CHAPTER
9   Time and Work (Pipe & Cisterns)

1. If 5 men or 7 women can earn ` 5,250 per day, how much would 7 men and 13 women earn per day ?
   (SSC CGL 1st Sit. 2010)
   (a) ` 11,600   (b) ` 11,700 (c) ` 16,100   (d) ` 17,100

2. If A and B together can complete a piece of work in 15 days and B alone in 20 days, in how many days can A alone complete the work ?   **(SSC CGL 1st Sit. 2010)**
   (a) 60   (b) 45   (c) 40   (d) 30

3. A can complete a piece of work in 18 days, B in 20 days and C in 30 days, B and C together start the work and are forced to leave after 2 days. The time taken by A alone to complete the remaining work is   **(SSC CGL 1st Sit. 2010)**
   (a) 10 days   (b) 12 days
   (c) 15 days   (d) 16 days

4. A can compete $\frac{1}{3}$ of a work in 5 days and B can do $\frac{2}{5}$ of the work in 10 days. In how many days both A and B together can complete the work ?   **(SSC CGL 2nd Sit. 2010)**
   (a) 10   (b) $9\frac{3}{8}$ (c) $8\frac{4}{5}$ (d) $7\frac{1}{2}$

5. 7 men can complete a piece of work in 12 days. How many additional men will be required to complete double the work in 8 days ?   **(SSC CGL 2nd Sit. 2010)**
   (a) 28   (b) 21   (c) 14   (d) 7

6. One pipe fills a water tank three times faster than another pipe. If the two pipes together can fill the empty tank in 36 minutes, then how much time will the slower pipe alone take to fill the tank ?   **(SSC CGL 2nd Sit. 2010)**
   (a) 1 hour 21 minutes   (b) 1 hour 48 minutes
   (c) 2 hours   (d) 2 hour 24 minutes

7. A can do a work in 12 days. When he had worked for 3 days, B joined him. If they complete the work in 3 more days, in how many days can B alone finish the work?
   (SSC CGL 1st Sit. 2011)
   (a) 6 days   (b) 12 days (c) 4 days   (d) 8 days

8. A and B can complete a piece of work in 8 days, B and C can do it in 12 days, C and A can do it in 8 days. A, B and C together can complete it in   **(SSC CGL 1st Sit. 2011)**
   (a) 4 days   (b) 5 days (c) 6 days   (d) 7 days

9. X is 3 times as fast as Y and is able to complete the work in 40 days less than Y. Then the time in which they can complete the work together is   **(SSC CGL 1st Sit. 2011)**
   (a) 15 days   (b) 10 days
   (c) $7\frac{1}{2}$ days   (d) 5 days

10. 'x' number of men can finish a piece of work in 30 days. If there were 6 men more, the work could be finished in 10 days less. The original number of men is
    (SSC CGL 2nd Sit. 2011)
    (a) 6   (b) 10   (c) 12   (d) 15

11. A work can be completed by P and Q in 12 days, Q and R in 15 days, R and P in 20 days. In how many days P alone can finish the work?   **(SSC CGL 2nd Sit. 2011)**
    (a) 10   (b) 20   (c) 30   (d) 60

12. A is thrice as good a workman as B and is, therefore, able to finish a piece of work in 60 days less than B. The time (in days) in which they can do it working together is
    (SSC CGL 2nd Sit. 2011)
    (a) 22   (b) $22\frac{1}{2}$ (c) 23   (d) $23\frac{1}{4}$

13. Pipe A alone can fill a tank in 8 hours. Pipe B alone can fill it in 6 hours. If both the pipes are opened and after 2 hours pipe A is closed, then the other pipe will fill the tank in
    (SSC CGL 1st Sit. 2012)
    (a) 6 hours   (b) $3\frac{1}{2}$ hours
    (c) 4 hours   (d) $2\frac{1}{2}$ hours

14. If 12 men or 18 women can reap a field in 14 days, then working at the same rate, 8 men and 16 women can reap the same field in: **(SSC CGL 2012)**
    (a) 9 days   (b) 5 days (c) 7 days   (d) 8 days

15. Two men A and B started a job in which A was thrice as good as B and therefore took 60 days less than B to finish the job. How many days will they take to finish the job, if they start working together?   **(SSC CGL 1st Sit. 2012)**
    (a) 15 days   (b) 20 days
    (c) $22\frac{1}{2}$ days   (d) 25 days

16. X and Y can do a piece of work in 30 days. They work together for 6 days and then X quits and Y finishes the work in 32 more days. In how many days can Y do the piece of work alone?   **(SSC CGL 2nd Sit. 2012)**
    (a) 30 days   (b) 32 days
    (c) 34 days   (d) 40 days

17. If 10 men or 18 boys can do a work in 15 days, then the number of days required by 15 men and 33 boys to do twice the work is   **(SSC Sub. Ins. 2012)**
    (a) $4\frac{1}{2}$ (b) 8   (c) 9   (d) 36

18. In a fort, there was sufficient food for 200 soldiers for 31 days. After 27 days, 120 soldiers left the fort. For how many extra days will be rest of the food last for the remaining soldiers? **(SSC Sub. Ins. 2012)**
    (a) 10 days   (b) 6 days
    (c) 4 days   (d) 12 days

19. A can do a piece of work in 20 days which B can do in 12 days. B worked at it for 9 days. A can finish the remaining work in : **(SSC CHSL 2012)**
    (a) 5 days   (b) 7 days (c) 11 days (d) 3 days

20. A is thrice as good a workman as B and takes 60 days less than B for doing a job. The time in which they can do it together is: **(SSC CHSL 2012)**
    (a) 15 days   (b) 30 days
    (c) $22\frac{1}{2}$ days   (d) 60 days

21. Two pipes A and B can fill a tank in 6 hours and 4 hours respectively. If they are opened on alternate hours and if pipe A is opened first, then the tank shall be full in **(SSC Multi-Tasking 2013)**
    (a) $4\frac{1}{2}$ hrs (b) 5 hrs   (c) $5\frac{1}{2}$ hrs   (d) 6 hrs

22. A, B and C can do a piece of work in 10, 12 and 15 days respectively. A leaves 5 days before the completion of the work and B leaves 2 days after A. The whole work lasts for **(SSC Multi-Tasking 2013)**
    (a) 7 days   (b) 6 days (c) 12 days (d) 13 days

23. A can do as much work as B and C together can do. A and B can together do a piece of work in 9 hours 36 minutes and C can do it in 48 hours. The time (in hours) that B needs to do the work alone, is : **(SSC Sub. Ins. 2013)**
    (a) 18   (b) 21   (c) 30   (d) 12

24. Water flows at the rate of 10 metres per minute from a cylindrical pipe 5 mm in diameter. How long it take to fill up a conical vessel whose diameter at the base is 30 cm and depth 24 cm? **(SSC Sub. Ins. 2013)**
    (a) 28 minutes 48 seconds (b) 51 minutes 12 seconds
    (c) 51 minutes 24 seconds (d) 28 minutes 36 seconds

25. 3 men and 7 women can do a job in 5 days while 4 men and 6 women can do it in 4 days. The number of days required for a group of 10 women working together, at the same rate as before, to finish the same job is: **(SSC Sub. Ins. 2013)**
    (a) 30   (b) 36   (c) 40   (d) 20

26. A can do a work in 20 days and B can do the same work in 30 days. In how many days can A and B together do the work ? **(SSC CHSL 2013)**
    (a) 15   (b) 16
    (c) 10   (d) 12

27. If 10 men or 20 women or 40 children can do a piece of work in 7 months, then 5 men, 5 women and 5 children together can do half of the work in: **(SSC CGL 1ˢᵗ Sit. 2013)**
    (a) 8 months   (b) 6 months
    (c) 4 months   (d) 5 months

28. A man undertakes to do a certain work in 150 days. He employs 200 men. He finds that only a quarter of the work is done in 50 days. The number of additional men that should be appointed so that the whole work will be finished in time is : **(SSC CGL 1ˢᵗ Sit. 2013)**
    (a) 50   (b) 75   (c) 100   (d) 125

29. A can finish a work in 18 days and B can do the same work in 15 days. B worked for 10 days and left the job. In how many days A alone can finish the remaining work ? **(SSC CGL 1ˢᵗ Sit. 2013)**
    (a) 8   (b) 6   (c) 5½   (d) 5

30. A can do a piece of work in 12 days while B alone can do it in 15 days. With the help of C they can finish it in 5 days. If they are paid ` 960 for the whole work. How much money A gets? **(SSC CGL 2ⁿᵈ Sit. 2013)**
    (a) ` 480     (b)  ` 240   (c) ` 320     (d)  ` 400

31. Ronald and Elan are working on an Assignment. Ronald takes 6 hours to type 32 pages on a computer, while Elan takes 5 hours to type 40 pages. How much time will they take working together on two different computers to type an assignment of 110 pages? **(SSC CGL 2ⁿᵈ Sit. 2013)**
    (a) 7 hrs. 30 min.   (b) 8 hrs.
    (c) 8 hrs. 15 min.   (d) 8 hrs. 25 min.

