Q.1 In which state is Madai festival celebrated?

Ans ✗ 1. Jharkhand

✓ 2. Chhattisgarh

✗ 3. Jammu and Kashmir

✗ 4. Odisha

Question ID : 5096471028
Status : Answered
Chosen Option : 1

Q.2 As per Economic Survey 2017-18, the service sector contributed _____ to India's GVA (Gross Value Added) in 2017- 18.

Ans ✓ 1. 55.2%

✗ 2. 45.2%

✗ 3. 25.2%

✗ 4. 95.2%

Question ID : 5096471030
Status : Answered
Chosen Option : 1

Q.3 The President has the power to promulgate ordinances under _____ of the Constitution of India.

Ans ✓ 1. Article 123

✗ 2. Article 153

✗ 3. Article 113

✗ 4. Article 130

Question ID : 5096471027
Status : Answered
Chosen Option : 1

Q.4 With whom has the Government of India entered into an agreement for flexible financing arrangement to accelerate research towards early development of biopharmaceuticals under National Biopharma Mission?

Ans ✗ 1. International Development Association

✗ 2. Asian Development Bank

✗ 3. New Development Bank

✓ 4. World Bank

Q.5 Indu Malhotra recently became the _____ woman lawyer to be directly elevated from the Bar to the Supreme Court as a judge.

Ans ✗ 1. sixth

✓ 2. first

✗ 3. tenth

✗ 4. second

Question ID : 5096471022
Status : Answered
Chosen Option : 2

Q.6 Which of the following hockey players won the Rajiv Gandhi Khel Ratna award in 2017?

Ans ✗ 1. Rupinder Pal Singh

✗ 2. Sandeep Singh

✓ 3. Sardara Singh

✗ 4. Manpreet Singh

Question ID : 5096471023
Status : Answered
Chosen Option : 1

Q.7 Which of the following is correct?

Ans ✗ 1.

The total number of Fundamental Duties provided by Article 51A of the Constitution of India is 15.

✗ 2.

The total number of Fundamental Duties provided by Article 51A of the Constitution of India is 8.

✗ 3.

The total number of Fundamental Duties provided by Article 51A of the Constitution of India is 19.

✓ 4.

The total number of Fundamental Duties provided by Article 51A of the Constitution of India is 11.

Question ID : 5096471026
Status : Answered
Chosen Option : 4

Q.8 It takes _____ full grown trees to make one tonne of paper.

Ans ✗ 1. 5

✓ 2. 17

✗ 3. 10

✗ 4. 25

Question ID : 5096471024
Status : Answered
Chosen Option : 2

Q.9 Who among the following introduced the 'Doctrine of Lapse'?

Ans ✗ 1. Lord Canning

✗ 2. Lord Ripon

✔ 3. Lord Dalhousie

✘ 4. Warren Hastings

Q.10 Which of the following is the basic unit of inheritance in living organisms which controls the transfer of hereditary characteristics from parents to offspring?

Ans ✔ 1. Gene

✘ 2. Chromosome

✘ 3. DNA

✘ 4. Cell

Section : General Intelligence

Q.1 Select the option that is related to the third term in the same way as the second term is related to the first term:

ACEG : ZXVT :: BDFH : ?

Ans ✔ 1. YWUS

✘ 2. YWTS

✘ 3. SUWY

✘ 4. YVUS

Q.2 Select the option that is different from the other three.

Ans ✘ 1. JKMPT

✘ 2. DEGJN

✘ 3. HIKNR

✔ 4. FGIKP

Q.3 'Flabby' is related to 'Toned' in the same way as 'Weak' is related to:

Ans ✘ 1. Sluggish

✘ 2. Week

✘ 3. Rigid

✔ 4. Robust

Q.4 Select the number that is different from the other three numbers.

Ans   ✔ 1. 9
         ✘ 2. 13
         ✘ 3. 3
         ✘ 4. 17

Q.5 Choose the option that will correctly replace the question mark (?) in the below number series.

15, 35, 63, ?, 143

Ans   ✘ 1. 109
         ✘ 2. 121
         ✔ 3. 99
         ✘ 4. 89

Q.6 If all the vowels are removed from the English alphabet, which letter would be ninth to the right of the sixth letter from the left?

Ans   ✘ 1. K
         ✘ 2. T
         ✘ 3. J
         ✔ 4. S

Q.7 Select the number that is different from the other three options.

Ans   ✔ 1. 9
         ✘ 2. 13
         ✘ 3. 11
         ✘ 4. 7

Q.8 Five children are standing in a single queue, one after another, facing the stage. R is nearest to the stage. S is standing ahead of P and is not before or after T. Q is just after R and T is not standing near Q. Who is at the end of the line?

Ans   ✘ 1. P
         ✔ 2. T
         ✘ 3. Q
         ✘ 4. R

Q.9

Given below are two statements and two conclusions. Consider these statements to be true even if they seem factually absurd. Read the conclusions and then decide which of the given conclusions logically follow(s) from the given statements.

Statements:

    A. All tables are chairs.
    B. All chairs are racks.

Conclusions:
    1. All racks are tables.
    2. All chairs are tables.

Ans ✗ 1. Both the conclusions follow

    ✗ 2. Only conclusion 2 follows

    ✔ 3. Neither conclusion 1 nor 2 follows

    ✗ 4. Only conclusion 1 follows

Question ID : 5096471044
Status : Answered
Chosen Option : 3

Q.10 Select the option that is related to the third number in the same way as the second number is related to the first number.

