $F \propto \frac{m_1 m_2}{r^2}$ or $F = G\frac{m_1 m_2}{r^2}$

Where, G is universal gravitational constant.

The value of (G) = 6.67×10^{-11} Nm^2 / kg^2.

4. Every object in the universe attracts another object with a force, which is inversely proportional to the square of ————.

(a) their energy (b) their mass
(c) their distance (d) their velocities

RRB Group-D 12-10-2018 (Shift-I)

Ans : (c) See the explanation of above question.

5. Each object of the universe attracts another object by a force is proportional to. . . . . .

(a) product of their heights
(b) product of their volumes
(c) product of their masses
(d) product of their energies

RRB Group-D 15-11-2018 (Shift-I)

Ans : (c) See the explanation of above question.

6. The force of gravity between any two bodies in the universe does not depend on. . . . . .

(a) Distance between them
(b) Product of their masses
(c) Gravitational constant
(d) Sum of their masses

RRB Group-D 11-10-2018 (Shift-I)

Ans : (d) The force of gravity between any two bodies in the universe does not depend on Sum of their masses.

7. S.I. unit of universal gravitational constant G is -

(a) $N\,kg^{-2}/m^2$ (b) $N\,m^2\,kg^{-2}$
(c) N/m (d) N kg/m

RRB JE 24.05.2019 (Shift-III)

Ans : (b) S.I. unit of G (universal gravitational constant) is $Nm^2\,kg^{-2}$.

$G = 6.67 \times 10^{-11}\ Nm^2 / kg^2$.

8. Which one of the following is not true about Kepler's rules for planetary bodies?

(a) The orbit of a planet is an elliptical with the Sun at one of the two foci.
(b) A line segment connecting a planet and the sun makes an equal area outside during equal intervals of time.
(c) The square of its orbital period is proportional to the cube of the semi-principal axis of its orbit.
(d) The orbital period depends on the mass of the planet.

RRB NTPC 07.04.2016 (Shift-III) Stage Ist

Ans : (d) Kepler's 1st law, all the planets revolve around the sun in elliptical orbits having the sun at one of the foci.

Kepler's 2nd law, states that the areal velocity of a planet revolving around the sun in elliptical orbit remains constant which implies the angular momentum of a planet remains constant.

Kepler's 3rd law, the square of the time period of revolution of a planet around the sun in an elliptical orbit is directly proportional to the cube of its semi-principal axis.

$T^2 \propto a^3$

9. Which of the following among is a weak force?

(a) momentum force
(b) gravitational force
(c) mass
(d) short range force

RRB Group-D 26-10-2018 (Shift-II)

Ans : (b) Among the following Gravitational force is a week force.

10. What is the value of gravitational constant (G)?

(a) $6.6734 \times 10^{-11}\,m^2 / Kg^2$
(b) $6.67408 \times 10^{-11}\,m^3 Kg^{-1} S^{-2}$
(c) $6.6734 \times 10^{-11}\,N\,m^2 / kg^{-2}$
(d) $6.6734 \times 10^{-11}\,N - m^2 / kg^2$

RRB Group-D 20-09-2018 (Shift-I)
RRB Group-D 05-12-2018 (Shift-II)
RRB Group-D 23-10-2018 (Shift-III)

Ans : (d) G is a universal gravitational constant. The value of G is 6.67×10^{-11} Nm^2 / kg^2.

11. If the distance between two objects is doubled, what will be the effect on the force between them?

(a) The gravitational force will increase 4 times.
(b) Gravitational force will increase 2 times.
(c) Gravitational force will decrease 2 times.
(d) Gravitational force will decrease 4 times.

RRB Group-D 13-12-2018 (Shift-II)

Ans : (d) If the distance between two objects is doubled, the gravitational force between them will decrease four times.

$$F = G\frac{m_1 m_2}{d^2} \quad ------(i)$$

$$\boxed{F \propto \frac{1}{d^2}}$$

$\therefore$ If distance is doubled

$d_1 = 2d$

$$F_1 = G\ \frac{m_1 m_2}{d_1^2}$$

$$F_1 = G\ \frac{m_1 m_2}{(2d)^2} = G\frac{m_1 m_2}{4d^2}$$

$$\boxed{F_1 = \frac{F}{4}}$$ [from equation (i)]

12. What is the change in the gravitational force between two objects when the mass of one of the two objects is doubled?

(a) The force of gravitation is doubled.
(b) The force of gravitation is tripled.
(c) The force of gravitation becomes four times.
(d) The force of gravitation is halved.

RRB JE 25.05.2019 (Shift-I)

Ans : (a)

According to Newton's law of gravity , $F \propto \frac{m_1 m_2}{r^2}$

$$F_1 = G\ \frac{m_1 m_2}{r^2} \quad \text{..... (i)}$$

If a mass of doubled. i.e. let m_1 is doubled

$$F_2 = G\ \frac{2m_1 m_2}{r^2}$$

$$= G\times\frac{2m_1 m_2}{r^2}$$ [From equation (i)]

$$\boxed{F_2 = 2F_1}$$

13. If the mass of two objects is tripled then the force between the two objects will be:

(a) force will be two times
(b) force will remain same
(c) force will be nine times
(d) force will be three times

RRB Group-D 27-11-2018 (Shift-I)

Ans : (c) According to Newton's law of gravitational force- "The force between the two bodies of the universe is always directly proportional to the product of their masses (m_1 and m_2) and inversely proportional to the square of the distance (r) between them."

$$F_1 = G\frac{M_1 \times M_2}{r^2} \quad \text{..... (i)}$$

If mass is tripled, in this case -

$$F_2 = G\frac{3M_1 \times 3M_2}{r^2}$$

$$F_2 = 9G\ \frac{M_1 \times M_2}{r^2}$$

$$\boxed{F_2 = 9F_1}$$ [From equation (i)]

That means, the force will be nine times.