32. One man, 3 women and 4 boys can do a piece of work in 96 hours, 2 men and 8 boys can do it in 80 hours, 2 men and 3 women can do it in 120 hours. 5 men and 12 boys can do it in **(SSC CGL 2ⁿᵈ Sit. 2013)**
    (a) $39\frac{1}{11}$ hours   (b) $42\frac{7}{11}$ hours
    (c) $43\frac{7}{11}$ hours   (d) 44 hours

33. A and B together can complete a piece of work in 12 days, B and C can do it in 20 days and C and A can do it in 15 days. A, B and C together can complete it in **(SSC CGL 2013)**
    (a) 8 days   (b) 10 days
    (c) 12 days   (d) 6 days

34. A and B together can complete a work in 3 days. They start together. But, after 2 days, B left the work. If the work is completed after 2 more days, B alone could do the work in **(SSC CGL 2013)**
    (a) 6 days   (b) 8 days (c) 10 days (d) 4 days

35. A does 20% less work than B. If A can complete a piece of work in $7\frac{1}{2}$ hours , then B can do it in **(SSC CGL 2013)**
    (a) 6 hours   (b) 8 hours
    (c) 10 hours   (d) 4 hours

36. A can do a certain work in the same time in which B and C together can do it. If A and B together could do it in 10 days and C alone in 50 days, then B alone could do it in **(SSC CGL 1ˢᵗ Sit. 2013)**
    (a) 15 days   (b) 20 days
    (c) 25 days   (d) 30 days

37. A can do a piece of work in 10 days. B can do the same work in 15 days. How long would both of them take to do the same work ? **(SSC CGL 1ˢᵗ Sit. 2013)**
    (a) 2 days   (b) 4 days
    (c) 6 days   (d) 8 days

38. 12 men construct 1.5 km of road in 7 days. 28 men will construct 12 km of roads in   **(SSC CGL 1st Sit. 2013)**
(a) 20 days   (b) 24 days (c) 28 days   (d)   38 days

39. A piece of work can be done by Ram and Shyam in 12 days, by Shyam and Hari in 15 days and by Hari and Ram in 20 days. Ram alone will complete the work in
          (SSC CGL 1st Sit. 2013)
(a) 30 days   (b) 32 days (c) 36 days   (d)   42 days

40. 3 men or 5 women can do a work in 12 days. How long will 6 men and 5 women take to finish the work?
          (SSC CGL 1st Sit. 2013)
(a) 4 days   (b)   5 days   (c) 6 days   (d)   7 days

41. A and B can do a job in 12 days. B and C in 15 days and C and A in 20 days. How long would A take to do that work ?
          (SSC CGL 1st Sit. 2013)
(a) 20 days   (b) 60 days (c) 30 days   (d)   40 days

42. Raju can do a piece of work in 20 days, while Ram can do it in 30 days. If both of them work at it together, then the

44. A can do $\frac{7}{8}$ of work in 28 days, B can do $\frac{5}{6}$ of the same work in 20 days. The number of days they will take to complete if they do it together is   **(SSC Sub. Ins. 2014)**

(a) $15\frac{3}{7}$ days   (b) $17\frac{3}{5}$ days

(c) $14\frac{5}{7}$ days   (d) $13\frac{5}{7}$ days

45. Seventy-five men are employed to lay down a railway line in 3 months. Due to certain emergency conditions, the work was to be finished in 18 days. How many more men should be employed to complete the work in the desired time ?
          (SSC Sub. Ins. 2014)
(a) 300   (b)   325   (c) 350   (d)   375

46. A, B and C together can do a piece of work in 40 days. After working with B and C for 16 days, A leaves and then B and C complete the remaining work in 40 days more. A alone could do the work in   **(SSC CGL 2014)**
(a) 80 days   (b) 90 days (c) 100 days (d) 120 days

47. Three pipes A, B and C can fill a tank in 6 hours. After working it together for 2 hours, C is closed and A and B can fill the remaining part in 7 hours. The number of hours taken by C alone to fill the tank is   **(SSC CGL 2014)**
(a) 10   (b)   12   (c) 14   (d)   16

48. Pratibha is thrice as efficient as Sonia and is therefore able to finish a piece of work in 60 days less than Sonia. Pratibha and Sonia can individually complete the work respectively in   **(SSC CGL 2014)**
(a) 30, 60 days   (b) 60, 90 days
(c) 30, 90 days   (d) 40, 120 days

49. A and B working separately can do a piece of work in 9 and 15 days respectively. If they work for a day alternately, with A beginning, then the work will completed in
          (SSC CHSL 2014)
(a) 10 days   (b)   11 days (c) 9 days   (d)   12 days

50. Two pipes A and B can fill a tank in 36 min. and 45 min. respectively. Another pipe C can empty the tank in 30 min. First A and B are opened. After 7 minutes, C is also opened. The tank is filled up in   **(SSC CHSL 2014)**
(a) 39 min.   (b) 46 min.
(c) 40 min.   (d) 45 min.

51. A and B together can do a piece of work in 6 days. If A can alone do the work in 18 days, then the number of days required for B to finish the work is   **(SSC CGL 1st Sit. 2015)**
(a) 12   (b) 9   (c) 15   (d)   10

52. A pipe can fill a tank in x hours and another can empty it in y hours. They can together fill it in (y > x)
          (SSC CGL 1st Sit. 2015)

(a) 18 minutes   (b) 14 minutes
(c) 15 minutes   (d) 30 minutes

54. A's 2 days work is equal to B's 3 days work. If A can complete the work in 8 days then to complete the work B will take :
          (SSC CGL 1st Sit. 2015)
(a) 14 days   (b)   15 days (c) 16 days   (d) 12 days

55. 4 men and 6 women complete a work in 8 days, 2 men and 9 women also complete it in 8 days. The number of days 18 women complete the work is :   **(SSC CGL 1st Sit. 2015)**

(a) $4\frac{2}{3}$ days   (b) $5\frac{2}{3}$ days

(c) $4\frac{1}{3}$ days   (d) $5\frac{1}{3}$ days

56. If 4 men or 8 women can do a piece of work in 15 days, in how many days can 6 men and 12 women do the same piece of work ?   **(SSC CGL 1st Sit. 2015)**
(a) 5 days   (b)   20 days (c) 15 days   (d) 30 days

57. 20 men can do a piece of work in 18 days. They worked together for 3 days, then 5 men joined them. In how many more days is the work completed ?   **(SSC Sub. Ins. 2015)**
(a) 12   (b) 14   (c) 15   (d)   13

58. 12 monkeys can eat 12 bananas in 12 minutes. In how many minutes can 4 monkeys eat 4 bananas ?
          (SSC Sub. Ins. 2015)
(a) 12   (b) 10   (c) 4   (d)   8

59. A contractor was engaged to construct a road in 16 days. After working for 12 days with 20 labours it was found that only 5/8th of the road had been constructed. To complete the work in stipulated time the number of extra labours required is :   **(SSC CHSL 2015)**
(a) 12   (b) 10   (c) 18   (d)   16

60. If 20 women can lay a road of length 100m in 10 days. 10 women can lay the same road of length 50m in :

(SSC CHSL 2015)

(a) 20 days   (b)   10 days (c) 5 days   (d)   15 days

61. A can finish a work in 7 days . B can finish the same work in 9 days . The days required to finish the work by both of them together.   **(SSC CGL 1ˢᵗ Sit. 2016)**

(a) $1\frac{15}{16}$ (b) $2\frac{15}{16}$ (c) $3\frac{15}{16}$ (d) $4\frac{15}{16}$

62. A can do 1/3rd of a work in 5 days and B can do 2/5th of this work in 10 days. Both A and B, together can do the work in

(SSC CGL 1ˢᵗ Sit. 2016)

(a) $7\frac{3}{8}$days   (b) $8\frac{4}{5}$days

(c) $9\frac{3}{8}$days   (d) 10 days

63. A is twice as good as B and together they finish a piece of work in 16 days. The number of days taken by A alone to finish the work is   **(SSC CGL 1ˢᵗ Sit. 2016)**

(a)   20 days   (b)   21 days
(c)   22 days   (d)   24 days

64. A, B and C contract a work for ` 440. Together A and B do 9/11 of the work. The share of C should be:

(SSC CGL 1ˢᵗ Sit. 2016)

(a)   75   (b)   90   (c)   100   (d)   80

65. A and B can separately finish a piece of work in 20 days and 15 days respectively. They worked together for 6 days, after which B was replaced by C. If the work was finished in next 4 days, then the number of days in which C alone could do the work is   **(SSC Sub. Ins. 2016)**

(a) 50 days   (b)   30 days (c) 40 days   (d)   60 days

66. If 4 men and 6 women can complete a work in 8 days, while 3 men and 7 women can complete it in 10 days, then 10 women complete it in   **(SSC Sub. Ins. 2016)**

(a)   40 days   (b)   45 days
(c)   35 days   (d)   50 days

67. A, B and C can complete a work in 20, 24 and 30 days respectively. All three of them starts together but after 4 days A leaves the job and B left the job 6 days before the work was completed. C completed the remaining work alone. In how many days was the total work completed?

