# QUANTITATIVE APTITUDE MADE EASY

IDEAL FOR
IBPS PO,
IBPS CLERK,
SBI PO, RRB, NICL,
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RAILWAYS, SSC

## RAMANDEEP SINGH

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# Chapter - 12

# Time and Work

**Three main factors of Time and Work**

There is a definite relationship between Time and Work. In this concept, there are only three factors:
- Time taken to complete a certain job
- Unit of work done
- Number of persons doing the job

There is a mental relationship between these three, discussed as follows:
Work done (W) = Number of days (Time taken) (T or D) × Number of men (M)
W = D × M

**Some basic points**
More number of men can do more work i.e. both are directly proportional
More number of men take less time to complete certain job i.e. both are inversely proportional
By summarizing, we get

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

Let us start solving some examples:

**Example 1:** 10 men can cut 8 trees in 16 days. In how many days can 6 men cut 10 trees?
**Solution:** This is a very simple example. You are given:
$W_1 = 8$
$W_2 = 10$
$M_1 = 10$
$M_2 = 6$
$D_1 = 16$
$D_2 = ?$

Using formula,

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

$$\frac{8}{10} = \frac{10}{6} \times \frac{16}{D_2}$$

$\Rightarrow D_2 = 33.3$

**Concept of efficiency**
This means, "How much work one person can do in one day (expressed in percentage)"
For example: A person can do a job in 2 days
$\Rightarrow$ He can do 50% work in one day
Therefore, his efficiency will be 50%
Just a 2-step concept
This concept involves two steps to calculate efficiency:

- Convert into fraction i.e. per day work
- Multiply with 100 i.e. convert into percentage

Try the following example first, then re-read above points

**Example 2**: If a person can complete his work in 5days. What will be his efficiency?
Solution: Number of days a person take to complete his work = 5
⇒ He is doing 1/5 th work per day (converted into fraction)
Convert it into percentage:
100/5 = 20%
Therefore, his efficiency is 20%.
Summarizing, If a person can do his job in n days, efficiency will be

Efficiency = $\frac{100}{n}$%
Note: Negative efficiency cancels the positive efficiency
For Example: Positive efficiency = 5%
Negative efficiency = 1.5%
Net efficiency = 5- 1.5 = 3.5%
As we all know, in competitive exams time management is very important. I suggest you to learn the fractions till 15.

| Number of days required to complete work | Work/Day | Efficiency (%) |
|---|---|---|
| N | 1/n | 100/n |
| 1 | 1 | 100 |
| 2 | 1/2 | 50 |
| 3 | 1/3 | 33.33 |
| 4 | 1/4 | 25 |
| 5 | 1/5 | 20 |
| 6 | 1/6 | 16.66 |
| 7 | 1/7 | 14.28 |
| 8 | 1/8 | 12.5 |
| 9 | 1/9 | 11.11 |
| 10 | 1/10 | 10 |
| 11 | 1/11 | 9.09 |
| 12 | 1/12 | 8.25 |
| 13 | 1/13 | 7.69 |
| 14 | 1/14 | 7.14 |
| 15 | 1/15 | 6.66 |

**Example 3**: A can do a job in 10 days. B can do a job in 5 days. In how many days they can complete the job if they work together?

**Solution:** Consider the above table
A's efficiency = 10%
B's efficiency = 20%
A+ B efficiency = 10 + 20 = 30%
This means, In one day A and B together can do 30% of work.
Therefore, Number of days A and B together take to do 100% of work = $\frac{100}{3}$
⇒3.33 days

**Example 4**: A and B together can do a job in 4 days. If A can do job in 12 days if he works alone, then how many days B alone take to complete the job?

**Solution:** A+B take = 4 days
⇒ A+B's efficiency = 25% i.e. they together do 25% of work in one day
A takes = 12 days
⇒ A's efficiency = 8.33%
B's efficiency = (A+B) - (A)

⇒ 25% - 8.33% = 16.66%
This means, B can do 16.66% work in one day
Therefore, to complete the job he will take = $\frac{100}{16.66}$ days
⇒ 6days

**Example 5**: A and B can do job in 8 days. B and C can do same job in 12 days. A, B and C together can do same job in 6 days. In how many days A and C together can complete the job?

**Solution:** You are given that:
A+B's efficiency = 12.5%
B+C's efficiency = 8.33%
A+B+C's efficiency = 16.66%
we need to find A+C
Consider, 2(A+B+C) = (A+B) + (B+C) + (C+A)
⇒2(16.66) = 12.5+ 8.33 + (C+A)
⇒ C+A = 12.49 = 12.5%
Therefore, A and C takes= $\frac{100}{12.5}$= 8 days
Hope you all understand this topic. I will soon update questions for your practice.