14. Which of the following statements is / are false?

A. The value of G is the same as its value on the moon, on Earth.
B. The gravitational force between the centers of two masses of 2 kg placed at a distance of 1m is 26.68×10^{-11} Nm^2/kg^2.
C. The force is inversely proportional to the square of the distance between the two objects.
D. The force of gravity between two objects doubles when the distance between them is halved.

(a) C and D only (b) A only
(c) Only D (d) B, C and D

RRB Group-D 31-10-2018 (Shift-I)

Ans : (c) Among the fundamental forces, the force of gravity is a weak force. According to Newton's law of gravitation, the force of attraction acting between any two bodies in the universe is directly proportional to the product of their mass and inversely proportional to the square of their distance. If the mass of two bodies is m_1 and m_2 and is located away from distance (r) each other,

Gravitational force $(F) = G\frac{m_1 m_2}{r^2}$ ..... (i)

$\therefore$ If distance is halved,

$$F_1 = \frac{G(m_1 m_2)}{(r/2)^2}$$

$$F_1 = \frac{4G(m_1 m_2)}{(r)^2}$$

$$\boxed{F_1 = 4F}$$ [from equation (i)]

15. The force of gravity exists between ..... objects, but cannot be felt until the mass of objects, such as planets, is very high -

(a) four (b) each and every
(c) only two (d) only one

RRB Group-D 24-10-2018 (Shift-I)

Ans : (b) The force of gravity is present between each object. But this cannot be realised unless the mass of the objects, such as planets, is very high.

16. The force of gravity on an object is called.

(a) weight (b) momentum
(c) stress (d) impulse

RRB Group-D 22-10-2018 (Shift-III)

Ans : (a) The force of gravity on an object is called a weight.

$\therefore$ w = mg

According to Newton's law of gravitational force.

$$F = G\frac{m_1 \times m_2}{d^2}$$

where G = universal gravitational constant

$G = 6.673 \times 10^{-11}$ N-m^2/kg^2

17. Discovery of universal gravitational constant 'G' had done by -

(a) Antoine-Laureate Lavoisier

(b) Isaac Newton

(c) Henry Cavendish

(d) John Dalton

RRB ALP & Tec. (09-08-18 Shift-III)
RRB Group-D 22-10-2018 (Shift-I)
RRB Group-D 30-10-2018 (Shift-II)

Ans : (c) The universal gravitational constant G was discovered by Henry Cavendish. .

18. The universal law of gravity applies to.....

(a) Sun and planets (b) Earth and Sun

(c) Earth and Moon (d) Any pair of objects

RRB Group-D 09-10-2018 (Shift-I)

Ans : (d) According to the universal law of gravitational force, due to the gravity of an object, the property of attracting other objects towards it by that object is called gravity. Since this property of the object exists everywhere in the universe and never ends. Hence the universal law of gravity applies to any pair of objects. The value of universal gravitational constant (G) is 6.67×10^{-11} Nm^2/kg^2

19. F = GM m/d^2 what is G called in the formula?

(a) Universal gravitational constant

(b) Acceleration due to gravity

(c) Gravitational force

(d) High altitude

RRB Group-D 05-11-2018 (Shift-III)

Ans : (a) Here G is a universal gravitational constant. The value of G is 6.67×10^{-11} Nm^2 / kg^2.

20. Suppose the gravitational force changes inversely from the n power of the distance, then the time period of the planet revolving around the Sun in a circular orbit of R radius, will be proportional-

(a) R^{-n} (b) R^n

(c) $R^{(n+1)/2}$ (d) $R^{(n-1)/2}$

RRB Group-D 15-11-2018 (Shift-I)

Ans : (c) Gravitational force $\propto \frac{1}{(\text{distance})^n}$

or, $F \propto \frac{1}{R^n}$ {R is radius)

or, $ma \propto \frac{1}{R^n}$ [F=ma]

or, $a \propto \frac{1}{R^n}$ [m = constant]

or, $R\omega^2 \propto \frac{1}{R^n}$ $(a = R\omega^2)$

or, $\omega^2 \propto \frac{1}{R^{n+1}}$

or, $\left(\frac{2\pi}{T}\right)^2 \propto \frac{1}{R^{n+1}}$ $\left(\omega = \frac{2\pi}{T},\right)$

or, $\frac{1}{T^2} \propto \frac{1}{R^{n+1}}$ $(4\pi^2 = \text{constant})$

or, $T^2 \propto R^{n+1}$

or, $T \propto R^{\frac{n+1}{2}}$

21. Which of the following statements is/are incorrect?

A. The value of G on the Moon is equal to the value of G on Earth.

B. The gravitational force applied between two objects placed at a distance of 1 meter from each other, whose masses are of 2 kg each, is 26.68×10^{-11} N.

C. Newton's law of gravity is valid only in the laboratory.

D. Force is inversely proportional to the square of the distance between two objects.

(a) B, C and D (b) Only C and D

(c) Only C (d) Only A

RRB ALP & Tec. (31-08-18 Shift-III)

Ans : (c) According to Newton's law of gravitational, force of attraction between any two objects is directly proportional to the product of the masses of the objects and inversely proportional to the square of the distance between them.

According to Newton's law, the attraction force $(F) = G\frac{M_1M_2}{R^2}$

Where, G is a constant, called universal gravitational constant. Therefore, the value of G on the Moon is equal to the value of G on Earth. If M_1=2Kg and M_2=2Kg and the distance them is (R) = 1 meter.

Gravitational Force, $(F) = G\frac{M_1M_2}{R^2}$

$$(F) = 6.67\times10^{-11}\times\frac{2\times2}{(1)^2}$$

$$(F) = \frac{6.67\times10^{-11}\times4}{1} = 26.68\times10^{-11}\text{N}$$

Thus, according to the above given statement, statement (c) is false

22. If the distance between two particles increases, what is the effect on the force of gravitational between them?

(a) increases (b) decreases

(c) becomes zero (d) remains the same

RRB Group-D 12-11-2018 (Shift-III)

Ans : (b) If the distance between two particles increases, the effect on the gravitational force between them decreases. According to Newton's Law of Gravitation, the force of attraction between any two bodies in the universe is directly proportional to the product of their mass and inversely proportional to the square of the distance between them.

$$F \propto \frac{m_1m_2}{r^2}$$

23. The force of gravity between of two objects is F. If the mass of objects is halved without changing their distance, the gravitational force will be:

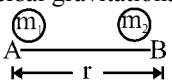
(a) 2F (b) F

(c) F/2 (d) F/4

RRB Group-D 16-11-2018 (Shift-I)

Ans : (d) Gravitational Force (F) = $G\frac{m_1m_2}{r^2}$ ..... (i)

Where, m_1, m_2 - mass of objects,
r - distance between objects and
G- universal gravitational constant.