7 : 64 :: 12 : ?

Ans ✗ 1. 84

    ✗ 2. 172

    ✗ 3. 110

    ✔ 4. 169

Question ID : 5096471042
Status : Answered
Chosen Option : 4

Q.11 Identify the word-pair that is different from the other three.

Ans ✔ 1. Tough : Tender

    ✗ 2. Dynamic : Energetic

    ✗ 3. Authoritarian : Dominating

    ✗ 4. Wimpy : Feeble

Question ID : 5096471041
Status : Answered
Chosen Option : 1

Q.12 From the given options, select the word that CANNOT be formed using the letters of the given word.

ADMIRATION

Ans ✗ 1. ADROIT

    ✔ 2. ADMIRE

    ✗ 3. RANDOM

    ✗ 4. DOMAIN

Question ID : 5096471039
Status : Answered
Chosen Option : 2

Q.1

3 Pointing to a photograph, Somen said, "His mother is my mother-in-law's son's only sister. "How is Somen related to the person in the photograph?

Ans

✗ 1. Brother-in-law

✗ 2. Son

✔ 3. Father

✗ 4. Himself

Question ID : 5096471034
Status : Answered
Chosen Option : 2

Q.1 4 In a certain code language 'ADMIT' is written as 'YVMQF'. How will 'TRAIN' be written in the same code language?

Ans

✗ 1. FHVQM

✗ 2. FHYQM

✔ 3. FHYQL

✗ 4. FIYQM

Question ID : 5096471040
Status : Answered
Chosen Option : 3

Q.1 5 If the fifth day of a month is 4 days earlier to Friday, what day will it be on the twenty-first day of that month?
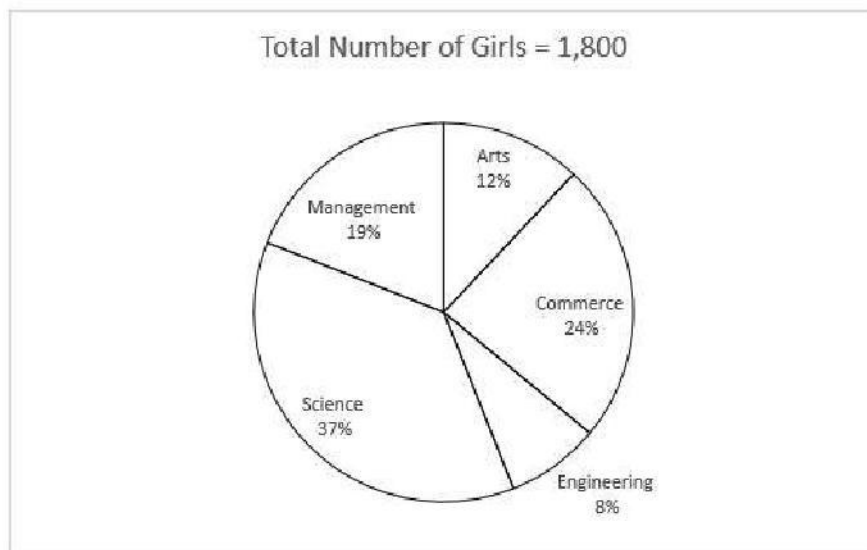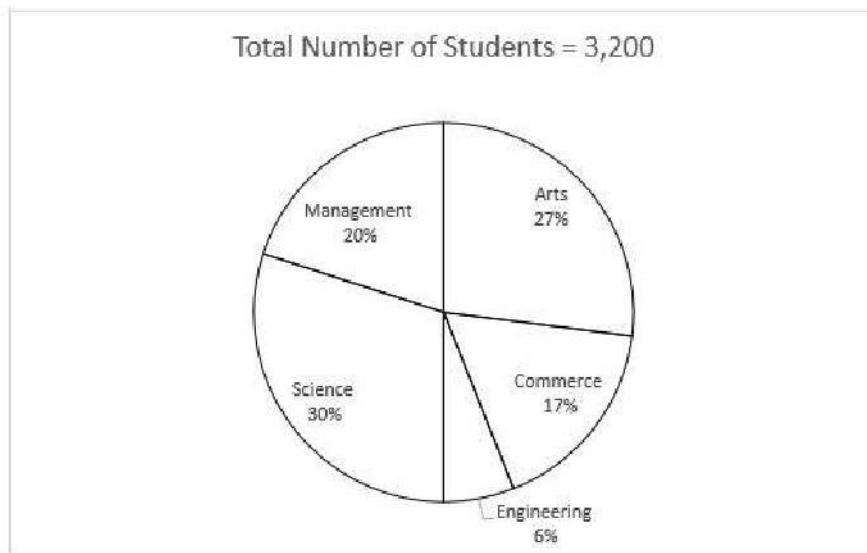
Ans

✔ 1. Wednesday

✗ 2. Friday

✗ 3. Monday

✗ 4. Tuesday

Question ID : 5096471038
Status : Answered
Chosen Option : 1

Section : General Aptitude

Q.1

Study the following pie charts and answer the question.

Total Number of Students = 3,200

Management 20%
Arts 27%
Science 30%
Commerce 17%
Engineering 6%

Total Number of Girls = 1,800

Arts 12%
Management 19%
Commerce 24%
Science 37%
Engineering 8%

What is the ratio of the total number of girls in the Engineering and Science disciplines to the total number of boys in Arts, Engineering and Science?