# Trick

One simple technique is using days in denominator while solving questions. For example, A can do a job in 3 days and B can do the same job in 6 days. In how much time they can do the job together.

**Solution -** 1/3 + 1/6 = 1/2, hence 2 days is the answer.
Examiner can set the question in opposite way and can ask you how much time A or B alone will take to complete the job. It is quite easy to calculate said question by putting values in equation we arrived in above question.

You need to understand one simple concept - If A can do a job in 10 day then in one day A can do 1/10th of job.

Now let's solve questions with this trick
**Question 1** - A take 5 days to complete a job and B takes 10 days to complete the same job. In how much time they will complete the job together?

**Solution -** A's efficiency = 20%, B's efficiency = 10%. If they work together they can do 30% of the job in a day. To complete the job they need 3.33 days.

**Question 2** - A is twice as efficient as B and can complete a job 30 days before B. In how much they can complete the job together?

**Solution -** Let efficiency percentage as x
A's efficiency = 2x and B's efficiency = x
A is twice efficient and can complete the job 30 days before B. So,
A can complete the job in 30 days and B can complete the job in 60 days

A's efficiency = 1/30 = 3.33%
B's efficiency = 1/60 = 1.66%
Both can do 5% (3.33% + 1.66%) of the job in 1 day.
So the can complete the whole job in 20 days (100/5)

**Question 3** - A tank can be filled in 20 minutes. There is a leakage which can empty it in 60 minutes. In how many minutes tank can be filled?

**Solution -**
**Method 1**
⇒ Efficiency of filling pipe = 20 minutes = 1/3 hour = 300%
⇒ Efficiency of leakage = 60 minutes = 100%

We need to deduct efficiency of leakage so final efficiency is 200%. We are taking 100% = 1 Hour as base so answer is 30 minutes.

**Method 2**
⇒ Efficiency of filling pipe = 100/20 = 5%
⇒ Efficiency of leakage pipe = 100/60 = 1.66%
⇒ Net filling efficiency = 3.33%
So, tank can be filled in = 100/3.33% = 30 minutes

You can change the base to minutes or even seconds.

**Question 4** - 4 men and 6 women working together can complete the work within 10 days. 3 men and 7 women working together will complete the same work within 8 days. In how many days 10 women will complete this work?

**Solution -** Let number of men =x, number of women = y
⇒ Efficiency of 4 men and 6 women = 100/10 = 10%
⇒ So, 4x+6y = 10
Above equation means 4 men and 6 women can do 10% of a the job in one day.

⇒ Efficiency of 3 men and 7 women = 100/8 = 12.5%
So, 3x+7y = 12.5

By solving both equations we get, x = -0.5 and y = 2

⇒ Efficiency of 1 woman(y) = 2% per day
⇒ Efficiency of 10 women per day = 20%
So 10 women can complete the job in 100/20 = 5 days

**Question 5** - A and B together can complete a task in 20 days. B and C together can complete the same task in 30 days. A and C together can complete the same task in 30 days. What is the respective ratio of the number of days taken by A when completing the same task alone to the number of days taken by C when completing the same task alone?

**Solution -** ⇒ Efficiency of A and B = 1/20 per day = 5% per day _____1
⇒ Efficiency of B and C = 1/30 per day = 3.33% per day_____2
⇒ Efficiency of C and A = 1/30 per day = 3.33% per day_____3

Taking equation 2 and 3 together
⇒ B + C = 3.33% and C + A = 3.33%
⇒ C and 3.33% will be removed. Hence A = B
⇒ Efficiency of A = B = 5%/2 = 2.5% = 1/40
⇒ Efficiency of C = 3.33% - 2.5% = 0.833% = 1/120
⇒ A can do the job in 40 days and C can do the job in 120 days he they work alone.
⇒ Ratio of number of days in which A and C can complete the job 1:3.