(SSC CGL 2017)

(a)   10   (b)   12   (c)   14   (d)   16

68. Raman can do a work in 5 days, Jatin can do the same work in 7 days and Sachin can do the same work in 9 days. If they do the same work together and they are paid ` 2860, then what is the share (in `) of Raman? **(SSC CGL 2017)**

(a)   1260   (b)   700   (c)   900   (d)   870

69. A piece of work was finished by A, B, and C together. A and B together finished 60% of the work and B and C together finished 70% of work. Who among the three is the most efficient?   **(SSC CGL 2017)**

(a)   A   (b)   B   (c) C   (d)   A or B

70. A can do a work in 8 days, B can do the same work in 10 days and C can do the same work in 12 days. If all three of them do the same work together and they are paid ` 7400, then what is the share (in `) of B?   **(SSC CGL 2017)**

(a)   2600   (b)   3000   (c) 2400   (d)   2000

71. A does 80% of a work in 20 days. He then calls in B and they together finish the remaining work in 4 days. How long B alone would take to do the whole work? **(SSC CHSL 2017)**

(a)   12.5 days   (b) 100 days
(c)   22.5 days   (d) 35 days

72. A can do a piece of work in 5 days and B in 4 days. How long will they take to do the same work when working together?   **(SSC MTS 2017)**

(a) $3\frac{2}{9}$ (b) $2\frac{2}{9}$ (c) $4\frac{1}{3}$ (d)   9

73. A certain number of men complete a piece of work in 60 days. If there were 8 men more, the work can be finished in 10 days less. The number of men originally is :

(SSC MTS 2017)

(a)   32   (b)   40   (c)   36   (d)   30

74. P is four times as efficient as Q.P can complete a work in 45 days less than Q. If both of them work together, then in how many days the work will be completed?

(SSC Sub. Ins. 2017)

(a)   10   (b)   12   (c)   15   (d)   30

75. Two inlet pipes can fill a cistern in 10 and 12 hours respectively and an outlet pipe can empty 80 gallons of water per hour. All the three pipes working together can fill the empty cistern in 20 hours. What is the capacity (in gallons) of the tank?   **(SSC Sub. Ins. 2017)**

(a)   360   (b)   300   (c) 600   (d)   900

76. The efficiency of A, B and C are in the ratio 5 : 6 : 9. Working together, they can complete a work in 18 days. In how many days can B alone complete 25% of that work?

(SSC Sub. Ins. 2018)

(a)   16   (b)   10   (c)   18   (d)   15

77. Two pipes A and B can fill an empty Tank in 8 hours and 12 hours respectively. They are opened alternately for 1 hour each, starting with pipe A first. In how many hours will the empty tank be filled?   **(SSC Sub. Ins. 2018)**

(a) $9\frac{1}{4}$ (b)   9   (c) $9\frac{1}{3}$ (d) $9\frac{1}{2}$

78. 36 persons working 8 hours a day can do 3 units of work in 12 days. How many persons are required to do 5 units of that work in 16 days, if they work for 6 hours a day?

(SSC Sub. Ins. 2018)

(a)   50   (b)   60   (c)   55   (d)   45

79. Pipes A and B can fill a tank in 6 hours and 8 hours respectively and pipe C can empty' the full tank in 12 hours. All three pipes are opened together, but pipe A is closed after 3 hours. In how many hours will the remaining part of the tank be filled?   **(SSC Sub. Ins. 2018)**

(a)   10   (b)   11   (c)   12   (d)   9

80. It is given that men are twice as efficient than women in respect of doing a work. If three men and two women can complete the work in 2 days, then in how many days can a women working alone complete the work?

(SSC CHSL 2018)

(a) $12\dfrac{1}{2}$ (b) 16   (c) $10\dfrac{1}{3}$ (d) 8

81. A is 40% more efficient than B and C is 20% less efficient than B. Working together, they can finish a work is 5 days. In how many days will A alone complete 70% of that work?

(SSC CGL 2018)

(a) 9   (b) 7   (c) 10   (d) 8

82. The efficiencies of A, B and C are in the ratio of 5 : 3 : 2. Working together, they can complete a task in 2l hours. In how many hours will B alone complete 40% of that task?

(SSC CGL 2018)

(a) 28   (b) 24   (c) 35   (d) 21

83. N and K together can complete a work in 240 days. K and G together can complete the same work in 72 days and N and G together can complete the same work in 80 days. In how many days K alone can complete the same work?

(SSC MTS 2018)

(a) 280 days   (b) 240 days
(c) 360 days   (d) 180 days

84. Vijay alone can complete a work in 50 days. How much part of the work will be completed in ten days?

(SSC MTS 2018)

(a) $\dfrac{1}{5}$ (b) $\dfrac{1}{3}$ (c) $\dfrac{1}{10}$ (d) $\dfrac{1}{4}$

85. A, B and C can individually complete a piece of work in 24 days, 15 days and 12 days, respectively. B and C started the work and worked for 3 days and left. The number of days required by A alone to complete the remaining work, is :

(SSC CGL 2019-20)

(a) 11   (b) $15\dfrac{1}{2}$ (c) 18   (d) $13\dfrac{1}{5}$

86. Pipe A can fill a tank in 6 hours. Pipe B can fill the same tank in 8 hours. Pipe A, B and C together can fill the same tank in 12 hours. Then which of the following statements is true for Pipe C?   **(SSC MTS 2019-20)**

(a) It can fill the tank in 4 hours 40 minutes
(b) It can fill the tank in 4 hours 48 minutes
(c) It can empty tank in 4 hours 48 minutes
(d) It can empty the tank in 4 hours 40 minutes

87. Two teachers A and B can complete an academic work in 10 days and 15 days respectively. They started the work together, but A left after 5 days and another teacher C joined, who alone can complete the work in 60 days. In how many days the work got completed?   **(SSC MTS 2019-20)**

(a) 7   (b) 5   (c) 6   (d) 2

88. 30 men working 8 hours per day can dig a pond in 16 days. By working how many hours per day can 32 men dig two same ponds, in 20 days?   **(SSC CHSL 2019-20)**

(a) 6 hours per day   (b) 7 hours per day
(c) 5 hours per day   (d) 8 hours per day

89. A man and a woman, working together can do a work in 66 days, The ratio of their working efficiencies is 3 : 2. In how many days 6 men and 2 women working together can do the same work?   **(SSC CGL-2020-21)**

(a) 14   (b) 12   (c) 15   (d) 18

90. Annu can complete a piece of work in 22 days. Shama is 60% more efficient than Annu. How many does Shama along take to complete the same piece of work?

(SSC CHSL-2020-21)

(a) $35\dfrac{1}{3}$ (b) $36\dfrac{2}{3}$ (c) $13\dfrac{1}{5}$ (d) $13\dfrac{3}{4}$

91. 'A' alone can do a peirce of work in 10 days and 'B' alone can do it in 15 days. 'A' and 'B' undertook to do the work for ` 42,000. With the help of 'C', they completed the work in 5 days. How much (in `) is to be paid to C?

(SSC MTS 2020-21)

(a) 14,000   (b) 21,000   (c) 7,000   (d) 15,000

92. Twenty persons take 15 days to complete a certain work, working 8 hours a day. To complete the same work in 4 days, the number of hours a day 60 persons should work, is:

(SSC MTS 2020-21)

(a) 12   (b) 11   (c) 9   (d) 10

93. A is twice as good a workman as B and together they finish a piece of work in 13 days. In how many days will B alone finish the work?   **(SSC Sub-Inspector 2020-21)**

(a) 39   (b) 42   (c) 21   (d) 18.5

94. Two pipes A and B can fiill a tank in 15 hours and 18 hours, respectively. Both pipes are opened simultaneously to fill the tank. In how many hours will the empty tank be filled?

(SSC Sub-Inspector 2020-21)

(a) $8\dfrac{2}{11}$ (c) $9\dfrac{2}{11}$ (c) $7\dfrac{2}{11}$ (d) $10\dfrac{2}{11}$

95. Pipes A and B can fill a tank in 16 hours and 24 hours, respectively, whereas pipe C can empty the full tank in 40 hours. All three pipes are opened together, but pipe A is closed after 10 hours. After how many hours will the remaining part of the tank be filled?