Ans ✔ 1. 9 : 11
     ✘ 2. 11 : 10
     ✘ 3. 11 : 9
     ✘ 4. 10 : 11

Q.2 The ratio between the number of students in class I and II is 8 : 5, that between the number of students in class II and III is 3 : 4 and that between the number of students in class III and IV is 7 : 8. If the difference between the number of students in class II and IV is 33, then the number of students in class III is:

Ans ✘ 1. 68
     ✘ 2. 90
     ✔ 3. 84
     ✘ 4. 76

Q.3 A solid metallic right circular cylinder of base diameter 16 cm and height 2 cm is melted and recast into a right circular cone of height three-times that of the cylinder. The curved surface area of the cone will be:
(Use $\pi = 3.14$)

Ans

✗ 1. 254.8 cm^2

✓ 2. 251.2 cm^2

✗ 3. 250.4 cm^2

✗ 4. 248.6 cm^2

Q.4 A 240 m long train, moving at an average speed of 54 km/h, crosses a platform in 30 s. A man crosses the same platform in 120 s. What is the speed (in km/h) of the man?

Ans

✓ 1. 6.3

✗ 2. 7.2

✗ 3. 5.7

✗ 4. 6.8

Q.5 If $\dfrac{\sqrt{50}+\sqrt{98}+\sqrt{72}}{5\sqrt{2}-\sqrt{18}} - \left(\sqrt{75}+\sqrt{108}-\sqrt{147}\right) = a + b\sqrt{3}$, then the value of $\sqrt{4a - 7b}$ will be:

Ans

✗ 1. 7

✗ 2. 6

✓ 3. 8

✗ 4. 5

Q.6

The value of $\dfrac{\frac{4}{5}\text{ of }\frac{7}{8}\left(\frac{1}{4}+\frac{5}{4}+\frac{3}{2}\right)}{1\frac{3}{4}+\frac{1}{2}}$ of $\left(2\frac{16}{17} \div \frac{7}{9}\right)$ is:

Ans

✓ 1. 2

✗ 2. $\frac{1}{2}$

✗ 3. 3

✗ 4. $\frac{2}{3}$

Q.7 Anita borrowed two equal sums at the beginning of two successive years at 10% compound interest. At the end of the second year, she paid ₹ 12,474 to settle her debts. How much did she borrow each year?

Ans
- ✗ 1. ₹ 4,800
- ✗ 2. ₹ 5,000
- ✓ 3. ₹ 5,400
- ✗ 4. ₹ 5,600

Q.8 Person A sold a car to B at a loss of 28%. B spent ₹ 2,520 on its repair and sold it to C for ₹ 70,875 and thus earned a profit of 12.5%. How much had A paid to buy the car?

Ans
- ✓ 1. ₹ 84,000
- ✗ 2. ₹ 63,000
- ✗ 3. ₹ 75,000
- ✗ 4. ₹ 60,480

Q.9 A trader marks his goods such that he earns a profit of 50% on its cost. He then sells it by offering a discount of x% on its marked price. If his actual profit is 9.85%, then the value of x is:

Ans
- ✓ 1. 15.5
- ✗ 2. 12
- ✗ 3. 15
- ✗ 4. 12.5

Q.10 Let x be the greatest number such that when it divides 5892, 6105 and 6531, the remainder in each case is y. When $(x + y)$ is divided by 33, then the remainder will be:

Ans
- ✗ 1. 23
- ✗ 2. 19
- ✓ 3. 24
- ✗ 4. 25

Q.11 The income of A is 20% more than that of B, and the income of C is 10% less than the sum of the incomes of A and B. If the income of C is ₹ 19,800, then by what percentage is the income of C more than the income of B?

Ans
- ✓ 1. 98%
- ✗ 2. 88%
- ✗ 3. 95%
- ✗ 4. 96%

Q.1

Q.2 A sum of ₹ 8,690 is divided among A, B and C such that $\frac{2}{5}$ of A, $\frac{4}{9}$ of B and $\frac{6}{11}$ of C are equal. What is the difference between A and C?

Ans   ✗ 1. ₹ 550

     ✗ 2. ₹ 860

     ✗ 3. ₹ 380

     ✓ 4. ₹ 880

Q.13 Tap A can fill an empty tank in 10 h while tap B can empty a fully-filled up tank in 12 h. Tap A is turned on first. After 2 hours, Tap B is also turned on. What will the total time (in hours) taken to fill the tank be?

Ans   ✗ 1. 56

     ✗ 2. 52

     ✓ 3. 50

     ✗ 4. 48

Q.14 The average score of a batsman for a certain number of innings was 42 runs. In the next five innings he scored 20, 35, 25, 10 and 40 runs and his average for all the innings came down by 5. How many innings did he play in all?

Ans   ✗ 1. 12

     ✓ 2. 16

     ✗ 3. 15

     ✗ 4. 14

Q.15 The value of $\dfrac{1.331 \times 21.9 \times 1.24}{16.5 \times 0.121 \times 7.3 \times 0.62} \times \dfrac{2.8 \times 1.\overline{36}}{31.\overline{81}}$ is:

Ans   ✗ 1. 0.24

     ✗ 2. 0.36

     ✓ 3. 0.48

     ✗ 4. 0.18

Section : General English

Q.1 In the following sentence, four words or phrases have been underlined. One of them is incorrect. Choose the INCORRECT word or phrase from the given options.

If the water level in Periyar rises alarmingly, more people from the banks of Periyar in Ernaculum District were evacuated.