If mass is halved

$$F_1 = \frac{G\frac{m_1}{2}\times\frac{m_2}{2}}{r^2} = \frac{1}{4}G\frac{m_1m_2}{r^2}$$

$$F_1 = \frac{1}{4}F \qquad \text{[from equaiton (i)]}$$

24. Earth attracts things towards itself this is due to...

(a) Gravitational force (b) Centripetal force

(c) Electromagnetic force (d) Centrifugal force

RRB Group-D 07-12-2018 (Shift-III)
RRB Group-D 25-10-2018 (Shift-II)

Ans : (a) The force of attraction between any two objects in the universe is called 'gravitational force'. Therefore, due to the force of gravity or gravitational force, the earth attracts any object towards it. As the fruit falls from the tree, throwing the stone up and coming back down.

25. Which of the following is not related to universal law of gravity?

(a) The force that binds us to the earth

(b) Moon movement around the Earth

(c) Tides due to Moon and Sun

(d) Movement of Earth around the Moon

RRB Group-D 01-12-2018 (Shift-II)
RRB Group-D 15-10-2018 (Shift-II)

Ans : (d) The mutual attraction between the objects acting on gravity and the force generated by it is called the force of gravity. We are tied to the Earth due to the force of gravity. Due to the force of gravity, the moon moves around the earth and due to the gravity of the moon and the sun, tides in the sea. Whereas the motion of the Earth around the moon is not related to the universal law of gravity.

26. What would be the minimum energy required to launch a satellite of m kg from the Earth's surface in a circular orbit at an altitude of 2R? The radius of the Earth is R.

(a) 2 mgR (b) 3 mgR

(c) $\frac{1}{5}$mgR (d) $\frac{5}{6}$mgR

RRB Group-D 02-11-2018 (Shift-II)

Ans : (d) According to Energy Conservation Law–
Total energy of the body on the surface of the Earth = Total energy at 2R distance from the Earth

$$\frac{-GMm}{R} + K.E \text{ (at a earth's surface with altitude 'h = R')}$$

$$= \frac{-GMm}{R+2R} + K.E \text{ (at a earth's surface with altitude 'h = 2R')}$$

$$\frac{-GMm}{R} + K.E = \frac{-GMm}{R+2R} + \frac{1}{2}mv^2$$

$$K.E = \frac{2GMm}{3R} + \frac{1}{2}mv^2 ...(i)$$

$\because$ Centripetal force in circular orbit = Force of gravity

$$\because \quad \frac{mv^2}{(R+2R)} = \frac{GMm}{(R+2R)^2}$$

$$v^2 = \frac{GM}{3R} .....(ii)$$

From equation (i) and (ii),

$$= \frac{2GMm}{3R} + \frac{1}{2}\frac{GMm}{3R}$$

$$K.E = \frac{5GMm}{6R} = \frac{5}{6}mgR \qquad \left(\because g = \frac{GM}{R^2}\right)$$

27. Which of the following statements is incorrect?

(a) The weight of the object is maximum at the poles and minimum at the equator.

(b) The weight of the object is minimum at the poles and maximum at the equator.

(c) The weight of the object at the center of the Earth is zero.

(d) When the object is moved to a higher height, its weight decreases.

RRB Group-D 02-11-2018 (Shift-I)

Ans : (b) From Newton's Law of Gravitational Force.

$$F = G\frac{m_1m_2}{r^2}$$

or, $m_2g = G\frac{m_1m_2}{r^2} \Rightarrow g = G\frac{m_1}{r^2}$

G = universal gravitational constant, g = gravitational acceleration, r = radius of Earth, m_2 = mass of body

m_1 = mass of earth,

or, $g \propto \frac{1}{r^2}$ or $\boxed{\text{weight} \propto \frac{1}{r^2}}$

The weight of an object will be maximum at the poles and minimum at the equator.

The weight of the object will decrease when it goes up because the value of r will increase when it goes up and the weight of an object at the center will be zero.

28. If the distance between two objects exceeds the normal distance by 6 times, the force of gravity will be -

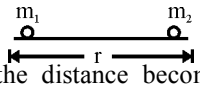
(a) 6 times (b) 36 times

(c) 1/36 times (d) 12 times

RRB Group-D 16-11-2018 (Shift-II)

Ans : (c) Let the two objects of masses be m_1 and m_2 and the distance between them is r.

Gravitational force, $F = G\frac{m_1 m_2}{r^2}$



When the distance becomes 6 times, the force (F ') between the objects

$$F' = G\ \frac{m_1.m_2}{(6r)^2}$$

$$F' = G\ \frac{m_1.m_2}{36r^2} \qquad \left[\because F = G\frac{m_1.m_2}{r^2}\right]$$

$$F' = \frac{F}{36}$$

29. What is called the force of attraction between any two physical objects?

(a) friction force (b) gravitational force
(c) centripetal force (d) mechanical force

RRB Group-D 16-11-2018 (Shift-II)
RRB Group-D 04-10-2018 (Shift-II)

Ans : (b) The force of attraction between any two physical objects is called the force of gravitational force. Isaac Newton gave the theory of gravitational force.
According to Newton's law of Gravitational Force,

$$= G\frac{m_1 \times m_2}{d^2}$$

G = universal gravitational constant
m_1, m_2 = mass of the body
d = distance between them.