(SSC Sub-Inspector 2020-21)

(a) $12\dfrac{1}{2}$ (b) 10   (c) 20   (d) $15\dfrac{1}{2}$

96. A and B can do a job in 10 days and 5 days, respectively. They worked together for two days, after which B was replaced by C and the work was finished in the next three days. How long will C alone take to finish 60 % of the job?   **(SSC Sub-Inspector 2020-21)**

(a) 18 days   (b) 30 days   (c) 25 days   (d) 24 days

HINTS & EXPLANATIONS

1. **(d)** $5 \text{ men} \equiv 7 \text{ women}$

$\therefore 7 \text{ men} \equiv \dfrac{7}{5} \times 7 = \dfrac{49}{5} \text{ women}$

$\therefore 7 \text{ men} + 13 \text{ women} = \dfrac{49}{5} + 13 = \dfrac{114}{5} \text{ women}$

Now,

$\because 7 \text{ women} \equiv `5250$

$\therefore \dfrac{114}{5} \text{ women} \equiv \dfrac{5250}{7} \times \dfrac{114}{5} = `17100$

> **Alternate Method:**
> 5 Men = 7 women
> Work efficiency of Man: Woman = 7: 5
> Work efficiency of 5 Men = 5 ×7 = 35
> Work efficiency of 7 Men and 13 Women = 7 × 7 + 5 × 65 = 114
>
> Required amount = $\dfrac{5250}{35} \times 114 = `17100$

2. **(a)** $(A + B)\text{'s 1 day's work} = \dfrac{1}{15}$

B's 1 day's work $= \dfrac{1}{20}$

$\therefore$ A's 1 day's work $= \dfrac{1}{15} - \dfrac{1}{20} = \dfrac{4-3}{60} = \dfrac{1}{60}$

$\therefore$ A alone will do the work in 60 days

3. **(c)**   (B + C)'s 2 days' work

$= 2\left(\dfrac{1}{20} + \dfrac{1}{30}\right) = 2\left(\dfrac{3+2}{60}\right) = \dfrac{1}{6} \text{ part}$

Remaining work $= 1 - \dfrac{1}{6} = \dfrac{5}{6} \text{ part}$

$\therefore$ Time taken by A to complete this part of work

$= \dfrac{5}{6} \times 18 = 15 \text{ days}$

4. **(b)**   Total time taken by A = 15 days

Total time taken by B = $\dfrac{10 \times 5}{2} = 25 \text{ days}$

$\therefore$ (A + B)'s 1 day's work

$= \dfrac{1}{15} + \dfrac{1}{25} = \dfrac{5+3}{75} = \dfrac{8}{75}$

$\therefore$ the work will be completed in $\dfrac{75}{8} = 9\dfrac{3}{8}$ days.

5. **(c)** $M_1 D_1 W_2 = M_2 D_2 W_1$
$\Rightarrow 7 \times 12 \times 2 = M_2 \times 8 \times 1$

$\Rightarrow M_2 = \dfrac{7 \times 12 \times 2}{8} = 21$

$\therefore$ No. of additional men = 21 − 7 = 14

6. **(d)**   If time taken by the pipe at faster rate to fill the tank be x minutes, then

$\dfrac{1}{x} + \dfrac{1}{3x} = \dfrac{1}{36} \Rightarrow \dfrac{3+1}{3x} = \dfrac{1}{36}$
$\Rightarrow 3x = 4 \times 36$
$\Rightarrow x = 48 \text{ minutes}$
$\therefore$ Time taken by the slower pipe
$= 48 \times 3 = 144 \text{ minutes} = 2 \text{ hours } 24 \text{ minutes}$

> **Alternate Method:**
> Work efficiency of first pipe : work efficiency of second pipe = 3 : 1
> Total work unit = (3 + 1) 36 = 144
>
> Time required for slow pipe = $\dfrac{144}{1} = 144$ min
>
> = 2 hrs 24 min.

7. **(a)**   According to Question,

$\dfrac{3}{A} + \dfrac{3}{A} + \dfrac{3}{B} = 1, \dfrac{6}{12} + \dfrac{3}{B} = 1$

$\Rightarrow \dfrac{3}{B} = \dfrac{1}{2}$
$\Rightarrow B = 6 \text{ days}$

8. **(c)** $(A + B)\text{'s 1 day's work} = \dfrac{1}{8}$

$(B + C)\text{'s 1 day's work} = \dfrac{1}{12}$

$(C + A)\text{'s 1 day's work} = \dfrac{1}{8}$

On adding,
2 (A + B + C)'s 1 day's work

$= \dfrac{1}{8} + \dfrac{1}{12} + \dfrac{1}{8} = \dfrac{3+2+3}{24} = \dfrac{8}{24} = \dfrac{1}{3}$

$\therefore$ (A + B + C)'s 1 day's work $= \dfrac{1}{6}$

Hence, the work will be completed in 6 days.

9. **(a)**   If X completes a work in x days then Y will do the same in 3x days.
$\therefore 3x - x = 40 \Rightarrow x = 20$
$\therefore$ Y will finish the work in 60 days.

$\therefore$ (X + Y)'s 1 day's work $= \dfrac{1}{20} + \dfrac{1}{60} = \dfrac{3+1}{60} = \dfrac{1}{15}$

$\therefore$ Both together will complete the work in 15 days.

10. **(c)** $m_1 d_1 = m_2 d_2$
$x(30) = (x + 6) 20$
$\Rightarrow 2x + 12 = 3x$
$\Rightarrow 3x - 2x = 12$
$\Rightarrow x = 12 \text{ men}$

11.   **(c)**   (P + Q)'s 1 day's work = $\dfrac{1}{12}$ ...(i)

(Q + R)'s 1 day's work = $\dfrac{1}{15}$ ...(ii)

(R + P)'s 1 day's work = $\dfrac{1}{20}$ ...(iii)

Adding all three equations, 2 (P + Q + R)'s 1 day's work

$= \dfrac{1}{12} + \dfrac{1}{15} + \dfrac{1}{20} = \dfrac{5+4+3}{60} = \dfrac{12}{60} = \dfrac{1}{5}$

$\therefore$ (P + Q + R)'s 1 day's work $= \dfrac{1}{10}$ ...(iv)

$\therefore$ P's 1 day's work
= Equation (iv) – equation (ii)

$= \dfrac{1}{10} - \dfrac{1}{15} = \dfrac{3-2}{30} = \dfrac{1}{30}$

$\therefore$ P alone will complete the work in 30 days,

> **Alternate Method:**
> Work efficiency of P + Q : Q + R : P + R =
>
> $\dfrac{1}{12} : \dfrac{1}{15} : \dfrac{1}{20} = 5 : 4 : 3$
>
> Working efficiency of P + Q + R = $\dfrac{5+4+3}{2} = 6$ unit
>
> Total work unit = $5 \times 12 = 60$
> Work efficiency of P = (P + Q + R) – (Q + R) = 6 – 4
> = 2 units
>
> Required time = $\dfrac{60}{2} = 30$ days.

12.   **(b)**   If A completes the work in x days, B will do the same in 3x days.

$\therefore 3x - x = 60$
$\Rightarrow 2x = 60 \Rightarrow x = 30$ and $3x = 90$
$\therefore$ (A + B)'s 1 day's work

$= \dfrac{1}{30} + \dfrac{1}{90} = \dfrac{3+1}{90} = \dfrac{4}{90} = \dfrac{2}{45}$

$\therefore$ A and B together will do the work in $\dfrac{45}{2} = 22\dfrac{1}{2}$ days.

13.   **(d)**   Part of the tank filled by both pipes in two hours

$= 2\left(\dfrac{1}{8} + \dfrac{1}{6}\right) = 2\left(\dfrac{3+4}{24}\right) = \dfrac{7}{12}$

Remaining part $= 1 - \dfrac{7}{12} = \dfrac{5}{12}$

Time taken by B in filling the remaining part

$= \dfrac{5}{12} \times 6 = \dfrac{5}{2} = 2\dfrac{1}{2}$ hours

14.   **(a)** $\because$ 12 men $\equiv$ 18 women
$\therefore$ 2 men $\equiv$ 3 women
$\therefore$ 8 men + 16 women = 28 women
$\therefore M_1 D_1 = M_2 D_2$

$\Rightarrow 18 \times 14 = 28 \times D_2$

$\Rightarrow D_2 = \dfrac{18 \times 14}{28} = 9$ days

15.   **(c)**   If time taken by A be x days,
then, time taken by B will be 3x days
$\therefore 3x - x = 60$
$\Rightarrow 2x = 60$
$\Rightarrow x = 30$
Time taken by B = 90 days

$\therefore$ (A + B)'s 1 day's work $= \dfrac{1}{30} + \dfrac{1}{90} = \dfrac{3+1}{90} = \dfrac{4}{90} = \dfrac{2}{45}$

$\therefore$ The work will be completed in $\dfrac{45}{2}$ i.e. $22\dfrac{1}{2}$ days

16.   **(d)**   (X + Y)'s 6 days' work $= \left(\dfrac{1}{30} \times 6\right) = \dfrac{1}{5}$.

Remaining work $= \left(1 - \dfrac{1}{5}\right) = \dfrac{4}{5}$

Now, $\dfrac{4}{5}$ work is done by Y in 32 days.

$\therefore$ Whole work will be done by Y in $\left(32 \times \dfrac{5}{4}\right) = 40$ days.

17.   **(c)**   10 men in 15 days
$\Rightarrow$ 1 man can do the work in 150 days
$\Rightarrow$ 1 man can do twice the work in 300 days
Similarly, 18 boys in 15 days
$\Rightarrow$ 1 boy can do the work in 270 days
$\Rightarrow$ 1 boy can do twice the work in 540 days
Now, if there are 15 men and 33 boys trying to do twice the work then,

$\left(15 \times \dfrac{1}{300}\right) + \left(33 \times \dfrac{1}{540}\right)$

$= \dfrac{1}{20} + \dfrac{11}{180} = \dfrac{9+11}{180} = \dfrac{20}{180} = \dfrac{1}{9}$

$\therefore$ It will take 9 days for 15 men and 33 boys to do twice the work.