Ans   ✗ 1. more people

     ✓ 2. were evacuated

     ✗ 3. alarmingly

     ✗ 4. from the banks

Q.2 Select the option that is NOT an antonym of another word by way of adding the prefix 'im-'.

Ans ✗ 1. impassive

✗ 2. impertinent

✗ 3. imperceptible

✓ 4. impression

Q.3 Select the correct passive form of the given sentence.

Somebody has stolen the manhole cover in our lane.

Ans ✓ 1. The manhole cover in our lane has been stolen.

✗ 2. The manhole cover in our lane is being stolen.

✗ 3. The manhole cover in our lane had been stolen.

✗ 4. Our lane in the manhole cover has been stolen.

Q.4 Select the most appropriate option to fill in the blank.

She didn't buy the second-hand study table because _____ top was chipped off.

Ans ✓ 1. its

✗ 2. that

✗ 3. it

✗ 4. her

Q.5 Select the most appropriate synonym of the given word.

DUBIOUS

Ans ✗ 1. Assured

✗ 2. Convinced

✓ 3. Doubtful

✗ 4. Certain

Q.6

Select the most appropriate option to fill in the blank.

_____ I didn't speak French, I managed to make myself understood.

Ans ✔ 1. Even though

✘ 2. Whether

✘ 3. In spite of

✘ 4. In case

Question ID : 5096471068
Status : Answered
Chosen Option : 1

Q.7 Select the most appropriate option to fill in the blank.

There is heavy fog at the Delhi airport. The plane, _____, has been diverted.

Ans ✘ 1. still

✔ 2. therefore

✘ 3. because

✘ 4. although

Question ID : 5096471067
Status : Answered
Chosen Option : 2

Q.8 Select the most appropriate synonym of the given word.

RECIPROCATE

Ans ✘ 1. Remind

✘ 2. Receive

✘ 3. Remember

✔ 4. Respond

Question ID : 5096471072
Status : Answered
Chosen Option : 3

Q.9 Select the most appropriate option to fill in the blank.

I was exhausted last night after driving, so I went to bed _____ than usual.

Ans ✘ 1. early

✘ 2. earliest

✔ 3. earlier

✘ 4. as early

Question ID : 5096471063
Status : Answered
Chosen Option : 3

Q.10 Select the wrongly spelt word.

Ans ✘ 1. germinate

✗ 2. geometry

✗ 3. generalise

✓ 4. geniune

Q.11 Select the most appropriate option to fill in the blank.

As soon as he _____ home, he sits and talks to his children asking them about their day.

Ans ✗ 1. is coming

✗ 2. came

✓ 3. comes

✗ 4. has come

Q.12 In the following sentence, four words or phrases have been underlined. One of them is incorrect. Choose the INCORRECT word or phrase from the given options.

In India most people wears both their traditional clothes and western dresses.

Ans ✗ 1. In India

✗ 2. their

✗ 3. western

✓ 4. wears

Q.13 Select the most appropriate direct form of the given sentence.

Addressing the students, the professor said that it gave him great pleasure to be interacting with them.

Ans ✓ 1.
Addressing the students, the professor said, "It gives me great pleasure to be interacting with you."

✗ 2.
Addressing the students, the professor said, "It gave him great pleasure to be interacting with them."

✗ 3.
Addressing the students, the professor said, "It gives him great pleasure to be interacting with you."

✗ 4.
Addressing the students, the professor said, "It has given me great pleasure to be interacting with you."

Q.14 Select the most appropriate indirect form of the given sentence.

He wrote, "It is time we thought about settling this deal."

Ans ✓ 1.

He wrote that it was time they thought about settling that deal.

✗ 2.

He wrote that it was time we thought about settling that deal.

✗ 3. He wrote that it is time we thought about settling this deal.

✗ 4.

He wrote that that is time they thought about settling that deal.

Q.1 5 Select the most appropriate option to fill in the blank.

The flat _____ is very nice but the entrance to the colony is crowded and dirty.

Ans ✗ 1. yourself

✗ 2. himself

✔ 3. itself

✗ 4. oneself

Q.1 6 Select the most appropriate option to fill in the blank.

The old Neem tree which _____ in our compound for fifty years suddenly crashed to the ground last night.

Ans ✔ 1. had stood

✗ 2. has stood

✗ 3. is standing

✗ 4. stands

Q.1 7 Select the most appropriate antonym of the given word.

OBSTRUCTED

Ans ✔ 1. Unhindered

✗ 2. Closed

✗ 3. Confused

✗ 4. Blocked

Q.1 8 Select the correctly spelt word.

Ans ✗ 1. comission

✗ 2. commnision

✔ 3. commission

✗ 4. comision

Q.19 Select the correct active form of the given sentence.

If he is elected by people in the next election, he will be greatly surprised.

Ans ✗ 1.

If people are electing him in the next election, he is greatly surprised.

✗ 2.

If he elected the people in the next election, he will be greatly surprised.

✗ 3.

If people elected him in the next election, he will be greatly surprised.

✓ 4.

If people elect him in the next election, he will be greatly surprised.

Q.20 Select the most appropriate option to fill in the blank.

She looked very graceful in her _____ sari.