30. Which force maintains the structure of our solar system?

(a) elastic (b) electrostatic
(c) mechanical force (d) gravitational

RRB Group-D 30-10-2018 (Shift-I)

Ans : (d) The solar system consists of the Sun and the celestial bodies, which are held in this system by the force of gravitational.

31. Symbol of universal gravitational constant is. . . . . .

(a) CG (b) G
(c) g (d) Cg

RRB Group-D 10-10-2018 (Shift-II)

Ans : (b) Newton's Law of Gravitation– The force of attraction acting between any two objects is proportional to the product of the masses of the objects and inversely proportional to the square of the distance between them.

$$F = G\frac{M_1 M_2}{R^2}$$

Here, i.e. G is a Universal Gravitational Constant.
The value of G is $6.67 \times 10^{-11}\ Nm^2 / kg^2$.

32. The value of acceleration due to gravity does not depend on.....

(a) Constant of gravity 'G'
(b) The mass of the object falling below 'm'
(c) Radius of Earth 'R'
(d) Earth's mass 'M'

RRB Group-D 08-10-2018 (Shift-II)
RRB Group-D 10-10-2018 (Shift-III)

Ans : (b) From, $g = G\frac{M_e}{R_e^2}$ value of acceleration due to gravity depends on the universal of gravitational constant (G), radius 'R' of the earth and mass 'M' of the earth. While the value of acceleration arising due to gravity does not depend on the mass of the object falling down. For this reason, when two objects of unequal mass fall on the earth from the same height, they fall on the earth simultaneously.

33. What will be the distance between these two bodies, if attraction force between two bodies is 1/9 F?

(a) three times (b) zero
(c) double (d) equal

RRB Group-D 10-10-2018 (Shift-I)

Ans : (a) If the mass of both bodies are m_1 and m_2 respectively and the force between the two bodies is F and F / 9. The distance between them is r_1 and r_2 and the universal gravitational constant is G.

$$F = \frac{Gm_1 m_2}{r_1^2} \text{.....(i)}$$

and $$\frac{F}{9} = \frac{Gm_1 m_2}{(r_2)^2} \text{.....(ii)}$$

from , Equation(i) ÷ Equation (ii)

$$\frac{F = \frac{Gm_1 m_2}{r_1^2}}{\frac{F}{9} = \frac{Gm_1 m_2}{r_2^2}}$$

or $$\frac{9F}{F} = \frac{r_2^2}{r_1^2}$$

or $$(3)^2 = \left(\frac{r_2}{r_1}\right)^2$$

or $$3 = \frac{r_2}{r_1}$$

or $$\boxed{r_2 = 3r_1}$$

Therefore, the distance between two bodies will be three times.

34. Which of the following is not an example of gravity?

(a) To prevent the planetary atmosphere from being separated from them.
(b) It helps in rotation of black hole.
(c) Keeps the stars connected together.
(d) The moon is in its orbit.

RRB Group-D 24-10-2018 (Shift-II)

Ans : (b) The mutual attraction of force acting between any two bodies is called gravitation and the force generated from it is called the force of gravitational. Such as the moon revolving around the earth, the earth revolving around the sun and preventing the planetary atmosphere from separating from them, connecting the stars, the moon being in its orbit, etc. Gravity is not responsible for the rotation of black holes.

(ii) Gravity and Motion Under Gravity

35. Free fall possible only in -

(a) atmosphere (b) air

(c) sea (d) vacuum

RRB Group-D 19-09-2018 (Shift-I)

Ans : (d) Any object falls freely in a vacuum because there is no effect of friction on the object.

36. What does the work done by gravity depend on?

(a) At the difference of the vertical heights of the initial and final positions of the object.

(b) Differentiation of changes in the initial and final states of the object.

(c) Differentiation of changes in the initial and final states of the object.

(d) Difference in the horizontal state of the object.

RRB Group-D 22-10-2018 (Shift-I)

Ans : (a) Work done by gravity

$w = (mgh_f - mgh_i)$

$= mg (h_f - h_i)$

Thus, the work done by gravity depends on the difference between the vertical heights of the initial and final states of the object.

37. Which of the following is incorrect statement -

(a) Gravitational acceleration (g) does not depend on the form, shape and mass of the body.

(b) Gravitational acceleration (g) is maximum at the poles.

(c) Gravitational acceleration (g) is minimum at the equator.

(d) If the lift is moving upwards with an acceleration, the virtual weight of a body is less than its actual weight.

RRB NTPC Stage Ist 29.04.2016 (Shift-III)

Ans : (d) Weight of body in lift-

(i) When the lift moving upward at a uniform speed, there is no change in the weight of the body.

(ii) When the lift goes up at an accelerated speed, the weight of the body increases. The weight of the body decreases while the lift descending at an accelerated speed.

(iii) If the lift lanyard (rope) breaks down while descending, the lift falls down in a free state, in which case the body becomes weightless i.e. the weight of the body feels zero. (But not mass)

38. If your weight 38 kg on Earth, what will be your weight on the planet Mercury?

(a) 19 kg (b) 760 kg

(c) 10 kg (d) 14.3 kg

RRB NTPC 29.03.2016 (Shift-II) Stage Ist

Ans : (d) Given, Weight on Earth = 38 kg

Note - Gravity of Mercury planet

$g_{mercury} = 0.378\ m/s^2$

Weight on Mercury = $38 \times 0.378 = 14.364$ kg.

39. Read the given statements (Assertion and Reason) carefully and select the most appropriate option with respect to them.

Assertion (a) : Trees grow against gravity

Reason (R) : Nature defines gravitational law

(a) Both A and R are true and R is the correct explanation of A

(b) A is true but R is false

(c) Both A and R are false

(d) Both A and R are true and R is not the correct explanation of A

RRB NTPC 20.01.2021 (Shift-I) Stage Ist

Ans : (b) Trees grow against gravity. The reason behind it is termed as Geotropism. It is a coordinated process of differential growth by a plant in response to gravity pulling on it. If the growth is in the direction of gravity then it is positive geotropism and if it is in the opposite direction of gravity then it is considered as negative geotropism. Nature doesnot defines gravitational law. Hence A is true but R is false.