## Exercise - 12

1) A can do a work in 15 days and B in 20 days. If they work on it together for 4 days, then the fraction of the work that is left is:
   a) 1/4            b) 1/10            c) 7/15
   d) 8/15           e) None of these

2) A can lay railway track between two given stations in 16 days and B can do the same job in 12 days, with help of C, they did the job in 4 days only. Then, C alone can do the job in:
   a) $9\frac{1}{5}$            b) $9\frac{2}{5}$            c) $9\frac{3}{5}$
   d) 10           e) None of these

3) A, B and C can do a piece of work in 20, 30 and 60 days respectively. In how many days can A do the work if he is assisted by B and C on every third day?
   a) 12 days            b) 15 days            c) 16 days
   d) 18 days           e) None of these

4) A is thrice as good as workman as B and therefore is able to finish a job in 60 days less than B. Working together, they can do it in:
   a) 20 days            b) $22\frac{1}{2}$            c) 25 days
   d) 30 days           e) None of these

5) A alone can do a piece of work in 6 days and B alone 8 days. A and B undertook to do it for Rs.3200. With the help of C, they completed the work in 3 days. How much is to be paid to C?
   a) Rs.375            b) Rs.400            c) Rs.600
   d) Rs.800           e) None of these

6) If 6 men and 8 boys can do a piece of work in 10 days while 26 men and 48 boys can do the same in 2 days, the time taken by 15 men and 20 boys in doing the same type of work will be:
   a) 4 days            b) 5 days            c) 6 days
   d) 7 days           e) None of these

7) A can do a piece of work in 4 hours; B and C together can do it in 3 hours, while A and C together can do it in 2 hours. How long will B alone take to do it?
a) 8 hours          b) 10 hours          c) 12 hours
d) 24 hours          e) None of these

8) 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:
a) 15 days          b) 20 days          c) 25 days
d) 30 days          e) None of these

9) A does 80% of a work in 20 days. He then calls in B and they together finish the remaining work in 3 days. How long B alone would take to do the whole work?
a) 23 days          b) 37 days          c) $37\frac{1}{2}$
d) 40 days          e) None of these

10) A machine P can print one lakh books in 8 hours, machine Q can print the same number of books in 10 hours while machine R can print them in 12 hours. All the machines are started at 9 A.M. while machine P is closed at 11 A.M. and the remaining two machines complete work. Approximately at what time will the work (to print one lakh books) be finished?
a) 11:30 A.M.          b) 12 noon          c) 12:30 P.M.
d) 1:00 P.M.          e) None of these

11) 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?
a) 5          b) $5\frac{1}{2}$          c) 6
d) 8          e) None of these

12) 4 men and 6 women can complete a work in 8 days, while 3 men and 7 women can complete it in 10 days. In how many days will 10 women complete it?
a) 35          b) 40          c) 45
d) 50          e) None of these

13) A and B can together finish a work 30 days. They worked together for 20 days and then B left. After another 20 days, A finished the remaining work. In how many days A alone can finish the work?
a) 45          b) 50          c) 54
d) 60          e) None of these

14) P can complete a work in 12 days working 8 hours a day. Q can complete the same work in 8 days working 10 hours a day. If both P and Q work together, working 8 hours a day, in how many days can they complete the work?
a) $5\frac{5}{11}$          b) $5\frac{6}{11}$          c) $6\frac{5}{11}$
d) $6\frac{6}{11}$          e) None of these

15) 10 women can complete a work in 7 days and 10 children take 14 days to complete the work. How many days will 5 women and 10 children take to complete the work?
a) 3          b) 5          c) 7
d) Data inadequate          e) None of these

16) X and Y can do a piece of work in 20 days and 12 days respectively. X started the work alone and then after 4 days Y joined him till the completion of the work. How long did the work last?

a) 6 days      b) 10 days      c) 15 days
d) 20 days      e) None of these

17) A is 30% more efficient than B. How much time will they, working together, take to complete a job which A alone could have done in 23 days?

a) 11 days      b) 13 days      c) $20\frac{3}{17}$

d) Data inadequate      e) None of these

18) Ravi and Kumar are working on an assignment. Ravi takes 6 hours to type 32 pages on a computer, while Kumar 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?

a) 7 hours 30 minutes      b) 8 hours      c) 8 hours 15 minutes
d) 8 hours 25 minutes      e) None of these

19) A, B and C can complete a piece of work in 24, 6 and 12 days respectively. Working together, they will complete the same work in:

a) $\frac{1}{24}$ day      b) $\frac{7}{24}$ day      c) $3\frac{3}{7}$      ]

d) 4 days      e) None of these

20) Sakshi can do a piece of work in 20 days. Tanya is 25% more efficient than Sakshi. The number of days taken by Tanya to do the same piece of work is:

a) 15      b) 16      c) 18
d) 25      e) None of these

21) A takes twice as much time as B or thrice as much time as C to finish a piece of work. Working together, they can finish the work in 2 days. B can do the work alone in:

a) 4 days      b) 6 days      c) 8 days
d) 12 days      e) None of these

22) A and B can complete a work in 15 days and 10 days respectively. They started doing the work together but after 2 days B had to lea0ve and A alone completed the remaining work. The whole work was completed in:

a) 8 days      b) 10 days      c) 12 days
d) 15 days      e) None of these

23) A and B can do a piece of work in 30 days, while B and C can do the same work in 24 days and C and A in 20 days. They all work together for 10 days when B and C leave. How many days more will A take to finish the work?