Ans ✓ 1. new green cotton

✗ 2. new cotton green

✗ 3. green cotton new

✗ 4. cotton green new

Section : Discipline

Q.1 The approximate solution of the system of simultaneous equations

$2x - 5y + 3z = 7$
$x + 4y - 2z = 3$
$2x + 3y + z = 2$

by applying Gauss-Seidel method one time (using initial approximation as $x - 0, y - 0, z - 0$) will be:

Ans ✗ 1. $x = 2.32, y = 1.245, z = -3.157$

✗ 2. $x = 1.25, y = -2.573, z = -3.135$

✗ 3. $x = 2.45, y = -1.725, z = -3.565$

✓ 4. $x = 3.5, y = -0.125, z = -4.625$

Q.2 The solution of differential equation $x^2 \frac{d^2y}{dx^2} - 2x \frac{dy}{dx} + 2y = 0$ will be_____, where c_1 and c_2 are arbitrary constants.

Ans ✓ 1. $y = c_1 x + c_2 x^2$

✗ 2. $y = c_1 \log x + c_2 x$

✗ 3. $y = c_1 + c_2 x$

✗ 4. $y = c_1 x^2 + c_2 x^3$

Q.3 When a ferromagnetic material is heated above the curie temperature, it becomes:

Ans

✔ 1. paramagnetic material

✗ 2. non-magnetic material

✗ 3. diamagnetic material

✗ 4. strongly charged

Q.4

The value of $\lim\limits_{x \to 2} \frac{x^2 - 4}{3x - 6}$ is:

Ans

✗ 1. $\frac{1}{3}$

✔ 2. $\frac{4}{3}$

✗ 3. 1

✗ 4. $\frac{2}{3}$

Q.5 In a dielectric, the displacement vector D, the polarisation vector P and the electric field vector E are related by the expression:

Ans

✗ 1. $D - \varepsilon_0 P = \varepsilon_0 E$

✗ 2. $D - E = \varepsilon_0 P$

✔ 3. $D - P = \varepsilon_0 E$

✗ 4. $E - P = \varepsilon_0 D$

Q.6 Two sources of monochromatic light are said to be coherent, if light waves produced by them have the same:

Ans

✔ 1. wavelength and constant phase difference

✗ 2. wavelength only

✗ 3. amplitude and same wavelength

✗ 4. amplitude only

Q.7 Which of the following incident light wavefronts is most suitable for observing a single slit diffraction pattern?

Ans ✗ 1. Either a cylindrical wavefront or a spherical wavefront

✗ 2. Cylindrical wavefront only

✔ 3. Plane wavefront only

✗ 4. Spherical wavefront only

Question ID : 5096471088
Status : Answered
Chosen Option : 1

Q.8 The general solution of $\frac{dx}{z^2 y} = \frac{dy}{z^2 x} = \frac{dz}{y^2 x}$ will be_____, where c_1 and c_2 are arbitrary constants.

Ans ✔ 1. $x^2 - y^2 = c_1, y^3 - z^3 = c_2$

✗ 2. $x + y = c_1, x^4 + z^4 = c_2$

✗ 3. $2x^2 + 3y^3 = c_1, 7x^3 - 5z^3 = c_2$

✗ 4. $x^2 + y = c_1, x^3 + z^2 = c_2$

Question ID : 5096471124
Status : Answered
Chosen Option : 1

Q.9 For a complex variable $Z = x + iy$, function $f(Z)$ will be a constant function, if f is:

Ans ✗ 1. a bounded function

✔ 2. a bounded function that is differentiable for all Z

✗ 3. not differentiable at origin

✗ 4. differentiable for all Z

Question ID : 5096471118
Status : Answered
Chosen Option : 2

Q.10 In a Fresnel's biprism setup, monochromatic light of wavelength 550 nm is used to obtain interference fringes on the screen. On introducing a thin sheet of transparent material of thickness 1.1 microns in the path of one of the interfering beams, the central fringe is shifted through distance equal to the spacing between successive bright fringes. Then, the refractive index of the transparent material is:

Ans ✗ 1. 1.7

✔ 2. 1.5

✗ 3. 1.4

✗ 4. 1.6

Question ID : 5096471092
Status : Answered
Chosen Option : 3

Q.11 In a single slit diffraction pattern, the intensity of the principal maximum is I_0. On doubling the slit width, its intensity will be:

Ans ✗ 1. $I_0 / 2$

✗ 2. $4 I_0$

✔ 3. I_0

✗ 4. $2 I_0$

Q.12 If a liquid drop is introduced between the plano-convex lens and the glass plate in a Newton's rings experimental setup, then the interference fringe pattern will:

Ans

✗ 1. expand

✗ 2. change from circular fringes into straight line fringes

✓ 3. shrink

✗ 4. remain the same

Q.13 X-rays are produced when a target of suitable material element of high atomic mass is bombarded by a beam of fast moving and high energy particles such as:

Ans

✗ 1. neutrons

✓ 2. electrons

✗ 3. protons

✗ 4. photons

Q.14 The speed of a fast moving particle, whose total energy is twice the mass energy of the particle at rest, is nearly:

Ans

✗ 1. 0.89 c

✗ 2. 0.86 c

✓ 3. 0.87 c

✗ 4. 0.88 c

Q.15 The ability of an optical instrument by which it can form separate images of two close objects is known as:

Ans

✗ 1. magnifying power

✓ 2. resolving power

✗ 3. optical power

✗ 4. dispersive power

Q.16 A sugar solution in a tube of length 20 cm, produces optical rotation of $13°$. The sugar solution is diluted to one-third of its previous concentration. If the diluted solution is contained in a tube of length 30 cm, the optical rotation will be:

Ans

✗ 1. 8.5°

✓ 2. 6.5°

✗ 3. $5.5°$

✗ 4. $7.5°$

Q.17 The length of the curve $x = t^3, y = \frac{3t^2}{2}, 0 \le t \le 1$ will be:

Ans ✔ 1. $2^{3/2} - 1$ units

✗ 2. $3^{3/2} - 2$ units

✗ 3. $5^{3/2} + 1$ units

✗ 4. $3^{3/2} + 1$ units

Q.18 Let $f(z) = u(x,y) + i(v(x,y))$ be an analytical function. If $u = 5x + 2xy$ then v is equal to_____, where c is a constant.