40. If the mass of a person is 60 kg on the surface of earth then the same person's mass on the surface of the moon will be:

(a) 0 kg (b) 360 kg

(c) 60 kg (d) 10 kg

RRB NTPC 28.12.2020 (Shift-I) Stage Ist

Ans : (c) According to the formula,

Weight = mass × gravitation

Gravitational value on moon is $1/6^{th}$ to that of the Earth. But question has been in reference with mass which is a constant Quantity and is independent of gravity. Hence the mass of an individual is remains same, 60 kg at every place. Or that of moon.

41. If the mass of an object is 60 kg on the surface of the Earth, what will be its mass on the Moon?

(a) 60N (b) 60kg

(c) 10N (d) 10kg

RRB Group-D 23-10-2018 (Shift-I)

Ans : (b) See the explanation of above question.

42. The value of 'g' (gravity) varies from the value of 'R' (radius). A student would observe minimum 'g' at the:

(a) Equator (b) Tropic of Capricorn

(c) Poles (d) Tropic of Cancer

RRB NTPC 02.03.2021 (Shift-I) Stage Ist

Ans : (a) Gravitational acceleration is the acceleration of an object in free fall within a vacuum (and thus without experiencing drag). This is the steady gain in speed caused exclusively by the force of gravitational attraction which is denoted as 'g.' The value of gravitational acceleration depends upon the mass and radius of the earth. Though the mass of the earth is fixed and the value of radius is ever-changing because the earth is not round instead sphere in shape.The radius changes with the change in place. The value of radius is least at the poles whereas highest on the equator. Gravitational acceleration is inversely proportional to radius. So gravitational acceleration is least at the equator and highest on the poles.

43. How long will it take to reach its highest point, if a ball is punched upwards with an initial velocity of 25 m/s, [The value of g can be taken as 10 m /s^2].

(a) 10 seconds (b) 2.5 seconds
(c) 50 seconds (d) 5 seconds

RRB Group-D 01-10-2018 (Shift-I)

Ans : (b) From the Newton's first equation of motion due to gravity–

Given,

Initial velocity (u) = 25 m/s

$g = 10\ m/s^2$

Final velocity (v) = 0 m/s

From, $v = u - gt$

$0 = 25 - gt$

$-25 = -gt$

$gt = 25$

$t = \frac{25}{10}$

= 2.5 seconds

44. The point where the entire weight of an object functions is called ————.

(a) center of mass
(b) center of friction
(c) center of gravity
(d) center of pressure

RRB Group-D 18-09-2018 (Shift-I)

Ans : (c) The point where the entire weight of an object functions is called center of gravity.

45. The mass of an object is 10 kg. What will be its weight on Earth? ($g = 9.8\ ms^{-2}$)

(a) 10N (b) 10kg
(c) 98kg (d) 98N

RRB Group-D 04-12-2018 (Shift-III)

Ans : (d) The mass of a body is the amount of matter contained in it. The mass of any body remains fixed. The weight of the body changes along with changing the value of gravitational acceleration (g).

W (weight) = mg (mass × gravitational acceleration).

$= 10 \times 9.8 = 98N$

46. Unit of 'g', same as unit of acceleration, i.e. is.....

(a) ms^2 (b) ms^1
(c) ms^{-2} (d) ms^{-1}

RRB Group-D 24-10-2018 (Shift-III)

Ans : (c) The unit of gravitational acceleration 'g' is the same as the unit of acceleration [i.e. unit of 'g' is ms^{-2}].

47. Which of the following statements is false?

(a) The value of 'g' changes with height.
(b) The value of 'g' depends on the mass of the falling object.
(c) The value of 'g' depends on the mass of the Earth.
(d) The value of 'g' changes as goes deeper in the Earth.

RR B Group-D 06-12-2018 (Shift-III)

Ans : (b) The acceleration produced in an object by a gravitational force is called gravitational acceleration. It is denoted by 'g'. The value of gravitational acceleration 'g' on Earth is 9.8 m / s^2.

Suppose the mass of the Earth is M_e and the radius of the Earth is R_e, the mass of the object placed on the surface of the Earth is m, then the force or gravitational force exerted by the Earth on the object will be $F = GM_em/R^2$. Where G is the gravitational constant - where,

$G = 6.7 \times 10^{-11}\ Nm^2 / kg^2$

Change in value of 'g'-

(1) On moving up or down from the center of the Earth, the value of 'g' decreases.
(2) The value of 'g' is maximum at the poles and minimum at the equator.
(3) The value of 'g' decreases as the Earth's rotation speed increases and the value of 'g' increases as earth rotation speed decreases.
(4) The value of 'g' depends on the mass and radius of the Earth i.e. it changes with height or depth

48. The acceleration due to gravity is maximum at _____.

(a) poles
(b) Equator
(c) The center of the earth
(d) at infinite distance from the earth

ALP Stage -II 23.01.2019 (shift - II)

Ans : (a) The value of Gravitation acceleration will be maximum at poles and will be minimum at equator.

49. The weight of an object is 60 N when measured on the surface of the earth. What will be its weight when measured on the lunar surface?

(a) 10 N (b) 1 N
(c) 360 N (d) 3.6 N

RRB Group-D 22-10-2018 (Shift-III)

Ans : (a) The value of gravitational acceleration on the moon is $1/6^{th}$ of the gravitational acceleration on Earth.

∵ Gravitational acceleration on the Moon (g')

$= \frac{g}{6}$

∴ Weight of object on Moon = $60 \times \frac{1}{6} = 10N$

50. An object weights 60 N when measured on the surface of the earth, its weight on the lunar surface will be-

(a) 10 N (b) 100 N
(c) 360 N (d) 1 N

RRB Group-D 05-10-2018 (Shift-II)
RRB Group-D 28-09-2018 (Shift-III)

Ans : (a) See the explanation of above question.