18.   **(b)**   Ratio of new number of persons in fort : original number of persons in fort = 80 : 200 = 2 : 5
Hence the food will last for 5/2 days of the original
(4 days = 31 days – 27 days)

$= \dfrac{5}{2} \times 4 = 10$ days

So, extra days = 6 days

19.   **(a)**   B's 1 day work $= \dfrac{1}{12}$

$\therefore$ B's 9 day's work $= \dfrac{9}{12} = \dfrac{3}{4}$

Remaining work $= 1 - \dfrac{3}{4} = \dfrac{1}{4}$

$\therefore$ A can finish this work in $\dfrac{20}{4}$ days = 5 days

20. **(c)** If A can finish a work = x days
B will do this work = 3x days
From question, $A - B = 3x - x = 60 \Rightarrow x = 30$
A = 30 days, B = 90 days

A's 1 day work + B's 1 day work = $\frac{1}{30} + \frac{1}{90} = \frac{4}{90}$

So, A and B working together can complete work

$= \frac{90}{4} = 22.5$ days

21. **(b)** A's work in 1 hour = $\frac{1}{6}$

B's work in 1 hour = $\frac{1}{4}$

(A + B)'s 2 hour's work when opened alternately

$= \left(\frac{1}{6} + \frac{1}{4}\right) = \frac{5}{12}$

(A + B)'s 4 hour's work when opened alternately

$= \frac{10}{12} = \frac{5}{6}$

Remaining part $= \left(1 - \frac{5}{6}\right) = \frac{1}{6}$

Now, it is A's turn and $\frac{1}{6}$ part is filled by A in 1 hour.

∴ Total time taken to fill the tank = (4 + 1) hrs. = 5 hrs.

22. **(a)** Suppose, the work was finished in x days. Then,
A's (x – 5) day's work + B's (x – 3) day's work
+ C's x day's work = 1.

$\Rightarrow \frac{x-5}{10} + \frac{x-3}{12} + \frac{x}{15} = 1 \Rightarrow 6(x-5) + 5(x-3) + 4x = 60.$
$\Rightarrow 6x - 30 + 5x - 15 + 4x = 60$
$\Rightarrow 15x = 60 + 30 + 15$
$\Rightarrow 15x = 105 \Rightarrow x = 7$ days.

23. **(b)** 9 hours 36 minutes

$= 9 + \frac{36}{60} = 9\frac{3}{5}$ hours $= \frac{48}{5}$ hours

(A + B)'s 1 hour's work = $\frac{5}{48}$ hours

C's 1 hour's work = $\frac{1}{48}$

∴ (A + B + C)'s 1 hour's work $= \frac{5}{48} + \frac{1}{48} = \frac{1}{8}$ ...(i)

A's 1 hours work = (B + C)'s 1 hour's work   ...(ii)

$\Rightarrow 2 \times$ A's 1 hour's work $= \frac{1}{8}$

$\Rightarrow$ A's 1 hour's work $= \frac{1}{16}$

∴ B's 1 hour's work $= \frac{5}{48} - \frac{1}{16} = \frac{5-3}{48} = \frac{1}{24}$

∴ B alone will finish the work in 24 hours

24. **(a)** Volume of water flowing from the pipe in 1 minute
$= \pi \times 0.25 \times 0.25 \times 1000$ ccm.

Volume of conical vessel $= \frac{1}{3}\pi \times 15 \times 15 \times 24$ ccm.

∴ Required time $= \frac{\pi \times 15 \times 15 \times 24}{3\pi \times 0.25 \times 0.25 \times 1000}$
= 28 minutes 48 seconds

25. **(d)** 3×5 men $+ 7 \times 5$ women
$= 4 \times 4$ men $+ 6 \times 4$ women
$\Rightarrow 16$ men $- 15$ men $= 35$ women $- 24$ women
∴ 1 man = 11 women
∴ 3 men + 7 women = 40 women
∴ $M_1 D_1 = M_2 D_2$
$\Rightarrow 40 \times 5 = 10 \times D_2$
$\Rightarrow D_2 = 20$ days

26. **(d)** A's 1 day's work = $\frac{1}{20}$

B's 1 day's work = $\frac{1}{30}$

(A + B)'s 1 day's work $= \left(\frac{1}{20} + \frac{1}{30}\right) = \frac{5}{60}$

∴ Both A and B will finish the work in $\frac{60}{5} = 12$ days.

27. **(c)** 10 men = 20 women = 40 children
i.e. 1m = 2w = 4 c
∴ $S_m + S_w + S_{ch}$
$\Rightarrow 5 \times 4 + 5 \times 2 + 5 = 35$

∴ $\frac{M_1 D_1}{W_1} = \frac{M_2 D_8}{W_2}$

∴ $\frac{40 \times 7}{1} = \frac{35 \times D_2}{\frac{1}{2}}$

$\Rightarrow \frac{40 \times 7}{35 \times 2} = D_2 \Rightarrow D_2 = 4$ months.

28. **(c)** 200 men do $\frac{1}{4}$ work in 50 days.

∴ $\frac{M_1 D_1}{W_1} = \frac{M_2 D_2}{W_2}$

$\Rightarrow \frac{200 \times 50}{\frac{1}{4}} = \frac{M_2 \times 100}{\frac{3}{4}}$

$\Rightarrow M_2 \times 100 = 200 \times 50 \times 3 \Rightarrow M_2 = 300$
∴ Additional men = 100

29. **(b)** Work done by B in 10 days $= \frac{\overset{2}{\cancel{10}}}{\cancel{15}} = \frac{2}{3}$

Remaining work $= 1 - \frac{2}{3} = \frac{1}{3}$

∴ Time taken by A $= \frac{1}{3} \times 18 = 6$ days.

30. (d) Work done by A and B in 5 days

$$= 5\left(\frac{1}{12}+\frac{1}{15}\right) = 5\left(\frac{5+4}{60}\right) = \frac{9}{12} = \frac{3}{4}$$

Time taken by C in doing $\frac{1}{4}$

Work = 5 days
∴ C will complete in 20 days.

∴ Ratio of wages $= \frac{1}{12}:\frac{1}{15}:\frac{1}{20} = 5:4:3$

∴ Amount received by A $= \frac{5}{12} \times 960 = $ ` 400

31. (c) Ronald's 1 hour's work $= \frac{32}{6} = \frac{16}{3}$ pages

Elan's 1 hour's work = 8 pages
1 hour's work of the both

$$= \frac{16}{3} + 8 = \frac{40}{3} \text{ pages}$$

∴ Required time

$$= \frac{110 \times 3}{40} = \frac{33}{4} \text{ hours} = 8 \text{ hours } 15 \text{ minutes}$$

32. (c) 1 hr's work of 1 man and 4 boys $= \frac{1}{160}$

1 hr's work of 1 man and 3 women $= \frac{1}{96}$

1 hr work of 3 women

$$= \frac{1}{96} - \frac{1}{160} = \frac{10-6}{960} = \frac{1}{240}$$

1 hr work of 2 men $= \frac{1}{120} - \frac{1}{240} = \frac{1}{240}$

1 hr work of 4 boys $= \frac{1}{160} - \frac{1}{480} = \frac{3-1}{480} = \frac{1}{240}$

∴ 2 men = 3 women = 4 boys
∴ 2 men + 8 boys = 12 boys
5 men + 12 boys = 22 boys
∴ By $M_1 D_1 = M_2 D_2$
$\Rightarrow 12 \times 80 = 22 \times D_2$

$$\Rightarrow D_2 = \frac{12 \times 80}{22} = \frac{480}{11} = 43\frac{7}{11} \text{ hours}$$

33. (b) (A + B)'s 1 day's work $= \frac{1}{12}$

(B + C)'s 1 day's work $= \frac{1}{20}$

(C + A)'s 1 day's work $= \frac{1}{15}$

On adding all three,

$$2 (A + B + C)\text{'s 1 day's work} = \frac{1}{12} + \frac{1}{20} + \frac{1}{15}$$

$$= \frac{5+3+4}{60} = \frac{1}{5}$$

∴ (A + B + C)'s 1 day's work $= \frac{1}{10}$

Hence, the work will be finished in 10 days.

34. (a) (A + B)'s 2 days' work $= \frac{2}{3}$

Remaining work $= 1 - \frac{2}{3} = \frac{1}{3}$

Time taken by A in doing $\frac{1}{3}$ work = 2 days

∴ Time taken by A in completing the work
= 6 days.

∴ B's 1 day's work $= \frac{1}{3} - \frac{1}{6} = \frac{2-1}{6} = \frac{1}{6}$

∴ B alone will complete the work in 6 days.

35. (a) Efficiency of A and B = 4 : 5
Ratio of respective time = 5 : 4
∴ Time taken by B

$$= \frac{4}{5} \times \frac{15}{2} = 6 \text{ hours}$$

36. (c) (A + B)'s 1 day's work $= \frac{1}{10}$;

C's 1 day's work $= \frac{1}{50}$

(A + B + C)'s 1 day's work

$$= \left(\frac{1}{10} + \frac{1}{50}\right) = \frac{6}{50} = \frac{3}{25} \qquad ...(1)$$

Also, A's 1 day's work = (B + C)'s 1 day's work   ...(2)
From (1) and (2), we get :

$$2 \times (A\text{'s 1 day's work}) = \frac{3}{25}$$

$$\Rightarrow \quad A\text{'s 1 day's work} = \frac{3}{25 \times 2} = \frac{3}{50}$$

∴   B's 1 day's work

$$= \left(\frac{1}{10} - \frac{3}{50}\right) = \frac{2}{50} = \frac{1}{25}$$

So, B alone could do the work in 25 days.