Ans ✗ 1. $x^2 + y^2 - 5x + c$

✗ 2. $x^2 - y^2 - 5xy + c$

✗ 3. $x^2 + y^2 + 5xy + c$

✔ 4. $y^2 - x^2 + 5y + c$

Q.19 A complete solution of partial differential equation $\frac{\partial z}{\partial x} - 3x^2 - \left(\frac{\partial z}{\partial y}\right)^2 - y$ will be_____, where a and b are arbitrary constants.

Ans ✗ 1. $z^2 = ax^2 + by^2 + 1$

✔ 2. $z = ax + x^3 + \left(\frac{2}{3}\right)(a+y)^{\frac{3}{2}} + b$

✗ 3. $z^{1/2} = (x+a)^{1/2} + (y+b)^{1/2}$

✗ 4. $z = (ax^2 + by^2)^{3/2} + 2$

Q.20 If the product of eigenvalues of matrix $A = \begin{bmatrix} 1 & 2 & -1 \\ 3 & 5 & 2 \\ 1 & k & 2 \end{bmatrix}$ is -8, then the value of k will be:

Ans ✔ 1. 3

✗ 2. 2

✗ 3. -2

✗ 4. -3

Q.2 1 The value of $\int cosec^6 x\, dx$ will be_____, where c is an arbitrary constant.

Ans

✔ 1. $\dfrac{-1}{5} cot^5 x - \dfrac{2}{3} cot^3 x - cot x + c$

✗ 2. $-sin^7 x - 5 sin^5 x - 3 sin^3 x - sin x + c$

✗ 3. $cos^5 x + 3 cos^3 x + cos x + c$

✗ 4. $cos^6 x - 4 cos^4 x + 2 cos^2 x + c$

Q.2 2 If $f(Z)$ is an analytical function and (r, θ) denotes the polar co-ordinates, then:

Ans

✔ 1. $\dfrac{\partial u}{\partial r} = \dfrac{1}{r}\dfrac{\partial v}{\partial \theta}$ and $\dfrac{\partial v}{\partial r} = \dfrac{-1}{r}\dfrac{\partial u}{\partial \theta}$

✗ 2. $\dfrac{\partial u}{\partial r} = \dfrac{-1}{r}\dfrac{\partial v}{\partial \theta}$ and $\dfrac{\partial v}{\partial r} = \dfrac{1}{r}\dfrac{\partial u}{\partial \theta}$

✗ 3. $\dfrac{\partial u}{\partial r} = -r\dfrac{\partial v}{\partial \theta}$ and $\dfrac{\partial v}{\partial r} = r\dfrac{\partial u}{\partial \theta}$

✗ 4. $\dfrac{\partial u}{\partial r} = r\dfrac{\partial v}{\partial \theta}$ and $\dfrac{\partial v}{\partial r} = -r\dfrac{\partial u}{\partial \theta}$

Q.2 3 Value of $\oint (5Z^4 - Z^3 + 2)dZ$ around unit circle $|Z| = 1$ will be:

Ans ✗ 1. 1

✗ 2. 6

✗ 3. -1

✔ 4. 0

Q.2 4 What happens to the relativistic mass of a moving particle, when its velocity increases?

Ans ✔ 1. increases

✗ 2.

sometimes decreases and at other times increases, depending on the nature of the particles

✗ 3. decreases very slowly

✗ 4. decreases rapidly

Q.2 5 In Fresnel's biprism experiment, if the distance between the slits is gradually increased, the fringe width in the interference fringe pattern obtained will:

Ans

✔ 1. decrease

✘ 2. increase

✘ 3. remain unchanged

✘ 4. first increase and then decrease

Q.26 The magnitude of the vector representing a product of electric field vectors, constituting electromagnetic waves, has the same dimensions as that of:

Ans

✔ 1. electromagnetic power density

✘ 2. electric current density

✘ 3. electromagnetic energy density

✘ 4. electric charge density

Q.27 Bragg's reflection by crystal in an X-ray beam CANNOT occur for a wavelength, if:

Ans

✔ 1. $\lambda > 2d$

✘ 2. $\lambda > d$

✘ 3. $\lambda < d$

✘ 4. $\lambda < 2d$

Q.28 Soft magnetic materials like iron and its alloys are used in the manufacture of:

Ans

✘ 1. permanent magnets

✘ 2. magnets for the toys

✘ 3. magnets used in measuring meters of current and voltage

✔ 4. cores of transformers employed in power generation

Q.29 In an inertial frame, a free particle:

Ans

✘ 1. is accelerated

✘ 2. is decelerated

✔ 3. moves with uniform velocity or is at rest

✘ 4. is either accelerated or decelerated

Q.30 The value of $\int \frac{x^2}{x^2 - 3x + 2} dx$ will be _____, where c is an arbitrary constant.