51. Which of the following is not a chemical reaction?

(a) Decomposition (b) Oxidation
(c) Gravity (d) Hydrolysis

RRB NTPC 07.04.2016 (Shift-II) Stage Ist

Ans : (c) Gravity is not a chemical reaction. Gravity is a physical reaction. Physical change is the change in which the colour, form, shape, and dimensions of the substance changes. No new substance is formed in it. Such as dissolving of sugar in water, breaking of glass. The change in which a new substance is obtained (which is completely different in chemical and physical properties from the original substance) is called a chemical change such as rusting of iron, curdling of milk, etc.

52. Astronauts feel.....weight inside the spacecraft.

(a) more (b) less

(c) zero (d) depends on G force.

RRB NTPC 11.04.2016 (Shift-II) Stage I[st]

Ans : (c) The space passengers (Astronauts) inside the spacecraft are in a state of weightless, which they feel zero weight inside the space craft because gravitational acceleration in space is zero.

53. Acceleration due to gravity g = ...

(a) GMR^2 (b) MR^2/G

(c) G/MR^2 (d) GM/R^2

RRB Group-D 10-12-2018 (Shift-I)

Ans : (d) According to the law of gravitational, the force of attraction on the object by the Earth is given by–

$$F = G\frac{M_e m}{R_e^2} \qquad \text{----- (i)}$$

According to Newton's second law of motion, force (F) produces gravitational acceleration (g) an object.

$\because F = mg$ ---- (ii)

From equation (i) and equation (ii) –

$$\text{Gravitational acceleration}(g) = G\frac{M_e}{R_e^2}$$

And the value of gravitational acceleration (g) is 9.8 ms^{-2}

54. If the mass of the Sun, Earth and the distance between them are M, m and r respectively; The work done by the gravity of the Sun for a revolution around the Sun of the Earth.

(a) zero (b) $\frac{GMm}{r^2}$

(c) $\frac{GM.m}{r}.2\pi$ (d) $\frac{GMm}{r^2}.2\pi$

RRB J.E. (14.12.2014, Green paper)

Ans : (a) Zero

Work = force × displacement

W = Force × (the total displacement of the earth by a circle on a circular path will be zero)

Work will be = zero. $\therefore \boxed{w = 0}$

55. The weight of a body at the center of the Earth will be:

(a) zero

(b) infinite

(c) as much as on the surface of the earth

(d) None of the above

RRB J.E. 2014 (14.12.2014 Set-2, Red Paper)

Ans : (a) Gravitational acceleration at the center of the Earth is zero (g = 0). So, the weight on the center of the earth will be zero (i.e. w = 0) But the mass of the object will never be zero. The value of g at the poles and at the equator respectively is maximum and minimum.

56. What height can he jump on the moon, if a person jumps 1.5 meters hight on the earth? [The value of g on the moon is 1 / 6th]

(a) 4.5 m (b) 9 m

(c) 6 m (d) 7.5 m

RRB ALP & Tec. (13-08-18 Shift-I)

Ans : (b) If the initial velocity and final velocity for jumping on Earth and Moon are 'u_1, u_2' and 'V_1, V_2' respectively –

According to question-

$$\frac{V_1^2}{V_2^2} = \frac{u_1^2 - 2g_1h_1}{u_2^2 - 2g_2h_2}$$

Before jumping to the Moon and the Earth $u_1 = u_2 = 0$, after jumping $V_1 = V_2$

again: $\frac{2g_1h_1}{2g_2h_2} = 1$

or $g_1h_1 = g_2h_2$ $\left[\begin{array}{l}\text{jumps height } (h_1) = 1.5 \text{ on earth} \\ \&(h_2) \text{ on the moon jump's height}\end{array}\right]$

$9.8 \times 1.5 = \frac{9.8}{6} \times h_2$

or $\boxed{h_2 = 9.0m}$

57. The acceleration due to gravity on the Earth's surface (mass M and radius R) is proportional to .....

(a) $\frac{M}{R^2}$ (b) $\frac{M}{R}$

(c) MR (d) $\frac{M^2}{R}$

RRB ALP & Tec. (17-08-18 Shift-III)

Ans : (a) The value of acceleration (g) is proportional to $\frac{M_e}{R_e^2}$ due to gravity on the surface of the Earth (mass M_e and radius R_e.

$$g = \frac{Gm_e}{R_e^2}$$

G = Universal gravitational constant

g = gravitational acceleration or acceleration due to gravity

M_e = Mass of earth

R_e = Earth's radius

58. Suppose an imaginary planet whose mass is equal to half of the earth and radius is one-third. If the acceleration due to gravity on the Earth's surface is g, then what will be the acceleration due to gravity on that planet?

(a) (1/2)g (b) (9/2)g

(c) (5/2)g (d) (3/2)g

RRB ALP & Tec. (17-08-18 Shift-II)

Ans : (b) If the mass of the Earth is M_e and the radius R_e and the gravitational acceleration 'g' on the Earth and the imaginary planet gravitational acceleration g_1 and the universal gravitational constant is G

then,

$$g = \frac{GM_e}{R_e^2} \quad \text{..... (1)}$$

if planet's mass = $\frac{M_e}{2}$ and radius = $\frac{R_e}{3}$

Then the gravitational acceleration (g_1) of planet

$$g_1 = \frac{\frac{GM_e}{2}}{\left(\frac{R_e}{3}\right)^2}$$

$$g_1 = \frac{\frac{GM_e}{2}}{\frac{R_e^2}{9}} \text{ or } g_1 = \frac{9}{2}\frac{GM_e}{R_e^2}$$

$$\boxed{g_1 = \frac{9}{2}g}$$ [from equation (i)]

59. Suppose an imaginary planet whose mass and radius are equal to half of the Earth. If the acceleration due to gravity on the Earth's surface is g, then what will be the acceleration due to gravity on that planet:

(a) g (b) $\frac{g}{2}$

(c) $\frac{g}{4}$ (d) 2g

RRB ALP & Tec. (20-08-18 Shift-I)