37. (c) A's 1 day's work $= \frac{1}{10}$ and B's 1 day's work $= \frac{1}{15}$

∴ (A + B)'s 1 day's work $= \left(\frac{1}{10} + \frac{1}{25}\right) = \frac{1}{6}$

So both together will finish the work in 6 days.

38. (b) Let the required number of days be x.
Then, more men, more km (Direct proportion)
more days, more km (Direct proportion)

Men 12 : 28 ⎫
Days 7 : x ⎭ :: 1.5 : 12

∴ $12 \times 7 \times 12 = 28 \times x \times 1.5$

$$x = \frac{12 \times 7 \times 12}{28 \times 1.5} = 24$$

39. **(a)** (Ram's + Shyam's) 1 day's work $= \dfrac{1}{12}$

(Shyam's + Hari's) 1 day's work $= \dfrac{1}{15}$

(Hari's + Ram's) 1 day's work $= \dfrac{1}{20}$

Adding all three,
2 (Ram's + Shyam's + Hari's)
1 day's work

$= \dfrac{1}{12} + \dfrac{1}{15} + \dfrac{1}{20} = \dfrac{5+4+3}{60} = \dfrac{1}{5}$

∴ (Ram's + Shyam's + Hari's)

1 day's work $= \dfrac{1}{10}$

∴ Ram's 1 day's work $= \dfrac{1}{10} - \dfrac{1}{15} = \dfrac{3-2}{30} = \dfrac{1}{30}$

∴ Ram alone will do the work in 30 days.

40. **(a)** 3 men ≡ 5 women

6 men + 5 women = 15 women

∴ By $M_1 D_1 = M_2 D_2$

$\Rightarrow 5 \times 12 = 15 \times D_2$

$\Rightarrow D_2 = \dfrac{5 \times 12}{15} = 4$ days

41. **(c)** (A + B)'s 1 day's work $= \dfrac{1}{12}$

(B + C)' 1 day's work $= \dfrac{1}{15}$

(C + A)' 1 days' work $= \dfrac{1}{20}$

∴ (A + B + C)'s 1 day's work $= \dfrac{1}{10}$

∴ A's 1 day's work $= \dfrac{1}{10} - \dfrac{1}{15} = \dfrac{3-2}{30} = \dfrac{1}{30}$

A will take 30 days to complete the work

42. **(a)** Raju and Ram together can finish the work in

$\left(\dfrac{20 \times 30}{20 + 30}\right) = 12$ days

43. **(a)** If A can finish the work in x days, B finish the same work in 2x days.
(A + B) together finish work in 20 days

$\dfrac{(2x)x}{2x + x} = 20$

$\Rightarrow x = 30$ days

44. **(d)** A can complete whole work in $\dfrac{28}{7} \times 8 = 32$ days

B can complete whole work in $\dfrac{20 \times 6}{5} = 24$ days

∴ A and B together can complete whole work in

$\dfrac{32 \times 24}{32 + 24} = \dfrac{32 \times 24}{56} = \dfrac{96}{7} = 13\dfrac{5}{7}$ days

45. **(a)** More the no. of men less time they take to complete work.
Let x men are added,

$\dfrac{75}{75 + x} = \dfrac{18}{90}$ (Inverse Proportion)

$\Rightarrow \dfrac{75}{75 + x} = \dfrac{1}{5}$

$\Rightarrow 375 - 75 = x$

$\Rightarrow x = 300$

46. **(c)** (A + B + C)'s 1 day's work $= \left(\dfrac{1}{40}\right)^{th}$ part of whole work

(A + B + C)'s 16 day's work $= \dfrac{16}{40} = \dfrac{2}{5}$ of whole work

(B + C) completes remaining work in 40 days. (B + C) completes $\left(\dfrac{3}{5}\right)^{th}$ part of work in 40 days.

∴ (B + C) completes whole work in $\dfrac{40 \times 5}{3} = \dfrac{200}{3}$ days.

$\dfrac{1}{A} + \dfrac{1}{B} + \dfrac{1}{C} = \dfrac{1}{40} \Rightarrow \dfrac{1}{A} + \dfrac{3}{200} = \dfrac{1}{40}$

$\Rightarrow \dfrac{1}{A} = \dfrac{1}{40} - \dfrac{3}{200} = \dfrac{5-3}{200} = \dfrac{2}{200}$

$\Rightarrow \dfrac{1}{A} = \dfrac{1}{100}$

∴ A alone can complete whole work in 100 days.

47. **(c)** $\dfrac{1}{A} + \dfrac{1}{B} + \dfrac{1}{C} = \dfrac{1}{6}$

(A + B + C) can do $\dfrac{2}{6} = \dfrac{1}{3}$ part of work in 2 hours.

Remaining work $= 1 - \dfrac{1}{3} = \dfrac{2}{3}$

In one hour (A + B) can do $\dfrac{2}{3 \times 7}$ part of work

$\Rightarrow \dfrac{1}{C} = \dfrac{1}{6} - \left(\dfrac{1}{B} + \dfrac{1}{C}\right)$

$\Rightarrow \dfrac{1}{C} = \dfrac{1}{6} - \dfrac{2}{21} = \dfrac{3}{42}$

$\Rightarrow C = 14$ hours

48. **(c)** Let Pratibha can finish the work in x days then, Sonia can finish the same work in 3x days.
According to question,
$3x - x = 60$

$\Rightarrow 2x = 60 \Rightarrow x = 30$

Pratibha and Sonia can individually complete the work in 30 days and 90 days respectively.

49. (b) Two days work $= \dfrac{1}{9} + \dfrac{1}{15} = \dfrac{5+3}{45} = \dfrac{8}{45}$

Ten days work $= 5 \times \dfrac{8}{45} = \dfrac{40}{45} = \dfrac{8}{9}$

Remaining work $= 1 - \dfrac{8}{9} = \dfrac{1}{9}$ which is done by A on 11th day.

Hence, the work will be completed in 11 days.

50. (a) In one minute $(A + B)$ can together fill $\dfrac{1}{36} + \dfrac{1}{45} = \dfrac{1}{20}$ part.

In 7 minutes part of tank filled $= \dfrac{7}{20}$

Remaining part $= 1 - \dfrac{7}{20} = \dfrac{13}{20}$

In 8th minutes, part filled by A, B and C altogether

$= \dfrac{1}{36} + \dfrac{1}{45} - \dfrac{1}{30} = \dfrac{1}{20} - \dfrac{1}{30} = \dfrac{1}{60}$

$\dfrac{13}{20}$ part of tank filled by $(A + B + C)$

$= 60 \times \dfrac{13}{20} = 39$ minutes

51. (b) A and B can complete work in 6 days

A can complete in 18 days

Let B can complete in x days

∴ One day work will be equal to

$\Rightarrow \dfrac{1}{6} = \dfrac{1}{18} + \dfrac{1}{x}$

$\Rightarrow \dfrac{1}{6} = \dfrac{x+18}{18x}$

$\Rightarrow 3x = x + 18$

$x = 9$ days

52. (d) Work done by A in one hour $= \dfrac{1}{x}$

Work done by B one in hour $= \dfrac{1}{y}$

Both A & B together work in one hour

$= \dfrac{1}{x} - \dfrac{1}{y} = \dfrac{y-x}{xy}$

Both A & B fill tank in $\dfrac{xy}{y-x}$ hours.

53. (a) Work done by 1$^{\text{st}}$ tap in one minute $= \dfrac{1}{30}$

Work done by 2$^{\text{nd}}$ tap in one minute $= \dfrac{1}{45}$

Both tap one minute work $= \dfrac{1}{30} + \dfrac{1}{45}$

$= \dfrac{45+30}{1350}$

$= \dfrac{75}{1350} = \dfrac{1}{18}$

54. (d) A's 2 days work = B's 3 days work.

A complete a work in 8 days

A's 1 day work $= \dfrac{1}{8}$ work

A's 2 days work $= \dfrac{1}{8} \times 2 = \dfrac{1}{4}$ work.

Now, B's 3 days work $= \dfrac{1}{4}$ work

B's 1 days work $= \dfrac{1}{12}$ work

∴ B's will take 12 days to complete the work.

55. (d) As $M_1 d_1 = M_2 d_2$

$\Rightarrow (4M + 6W) \times 8 = (2M + 9W) \times 8$

$\Rightarrow 4M + 6W = 2M + 9W$

$\Rightarrow 2M = 3W$

$\Rightarrow 1M = \dfrac{3}{2} W$

Now, $4M + 6W = 4 \times \dfrac{3}{2} W + 6W = 12W$

Here 12W complete a work in 8 days.