Ans

✘ 1. $x^2 + e^{2x} + 2\log x + c$

✔ 2. $x - \log|x - 1| + 4\log|x - 2| + c$

✘ 3. $x + e^x + \log|x + 1| + c$

✘ 4. $1 + x^2 \log|x + 1| - e^x + c$

Question ID : 5096471132
Status : Answered
Chosen Option : 2

Q.31 Consider two subsets of $\mathbb{R}^2$ given as, $S_1 = \{[1, -2], [3, 5]\}$ and $S_2 = \{[1, 1], [0, 0]\}$. Then,

Ans

✘ 1. S_1 is not a basis for $\mathbb{R}^2$ but S_2 is a basis for $\mathbb{R}^2$.

✘ 2. neither S_1 nor S_2 are bases for $\mathbb{R}^2$.

✘ 3. both S_1 and S_2 are bases $\mathbb{R}^2$.

✔ 4. S_1 is a basis for $\mathbb{R}^2$ but S_2 is not a basis for $\mathbb{R}^2$.

Question ID : 5096471135
Status : Answered
Chosen Option : 4

Q.32 The standard ordered basis of $\mathbb{R}^2$ is $\{e_1, e_2\}$. Let $T : \mathbb{R}^2 \rightarrow \mathbb{R}^2$ be the linear transformation such that T reflects the points through the line $x_1 = -x_2$. The standard matrix of T is:

Ans

✘ 1. $\begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}$

✔ 2. $\begin{pmatrix} 0 & -1 \\ -1 & 0 \end{pmatrix}$

✘ 3. $\begin{pmatrix} -1 & 0 \\ 0 & -1 \end{pmatrix}$

✘ 4. $\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$

Question ID : 5096471136
Status : Answered
Chosen Option : 2

Q.33 Let $\langle x_n \rangle$ and $\langle y_n \rangle$ be real sequences and let for some $k \in \mathbb{N}$, $0 \le x_n \le y_n$ for $n \ge k$.

Then, which of the following statements is true?

Ans

✘ 1. Divergence of $\sum y_n \Rightarrow$ Divergence of $\sum x_n$

✘ 2. $\sum x_n$ and $\sum y_n$ are always divergent

✘ 3. Convergence of $\sum x_n \Rightarrow$ Convergence of $\sum y_n$

✔ 4. Convergence of $\sum y_n \Rightarrow$ Convergence of $\sum x_n$

Question ID : 5096471120
Status : Answered
Chosen Option : 3

Q.34 For any two complex numbers Z_1 and Z_2, which of the following results is true?

Ans

✗ 1. $|Z_1 - Z_2| < |Z_1| - |Z_2|$

✗ 2. $|Z_1 - Z_2| < ||Z_1| - |Z_2||$

✗ 3. $|Z_1 + Z_2| < ||Z_1| - |Z_2||$

✔ 4. $|Z_1 + Z_2|^2 + |Z_1 - Z_2|^2 = 2(|Z_1|^2 + |Z_2|^2)$

Q.3 5 The value of $\int_0^{\frac{\pi}{2}} \frac{1}{1+\sqrt{cotx}}\, dx$ will be:

Ans

✔ 1. $\frac{\pi}{4}$

✗ 2. $\frac{\pi}{3}$

✗ 3. $\frac{\pi}{2}$

✗ 4. $\frac{\pi}{6}$

Q.3 6 When a beam of ordinary light is passed through a calcite crystal, the light splits into O-ray and E-ray inside the crystal. Which of the following statements is true?

Ans

✗ 1. Only O-ray is polarised

✗ 2. Neither E-ray nor O-ray is polarised

✗ 3. Only E-ray is polarised

✔ 4. Both E-ray and O-ray are polarised

Q.3 7 For what value of μ do the simultaneous equations $5x \quad 7y = 2$, $15x + 21y = \mu$ have no solution?

Ans

✗ 1. $\mu = 0$

✔ 2. $\mu \neq -6$

✗ 3. $\mu \neq 0$

✗ 4. $\mu = -6$

Q.3 8 Two lines, A and B, of an X-ray beam give first order reflection maximum at a glancing angle of 30° and third order reflection maximum at an angle of 60° respectively from the face of the same crystal. If the wavelength of line B is 0.098 nm, then the wavelength of line A will be:

Ans

✔ 1. 0.170 nm

✗ 2. 0.056 nm

✗ 3. 0.126 nm

✗ **4.** 0.092 nm

Q.39 The approximation to a root of the equation $x^2 + x - 1 = 0$ in the interval (0, 1) by applying method of false position one time, will be:

Ans ✗ **1.** 0.75

✔ **2.** 0.5

✗ **3.** 0.25

✗ **4.** 0.65

Q.40 For the curve $xy^3 - yx^3 = 6$, the slope of the tangent line at the point $(1, -1)$ is:

Ans ✗ **1.** $\frac{1}{2}$

✔ **2.** -1

✗ **3.** 2

✗ **4.** 1

Q.41 If $y = x^{n-1} . \ln x$, then the nth order derivative of y with respect to x at $x = \frac{1}{2}$ is:

Ans ✗ **1.** $3.[n!]$

✗ **2.** $2.[(n + 1)!]$

✗ **3.** $3(n - 1).[n!]$

✔ **4.** $2.[(n - 1)!]$

Q.42 Ultrasonic waves, propagating through a medium, can be detected by:

Ans ✗ **1.** Light meter

✗ **2.** Quincke's tube

✗ **3.** Envelope detector

✔ **4.** Thermal detector

Q.43 An acceptable wave function ψ associated with a moving particle must be:

Ans ✗ **1.** finite, single valued and discontinuous

❌ 2. finite, multiple valued and continuous

✅ 3. finite, single valued and continuous

❌ 4. infinite, single valued and continuous

Q.44 Which of the following statements is FALSE?