Ans : (d) Value of g on earth

$$g = \frac{GM_e}{R_e^2} \quad \text{..... (i)}$$

Suppose the gravity of the new planet is g '

$$g' = \frac{GM'}{(R')^2}$$

$$g' = \frac{G(M_e/2)}{(R_e/2)^2} \quad \left\{\because M' = \frac{M_e}{2},\ R' = \frac{R_e}{2}\right\}$$

$$g' = 2 \times \frac{GM_e}{R^2}$$

$$\boxed{g' = 2g}$$ [from equation (i)]

60. Suppose there is a planet whose mass and radius are twice the mass and radius of the Earth. The acceleration due to gravity on the surface of that planet is n times that of Earth. What will be the value of n :

(a) 4 (b) 1

(c) $\frac{1}{2}$ (d) 2

RRB ALP & Tec. (21-08-18 Shift-III)

Ans. : (c) Gravitational acceleration on earth (g)

$$g = \frac{G.M_e}{R_e^2}$$

Mass of second planet (M') = Mass of Earth× 2

$$M' = 2M_e$$

Radius (R ') = Radius of Earth ×2

$$= 2R_e$$

Thus, the gravitational acceleration of another planet

$$(g') = \frac{GM'}{R'^2}$$

$$g' = \frac{G.2M_e}{(2R_e)^2}$$

$$g' = \frac{GM_e}{2R_e^2}$$

[If gravitational acceleration of planet (g') is 'n' time that of earth's gravitational acceleration (g)]

$$ng = \frac{1}{2}\frac{GM_e}{R_e^2} \qquad \{\because g' = ng\}$$

$$n = \frac{1}{2} \quad \left\{\because g = \frac{GM_e}{R_e^2}\right\}$$

61. What is the value of acceleration due to gravity on the surface of the Earth?

(a) 10.8 meters per square second

(b) 9.8 centimeters per square second

(c) 9.6 centimeters per square second

(d) 9.8 meters per square second

RRB ALP & Tec. (31-08-18 Shift-I)

Ans. : (d) Gravitational acceleration on the surface of the Earth (g) = $\frac{GM_e}{R_e^2}$

$G = 6.67 \times 10^{-11}\ Nm^2/kg^2$

$M_e = 5.9722 \times 10^{24}$ kg

$R_e = 6.4 \times 10^6$ meter

$$g = \frac{6.67 \times 10^{-11} \times 5.97 \times 10^{24}}{(6.4 \times 10^6)^2}$$

$$= \frac{39.8199 \times 10^{13}}{40.96 \times 10^{12}}$$

$= 0.972 \times 10$

$= 9.72\ m/s^2 = 9.8\ m/s^2$

62. What is the value of the acceleration due to gravity (g) of Earth?

(a) 5.4 m s^{-2} (b) 9.8 m s^{-2}

(c) 3.8 m s^{-2} (d) 6.8 m s^{-2}

RRB JE CBT-II 31.08.2019 IInd Shift

Ans : (b) See the explanation of above question.

63. The weight of an object on Earth is 200 N and mass is 20 kg. What will be the value of gravitational acceleration?

(a) 9.8 m/s^{-2} (b) 10 m/s^2

(c) 9.8 m/s^{-2} (d) 10 m/s^{-2}

RRB Group-D 05-10-2018 (Shift-I)

Ans : (b) ∵ Weight = mass × gravitational acceleration

$$\text{Gravitational acceleration} = \frac{\text{weight}}{\text{mass}}$$

$$= \frac{200}{20} = 10 \text{ m/s}^2$$

64. Suppose a planet whose mass and radius is one-third of the mass and radius of the Earth. If the value of acceleration due to gravity on Earth is g, then its value on the planet will be....

(a) $\frac{1}{9}g$ (b) $9g$

(c) $\frac{1}{3}g$ (d) $3g$

RRB Group-D 19-09-2018 (Shift-II)

Ans : (d) If the acceleration due to gravity on the Earth is 'g' and 'g_1' on the unknown planet. The mass of the Earth is 'M_e' and the radius of the Earth is 'R_e' and the universal gravitational constant is 'G'.

Now, for Earth, $g = \frac{GM_e}{(R_e)^2}$ ----- (i)

For unknown planet,

$g_1 = G\frac{M_1}{R_1^2}$

If $\left(M_1 = \frac{M_e}{3} \text{ and } R_1 = \frac{R_e}{3}\right)$

$$g_1 = \frac{G\frac{M_e}{3}}{\left(\frac{R_e}{3}\right)^2} = \frac{G\frac{M_e}{3}}{\frac{R_e^2}{9}}$$

$$g_1 = \frac{9GM_e}{3R_e^2} = \frac{3GM_e}{R_e^2} \quad \text{----- (ii)}$$

From equation (i) and equation (ii),

or, $g_1 = 3g$

65. What will be the effect on the rock brought from the lunar surface?

(a) Its weight will change.

(b) Its mass will change.

(c) Both its mass and weight will change.

(d) Both its mass and weight will remain the same

RRB Group-D 27-11-2018 (Shift-III)

Ans : (a) The value of gravitational acceleration g on the Moon is $1/6^{th}$ of the value of gravitational acceleration on Earth. Therefore, the weight of the rock brought from the surface of the moon will change.

66. When two eggs are dropped from a certain height in such a way that one egg falls on the floor and the other on the pillow, which of the following will not be a possible outcome?

(a) Objects dropped from different heights exert different levels of force.

(b) Both eggs will break.

(c) The egg falling on the paved floor will break, because for a short period of time a wide force acts on it.

(d) The egg falling on the pillow will not break, because a small force acts on the egg for a long time.

RRB Group-D 05-11-2018 (Shift-III)

Ans : (b) When two eggs are dropped from a certain height in such a way that one egg falls on the concrete floor and the other on the pillow, the following possible consequences will be –

1. The egg falling on the floor will break because a wide force acts on it for a short period of time.
2. The egg falling on the pillow will not break, because a small force acts on the egg for a long time.
3. Objects dropped from different heights exert different levels of force.

Both eggs will break, this will not be a possible result.