So, let 18 women complete a work in x days

$12W \times 8 = 18W \times x$

$x = \dfrac{12 \times 8}{18} = \dfrac{16}{3}$ days $= 5\dfrac{1}{3}$ days

56. (a) $4M = 8W$

$\boxed{\therefore 1M = 2W}$

Now, $6M + 12W = 6 \times 2W + 12W$

$= 12W + 12W$

$= 24W$

Now, $M_1 d_1 = M_2 d_2$

$\Rightarrow 8W \times 15 = 24W \times d_2$

$\Rightarrow \quad \therefore d_2 = \dfrac{8W \times 15}{24} = 5$ days

57. (a) 1 men 1 day's work $= \dfrac{1}{20 \times 18} = \dfrac{1}{360}$

∴ 20 men 3 days work $= \dfrac{1}{18} \times 3 = \dfrac{1}{6}$

Remaining work $= 1 - \dfrac{1}{6} = \dfrac{5}{6}$

25 men 1 day work $= 25 \times \dfrac{1}{360} = \dfrac{5}{72}$

Now $\dfrac{5}{72}$ work is done by them in 1 day

∴ $\dfrac{5}{6}$ work is done by them in $\dfrac{72}{5} \times \dfrac{5}{6} = 12$ days

58. (a) 12 monkeys can eat 12 bananas in 12 minutes

So 1 monkey can eat 1 banana in 12 minutes

4 monkeys can eat 4 banana in 12 minutes

59. (d)

Days	No.of Labourers	Work done
12	20	5/8
4	?	$1-\dfrac{5}{8}=\dfrac{3}{8}$

Now, $m_1 D_1 w_2 = m_2 D_2 W_1$

$20 \times 12 \times \dfrac{3}{8} = M_2 \times 4 \times \dfrac{5}{8} \Rightarrow M_2 = \dfrac{20 \times 12 \times 3 \times 8}{4 \times 5 \times 8} = 36$

Hence, $36 - 20 = 16$ more men needed to complete the remaining work in 4 days.

60. (b) Required number of days $= \dfrac{10 \times 20 \times 50}{10 \times 100} = 10$ days

61. (c) A can do work in $= 7$ days
B can do work in $= 9$ days

Both can do work in $= \dfrac{9 \times 7}{9+7} = \dfrac{63}{16}$

$= 3\dfrac{15}{16}$ days

62. (c) A can do work in $= 5 \times 3 = 15$ days

B can do work in $= 10 \times \dfrac{5}{2} = 25$ days

Together, $\dfrac{1}{15} + \dfrac{1}{25} = \dfrac{8}{75} = \dfrac{75}{8}$ or $9\dfrac{3}{8}$ days

63. (d) Let B takes $2x$ days
and A takes x days

$\therefore \dfrac{1}{x} + \dfrac{1}{2x} = \dfrac{1}{16} \Rightarrow \dfrac{3}{2x} = \dfrac{1}{16} \Rightarrow x = 24$

64. (d) Remaining work $= 1 - \dfrac{9}{11} = \dfrac{2}{11}$

C will get $= \dfrac{2}{11} \times 440 = 2 \times 40 = 80$

65. (c) (A + B)'s 6 day's work $6\left(\dfrac{1}{20} + \dfrac{1}{15}\right) = \dfrac{7}{10}$

(A + C)'s 4 day's work $= \dfrac{3}{10}$

(A + C)'s 1 day's work $= \dfrac{3}{20}$

A's 1 day's work $= \dfrac{1}{20}$

C's 1 days work $= \left(\dfrac{3}{40} - \dfrac{1}{20}\right) = \dfrac{1}{40}$

Hence C alone can finish the work in 40 days.

66. (a) Let 1 man's 1 day's work $= x$
and 1 woman's 1 day's work $= y$

Then, $4x + 6y = \dfrac{1}{8}$ and $3x + 7y = \dfrac{1}{10}$

Solving two equations,

we get $x = \dfrac{11}{400}; y = \dfrac{1}{400}$

$\therefore$ 1 women's 1 day's work $= \dfrac{1}{400}$

$\Rightarrow$ 10 women's 1 day's work $= \left(\dfrac{1}{400} \times 10\right)$

Hence, 10 women will complete the work in 40 days.

67. (c) Suppose, the work was finished in x days. Then, A's 4 day's work + B's $(x-6)$ day's work + C's x day's work $= 1$

$\Rightarrow \dfrac{4}{20} + \dfrac{x-6}{24} + \dfrac{x}{30} = 1$

$\Rightarrow \dfrac{24 + 5(x-6) + 4x}{120} = 1$

$\Rightarrow 24 + 5x - 30 + 4x = 120$

$\Rightarrow 9x = 126$

$\therefore x = \dfrac{126}{9} = 14$ days

68. (a) Raman's 1 day's work $= \dfrac{1}{5}$

Jatin's 1 day's work $= \dfrac{1}{7}$

Sachin's 1 day's work $= \dfrac{1}{9}$

$\therefore$ Ratio of their wages $= 63 : 45 : 35$

$\therefore$ Raman's share $= \dfrac{2860}{143} \times 63 = `1260.$

69. (c) According to question,
A + B = 60% and B + C = 70%
$\therefore$ (A + B) + (B + C) − (A + B + C) = B
$(60 + 70 - 100) = 30$
$\therefore$ B = 30%
A = 30% and
C = 40%
Hence, C is most efficient.

70. (c) $\because$ Ratio of wages of A, B and C $= \dfrac{1}{8} : \dfrac{1}{10} : \dfrac{1}{12}$

$= 15 : 12 : 10$

$\therefore$ Amount received by B $= \dfrac{7400 \times 12}{37} = 2400.$

71. (b) Work done by A in 20 days $= \dfrac{80}{100} = \dfrac{4}{5}$

Work done by A in 1 day $= \dfrac{4}{5 \times 20} = \dfrac{1}{25}$ ...(i)

Work done by A and B in 4 days $= \dfrac{20}{100} = \dfrac{1}{5}$
(Because remaining 20% is done in 4 days by A and B).

$\therefore$ Work done by A and B in 1 day $= \dfrac{1}{5 \times 4} = \dfrac{1}{20}$ ...(ii)

$\therefore$ Work done by B in 1 day $= \dfrac{1}{20} - \dfrac{1}{25} = \dfrac{1}{100}$

$\therefore$ B can complete the work in 100 days.

72. (b) According to question,

A's 1 day's work $= \dfrac{1}{5}$

B's 1 day's work $= \dfrac{1}{4}$

$\therefore$ (A + B)'s day's work $= \left(\dfrac{1}{5} + \dfrac{1}{4}\right) = \dfrac{9}{20}$

$\therefore$ A and B can do work together in $\dfrac{20}{9}$ or $2\dfrac{2}{9}$ days .

73. (b) Here,

$M_1 = x$, $D_1 = 60$ days
$M_2 = (x + 8)$, $D_2 = 50$ days

Now,

$M_1 D_1 = M_2 D_2$

$\Rightarrow$ $x \times 60 = (x + 8) \times 50$
$\Rightarrow$ $60x = 50x + 400$
$\Rightarrow$ $10x = 400$
$\Rightarrow$ $x = 40$

$\therefore$ The number of men originally $= 40$.

74. (b) According to question,

If P can complete a work in 1 day, Q can complete the same work in 4 days.

Hence, if the difference is 3 days, Q can complete the work in 4 days

$\Rightarrow$ If the difference is 45 days, Q can complete the work in 60 days

$\therefore$ Q's 1 day's work $= \dfrac{1}{60}$

$\therefore$ P's 1 day's work $= 4 \times \dfrac{1}{60} = \dfrac{1}{15}$

$\therefore$ (P + Q)'s 1 day's work

$= \left(\dfrac{1}{15} + \dfrac{1}{60}\right) = \dfrac{(4+1)}{60} = \dfrac{5}{60} = \dfrac{1}{12}$

$\therefore$ P and Q together can do work in 12 days.

75. (c) Part filled by first pipe in 1 hour $= \dfrac{1}{10}$

Part filled by second pipe in 1 hour $= \dfrac{1}{12}$

Suppose, the waste pipe can empty the full tank in x hours.

Then, part emptied by waste pipe in 1 hour $= \dfrac{1}{x}$

All the three pipes can fill the tank in 20 hours

i.e. part filled by all three pipes in hour $= \dfrac{1}{20}$

Now,

$\Rightarrow \dfrac{1}{10} + \dfrac{1}{12} - \dfrac{1}{x} = \dfrac{1}{20}$

$\Rightarrow \dfrac{1}{x} = \dfrac{1}{10} + \dfrac{1}{12} - \dfrac{1}{20} = \dfrac{8}{60} = \dfrac{2}{15}$

$\therefore x = \dfrac{15}{2}$

i.e, the waste pipe can empty the full tank in $\dfrac{15}{2}$ hours

Given that the waste pipe can empty 80 gallons per hour.

Therefore, in $\dfrac{15}{2}$ hours, it can empty

$\dfrac{15}{2} \times 80 = 600$ gallons.

Hence, volume of the tank = 600 gallons.

76. (d) Ratio of efficiency of A : B : C = 5 : 6 : 9.

Ratio of time taken by A, B and C

$= \dfrac{90}{5} : \dfrac{90}{6} : \dfrac{90}{9}$

$= 18 : 15 : 10$.