Ans ❌ 1.

If a sequence X of real numbers converges to a real number and has two convergent subsequences X' and X" whose limits are not equal, then X is divergent.

✅ 2. A Cauchy sequence of real numbers is unbounded.

❌ 3.

If a sequence $\langle x_n \rangle$ of real numbers converges to a real number x, then any subsequence $\langle x_{n_k} \rangle$ of $\langle x_n \rangle$ also converges to x.

❌ 4.

A bounded sequence of real numbers has a convergent subsequence.

Q.45 A calcite crystal has been placed on a black dot on a piece of white sheet and then rotated. On looking though the calcite crystal from above, we can see:

Ans ✅ 1. one black dot rotating about the other stationary dot

❌ 2. two stationary black dots

❌ 3. one black dot only

❌ 4. two rotating black dots

Q.46 Dielectric losses may occur due to:

Ans ❌ 1. conductivity

✅ 2. polarisation

❌ 3. radioactivity

❌ 4. ionisation

Q.47 Which of the following particles in motion, having same kinetic energy has the longest wavelength?

Ans ✅ 1. An electron

❌ 2. A proton

❌ 3. An alpha-particle

❌ 4. A neutron

Q.48 A diffraction pattern due to single slit has been obtained using a beam of red light. On replacing the red light by violet light, the:

Ans ✗ 1. diffraction bands disappear

✓ 2. diffraction bands become narrower and crowd together

✗ 3. no change occurs in the diffraction pattern

✗ 4. diffraction bands become broader

Q.49 For the data,

$$x \quad : \quad 0 \quad 1 \quad 2$$
$$f(x) : \quad 8 \quad 5 \quad 6$$

the value of $\int_0^2 [f(x)]^2 \, dx$ by Trapezoidal rule will be:

Ans ✗ 1. 92

✓ 2. 75

✗ 3. 123

✗ 4. 42

Q.50 The relative permeability of a material A is slightly more than unity while that of a material B is slightly less than unity. Which of the following statements relating to the materials A and B is correct?

Ans ✗ 1. Material A is diamagnetic and B paramagnetic.

✗ 2. Both the materials A and B are ferromagnetic.

✗ 3. Both the materials A and B are paramagnetic.

✓ 4. Material A is paramagnetic and B diamagnetic.

Q.51 Which of the following phenomena CANNOT convert ordinary, unpolarised light to a partially polarised or plane polarised light?

Ans ✗ 1. Scattering

✗ 2. Double refraction

✗ 3. Reflection

✓ 4. Diffraction

Q.52 In electromagnetic waves, Poynting vector representing the flow of electromagnetic energy per unit area per unit time across the boundary is represented by:

Ans

  ✗ 1. E / H

  ✗ 2. E / B

  ✗ 3. $E \times B$

  ✔ 4. $E \times H$

Q.53 $x^2 \left(\frac{\partial z}{\partial x}\right)^2 = z \left(z - y \frac{\partial z}{\partial y}\right)$ is a partial differential equation of:

Ans

  ✗ 1. first order and first degree

  ✗ 2. second order and second degree

  ✔ 3. first order and second degree

  ✗ 4. second order and first degree

Q.54 The set $\mathbb{N}$ of natural numbers is:

Ans

  ✗ 1. unbounded below in $\mathbb{R}$

  ✗ 2. bounded above in $\mathbb{R}$

  ✔ 3. unbounded above in $\mathbb{R}$

  ✗ 4. bounded above and bounded below in $\mathbb{R}$

Q.55 An accelerated electric charge produces:

Ans

  ✗ 1. neither an electric field nor the magnetic field

  ✗ 2. magnetic field only

  ✗ 3. electric field only

  ✔ 4. both electric and magnetic fields

Q.56 The volume of the solid obtained by revolving the region bounded by the curve $y = x - x^2$ and the x-axis will be:

Ans

  ✗ 1. $\frac{\pi}{24}$ cubic units

  ✗ 2. $\frac{\pi}{15}$ cubic units

  ✔ 3. $\frac{\pi}{30}$ cubic units

❌ 4. $\frac{\pi}{25}$ cubic units

Q.57 The interval of convergence of the series $\sum_{n=0}^{\infty} x^{(n^2)}$ is:

Ans

❌ 1. $\mathbb{R} - [-1, 1]$

❌ 2. $[-1, 1]$

✅ 3. $(-1, 1)$

❌ 4. $\mathbb{R} - \{0\}$

Q.58 If $f(x) = x^2$, then the second order divided difference for the points x_0, x_1, x_2 will be:

Ans

❌ 1. -1

❌ 2. $\frac{-1}{x_1 - x_0}$

✅ 3. 1

❌ 4. $\frac{1}{x_2 - x_1}$

Q.59 Interference effects are possible due to superposition of two or more waves in a certain region of space in case of:

Ans

✅ 1. both transverse and longitudinal waves

❌ 2. longitudinal waves only

❌ 3. transverse waves only

❌ 4.
neither transverse waves nor a combination of transverse and longitudinal waves

Q.60 The volume of the solid bounded by the surface $x = 0$, $y = 0$, $x + y + z = 1$, and $z = 0$ will be:

Ans

✅ 1. $\frac{1}{6}$ cubic units

❌ 2. $\frac{2}{3}$ cubic units

❌ 3. $\frac{5}{6}$ cubic units

❌ 4. $\frac{1}{3}$ cubic units