67. The weight of an object is maximum:

(a) at the poles (b) equator

(c) on the tropics (d) on the sub tropics

RRB Group-D 17-09-2018 (Shift-II)

Ans : (a) The weight of an object is maximum at the poles because the value of the gravitational acceleration is maximum at the poles while it is minimum at the equator.

68. The movement of the Moon around the Earth is due to…

(a) Gravitational force (b) Centrifugal force

(c) Concentric force (d) Nuclear force

RRB Group-D 24-10-2018 (Shift-I)

Ans : (a) The movement of the Moon around the Earth is due to the force of gravity. i.e. gravitational force.

69. What will be the weight of the body on the pole compared to the weight of a body on the Earth's equator?

(a) The weight of the body on the poles will be less than its weight on the equator.

(b) The weight of the body on the poles will be equal to its weight on the equator.

(c) The weight of the body on the poles will be greater than its weight on the equator.

(d) The weight of the body on the poles will be zero.

RRB Group-D 09-10-2018 (Shift-II)

Ans : (c) The weight of the body on the pole will be greater than its weight on the Equator.

Since $g \propto \frac{1}{R_e^2}$,

Thus, the gravitational acceleration (g) at the equator is the minimum and the maximum at the pole a value of g is 9.8 m / s^2, which is derived at 45^0 latitudes and at sea level.

70. Gravitational acceleration at the surface of the Earth is 9.8 m/s^2. What will be the approximate acceleration value from the Earth's surface at 1/10th the height of its radius?

(a) 4.0 m/s^2 (b) 8.9 m/s^2

(c) 4.5 m/s^2 (d) 8.1 m/s^2

RRB Group-D 15-10-2018 (Shift-III)

Ans : (d) The gravitational acceleration when going up ward direction-

$$g' = \frac{g}{(1+h/R_e)^2}$$

$$g' = \frac{g}{\left(1+\frac{1}{10}\right)^2}$$

$$g' = \frac{100g}{121} = \frac{100\times 9.8}{121}$$

$$g' = 8.09\ m/s^2 \approx 8.1\ m/s^2$$

71. How many times the weight of an object on the Earth is on the Moon?

(a) 1/5 (b) 5

(c) 1/6 (d) 6

RRB Group-D 18-09-2018 (Shift-I)
RRB Group-D 08-10-2018 (Shift-I)

Ans : (d) The mass of the Moon is 1/81 of the Earth's mass and about 1/4 the diameter. The weight of an object on the Moon is 1/6 times its weight on the Earth. Thus, the weight of an object on Earth is 6 times its weight on the moon.

72. The radius and mass of a planet are half of the Earth's radius and mass. What will be the value of g on this planet?

(a) 4.9 m/s^2 (b) 9.8 m/s^2

(c) 19.6 m/s^2 (d) 39.2 m/s^2

RRB Group-D 12-11-2018 (Shift-II)

Ans : (c) Formula for acceleration due to gravity

$$mg = \frac{GM_e m}{R_e^2} \Rightarrow g = \frac{GM_e}{R_e^2} .....(i)$$

According to the question, if the radius of the Earth is R_e and the mass M_e, then the mass of the other planet $M' = \frac{M_e}{2}$ and radius $(R') = \frac{R_e}{2}$

Then the value of gravity on the planet

$$g' = \frac{GM'}{R'} = \frac{\frac{GM_e}{2}}{\left(\frac{R_e}{2}\right)^2}$$

$$g' = \frac{2GM_e}{R_e^2} .....(ii)$$

Putting the value of equation (i) in equation (ii),

$g' = 2g$

$g' = 2 \times 9.8 = 19.6 m/sec^2$

73. At which of the following places is the gravitational acceleration zero?

(a) at sea level

(b) at the center of the earth

(c) equator

(d) poles

RRB Group-D 10-12-2018 (Shift-I)

Ans : (b) We know that the value of g decreases when it goes below the Earth's surface whose value is equal to

$$g' = g\left(1-\frac{h}{R_e}\right)$$

At the center of the Earth ($h = R_e$) hence $g' = g\left(1-\frac{h}{R_e}\right)$

$$= g\left(1-\frac{R_e}{R_e}\right) \Rightarrow g' = 0 \quad \{\because h = R_e\}$$

74. The weight of an object on Earth is 200N. What is its mass? ($g = 10 ms^{-2}$) ?

(a) 20kg (b) 20Pa

(c) 20cc (d) 20N

RRB Group-D 05-10-2018 (Shift-III)

Ans : (a) We know that,

Weight of object (W) = mg

$200 = m \times 10$

$m = 20$ kg

75. The weight of an object is 6000N on Earth. What will be its weight on the surface of the Moon?

(a) 3600 N (b) 3600 kg

(c) 100 N (d) 1000 N

RRB Group-D 24-10-2018 (Shift-II)
RRB Group-D 05-12-2018 (Shift-III)

Ans : (d) We know that the value of gravitational acceleration on the Moon is 1/6 of the gravitational acceleration of the Earth.

Therefore the weight of the object on the surface of the Moon = 1/6 × the weight of the object on the surface of the Earth

$$= 6000N \times \frac{1}{6} = 1000N$$

76. The mass of an object is 20 kg, what will be the weight of that object on the Earth? [$g = 9.8 ms^{-2}$]

(a) –196N (b) 196 N

(c) 1960 N (d) 19.6 N

RRB Group-D 26-09-2018 (Shift-I)

Ans : (b) Weight of object (W) = mg

$= 20 \times 9.8 = 196$ N

77. What will be the mass of the object whose weight on Earth is 196 N? ($g = 9.8\ ms^{-2}$)?

(a) 1.96 kg (b) 20 kg

(c) 2 kg (d) 19.6 kg

RRB Group-D 10-10-2018 (Shift-II)

Ans : (b) Weight of object on Earth (W) = 196 N

Acceleration due to Gravity on Earth (g) = 9.8 ms^{-2}

Mass of object (m) = ?

$W = m \times g$

$$\Rightarrow m = \frac{W}{g}$$

$$m = \frac{196}{9.8} = 20 \text{ kg}$$