Now, from question, together they finish the work in 18 days.

so, $\dfrac{x}{18} + \dfrac{x}{15} + \dfrac{x}{10} = \dfrac{1}{18}$

$x\left(\dfrac{5+6+9}{90}\right) = \dfrac{1}{18}$

$x = \dfrac{90}{18} \times \dfrac{1}{20} = \dfrac{1}{4}$

Time taken by B to finish the work $= \dfrac{15}{x} = 15 \times 4 = 60$ days

time taken by B to finish 25% work $= \dfrac{60 \times 25}{100} = 15$ days

77. (d) In first two hours portion of the tank filled

$= \dfrac{1}{8} + \dfrac{1}{12} = \dfrac{5}{24}$

Portion of tank filled in 8 hours

$= \dfrac{4 \times 5}{24} = \dfrac{5}{6}$ tank

Remaining portion $= 1 - \dfrac{5}{6} = \dfrac{1}{6}$ tank

time required by pipe A to fill $\dfrac{1}{8}$ tank = 1 hour

$= (8 + 1) = 9$ hours.

Remaining empty tank $= \dfrac{1}{6} - \dfrac{1}{8} = \dfrac{1}{24}$

Time required by pipe B to Till $\dfrac{1}{24}$ tank

$= \dfrac{12}{24} = \dfrac{1}{2}$ hours.

Total time $= 9 + \dfrac{1}{2} = 9\dfrac{1}{2}$ hours.

78. (b) 36 persons do 3 units in 12 days working 8 hours a day

$\therefore$ 36 persons do 5 units in $\dfrac{12}{3} \times 5 = 20$ days working 8 hours a day

Now, when then work for 6 hours a day, then number of worker required to finish the work in 16 days

$= \dfrac{36 \times 20 \times 8}{6 \times 16} = 60$ workers

79. (d) Portion of the tank filled in one hour when all the three pipes open together $= \dfrac{1}{6} + \dfrac{1}{8} - \dfrac{1}{12} = \dfrac{5}{24}$

Portion of tank filled in 3 hours $= \dfrac{3 \times 5}{24} = \dfrac{5}{8}$

Remaining empty tank $= 1 - \dfrac{5}{8} = \dfrac{3}{8}$

Now, when pipe A is closed, then, portion of tank filled by B and C in 1 hour

$= \dfrac{1}{8} - \dfrac{1}{12} = \dfrac{1}{24}$

Time required to fill $\dfrac{3}{8}$ tank $= \dfrac{3}{8} \times 24 = 9$ hours

80. (b) 1 man = 2 women

work done by 3 men and 2 women in 2 days = 1.

work done by 6 women +2 women in 2 days = 1.

work done by 8 women in 1 day $= \dfrac{1}{2}$.

work done by 1 woman in 1 day $= \dfrac{1}{16}$.

Hence, work is completed by 1 woman in 16 days.

81. (d) Let B alone can finish the whole work in x days.

Then A alone can finish the same work in $\dfrac{x}{1.4}$ days

and C alone can finish the same work in $\dfrac{x}{0.8}$ days.

ATQ, $\dfrac{1.4}{x} + \dfrac{1}{x} + \dfrac{0.8}{x} = \dfrac{1}{5}$

$\dfrac{3.2}{x} = \dfrac{1}{5} \Rightarrow x = 16$

Time taken by A to finish 70% of work

$= \dfrac{x}{1.4} \times \dfrac{70}{100} = \dfrac{16}{1.4} \times \dfrac{70}{100} = 8$ days

82. (a) work done by A, B and C in one day

$= \dfrac{5}{x} + \dfrac{3}{x} + \dfrac{2}{x} = \dfrac{1}{21}$

$x = 10 \times 21$

Time required to complete 40% work

$\dfrac{10 \times 21}{3} \times \dfrac{40}{100} = 28$ hours

83. (c) (N + K)'s   1 days' work $= \dfrac{1}{240}$

(K + G)'s   1 days' work $= \dfrac{1}{72}$

(N + G)'s   1 days' work $= \dfrac{1}{80}$

On adding, 2(N + K + G)'s 1 days work

$= \dfrac{1}{240} + \dfrac{1}{72} + \dfrac{1}{80} = \dfrac{3 + 10 + 9}{720} = \dfrac{22}{720}$

$\therefore$ (N + K + G)'s 1 days work $= \dfrac{11}{720}$

$\therefore$ K's 1 day work $= \dfrac{11}{720} - \dfrac{1}{80}$

$= \dfrac{11 - 9}{720} = \dfrac{2}{720} = \dfrac{1}{360}$

Hence, K alone can complete whole work in 360 days.

84. (a) Vijay can do a work alone in 50 days

Work = Efficiency × Time

Hence 1 unit work completed in → 50 days

or 50 days → 1 work

10 days → $\dfrac{1}{50} \times 10 = \dfrac{1}{5}^{th}$

Hence $\dfrac{1}{5}^{th}$ part of the work will be completed in 10 days.

85. (d) A can do work in 1 day $= \dfrac{1}{24}$

B can do work in 1 day $= \dfrac{1}{15}$

C can do work in 1 day $= \dfrac{1}{12}$

B and C can work in 3 day $= \left(\dfrac{1}{15} + \dfrac{1}{12}\right) \times 3$

$\Rightarrow \dfrac{(4 + 5)}{60} \times 3 = \dfrac{9}{60} \times 3 = \dfrac{9}{20}$

Remaining work $= 1 - \dfrac{9}{20} = \dfrac{11}{20}$

$\therefore$ So, A alone can remaining work

$= \dfrac{11}{20} \times 24 = \dfrac{66}{5} = 13\dfrac{1}{5}$ days.

86. (c) A = 6 hrs

B = 8 hrs

A + B + C = 12 hrs

Let total capacity of tank = LCM (6, 8, 12) = 24

Efficiency of A $= \dfrac{24}{6} = 4$ unit/hr

B $= \dfrac{24}{8} = 3$ unit/hr

A + B + C $= \dfrac{24}{12} = 2$ unit/hr

C = −5

C can empty in $= \dfrac{24}{5} = 4$ hrs 48 minutes

87. (a) $A = 10, B = 15, C = 60$

Let total work $= 60$

Efficiencies $= A = 6$

$B = 4, C = 1$

$(A + B)$ work for 5 days

$= 10 \times 5 = 50$

$(B + C)$ work for to complete the remaining work

$= \dfrac{10}{5} = 2$

Total days to complete work $= 5 + 2 = 7$ days.

88. (a) From $M_1 d_1 W_1 = M_2 d_2 W_2$

$30 \times 16 \times 8 = 32 \times 20 \times W_2$

$\therefore W_2 = \dfrac{30 \times 16 \times 8}{32 \times 20} = 6$ hours per day.

89. (c) Man and women can do the work $= 66$ days

Let the efficiencies of man and women is $3x$ and $2x$.

$\therefore$ Total work $= 66 \times 5x = 330x$ units

6 men and 2 women's one day work $= 6 \times 3x + 2 \times 2x$

$= 18x + 4x = 22x$ units.

$\therefore$ 6 men and 2 women working together can do the

same work $= \dfrac{330x}{22x} = 15$ days

90. (d) Anu can complete the work $= 22$ days

	Anu	Shama
Efficiency	5	8
Days	8	5

$$\left[\begin{array}{l} \because \text{ Shama is 60\% more efficient} \\[4pt] \therefore \quad 60\% = \dfrac{+3}{5} \\[6pt] \text{and} \left(\text{Efficiency} \propto \dfrac{1}{\text{time}} \right) \end{array} \right]$$

$\therefore$ Shama alone can complete the work

$= \dfrac{22}{8} \times 5 = 13\dfrac{3}{4}$ days

91. (c) $A = 10$ days

$B = 15$ days

Let total work $= $ LCM $(10, 15) = 30$

Efficiency of $A = 3$

Efficiency of $B = 2$

Efficiency of $C = 1$

Paid to $C = \dfrac{42000}{6} \times 1 = ` 7000$

92. (d) Using formula,

$M_1 \times D_1 \times H_1 = M_2 \times D_2 \times H_2$

$\Rightarrow 20 \times 15 \times 8 = 60 \times 4 \times H_2$

$\Rightarrow 10 = H_2$

So, Number of hours would be required $= 10$ hrs.

93. (a) $A = 2B$

$\dfrac{A}{B} = \dfrac{2}{1}$ {Ratio of efficiency}

Total work $= 13 \times (2 + 1) = 39$

$B = \dfrac{39}{1} = 39$ days

94. (a) $A = 15$

$B = 18$

Total work $= $ LCM $(15, 18) = 90$

$A + B = \dfrac{90}{11} = 8\dfrac{2}{11}$ hours

95. (a) $A = 16$ hrs

$B = 24$ hrs

$C = 40$ hrs

Total capacity $= $ LCM $(16, 24, 40) = 240$

Efficiency $A = 15$

$B = 10$

$C = 6$

$(A + B + C)$ for 10 hrs $= 10 \times (15 + 10 - 6)$

$= 10 \times 19 = 190$

Remaining $= 50$

$B + C = \dfrac{50}{(10 - 6)} = 12\dfrac{1}{2}$ hrs

96. (a) $A = 10$

$B = 5$

Total work $= $ LCM $(10, 5) = 10$

Efficiency $A = 1$

$B = 2$

$(A + B)$ for 2 days $= 3 \times 2 = 6$

Remaining $= 4$

$A + C = \dfrac{4}{3}$

$C = \dfrac{4}{3} - 1 = \dfrac{1}{3}$

$C = 10 \times \dfrac{60 \times 3}{100 \times 1}$

$C = 18$ days