a) 18 days      b) 24 days      c) 30 days
d) 36 days      e) None of these

24) A works twice as fast as B. If B can complete a work in 12 days independently, the number of days in which A and B can together finish the work in:

a) 4 days      b) 6 days      c) 8 days
d) 18 days      e) None of these

25) Twenty women can do a work in sixteen days. Sixteen men can complete the same work in fifteen days. What is the ration between the capacity of a man and a woman?

a) 3 : 4      b) 4 : 3      c) 5 : 3
d) Date inadequate      e) None of these

26) A and B can do a work in 8 days, B and C can do the same work in 12 days. A, B and C together can finish it in 6 days. A and C together will do it in:

a) 4 days          b) 6 days          c) 8 days

d) 12 days          e) None of these

27) A can finish a work in 24 days, B in 9 days and C in 12 days. B and C start the work but are forced to leave after 3 days. The remaining work was done by A in:

a) 5 days          b) 6 days          c) 10 days

d) $10\frac{1}{2}$          e) None of these

28) X can do a piece of work in 40 days. He works at it for 8 days and then Y finished it in 16 days. How long will they together take to complete the work?

a) $13\frac{1}{3}$          b) 15 days          c) 20 days

d) 26 days          e) None of these

29) A and B can do a job together in 7 days. A is $1\frac{3}{4}$ times as efficient as B. The same job can be done by A alone in:

a) $9\frac{1}{3}$          b) 11 days          c) $12\frac{1}{4}$

d) $16\frac{1}{3}$          e) None of these

30) P is thrice as efficient as Q and is therefore able to finish a piece of work in 60 days less than Q. Find the time in which P and Q can complete the work individually.

a) 90 days, 30 days      b) 60 days, 20 days      c) 65 days, 30 days

d) 85 days, 90 days      e) None of these

31) A tub can be filled in 20 minutes but there is a leakage in it which can empty the full tub in 60 minutes. In how many minutes it can be filled?

a) 10 minutes          b) 30 minutes          c) 40 minutes

d) 25 minutes          e) None of these

32) A can do a piece of work in 14 days while B can do it in 21 days. In how many days, working together they will complete the whole work?

a) 10.5          b) 8          c) 8.4

d) 9          e) None of these

33) A is thrice as efficient as B. Working together they complete the work in 3 days. If B takes 8 days more than A, what is the number of days taken by A to finish the whole work, alone?

a) 4          b) 2          c) 12

d) 16          e) None of these

34) Aman can do a piece of work in 14 days, while Suneeta can do the same work in 21 days. They started the work together but 3 days before the completion of the work, Aman left the work. The total number of days to complete the work is :

a) $7\frac{1}{5}$          b) 8.5          c) 5

d) $10\frac{1}{5}$          e) None of these

35) Karan can do a work in 10 days while Sohan can do the same work in 20 days. They started work together. After 3 days Karan left the work and Sohan completed it. For how many days Sohan worked alone more than the number of days required when both worked together?

a) $4\frac{1}{3}$          b) $3\frac{1}{4}$          c) $2\frac{3}{5}$

d) $3\frac{2}{3}$          e) None of these

36) A and B undertook a work for Rs.350. A got Rs.150 more than that of B, when they worked together. B takes 9 days more than A, when they work individually. In how many days A and B working together can do the whole work:

a) 5          b) $4\frac{2}{7}$          c) $4\frac{5}{7}$

d) $5\frac{4}{7}$          e) None of these

37) When A, B and C are deployed for a task, A and B together do 70% of the work and B and C together do 50% of the work. Who is most efficient?

a) a          b) b          c) c

d) Data inadequate      e) None of these

38) A contractor undertook a work to complete in 60 days. But just after 20 days he observed that only $\frac{1}{5}$ th of the project work had been completed. To complete the work in time (i.e., in rest days) minimum how many workers he had to increase, if there were initially 75 workers were deployed for the task?

a) 25          b) 50          c) 75

d) Data inadequate      e) None of these

39) If 2 men or 3 women or 4 boys can do a piece of work in 52 days, then the same piece of work will be done by 1 man, 1 woman and 1 boy in :

a) 48 days          b) 36 days          c) 45 days

d) Data inadequate      e) None of these

40) A contractor undertook to complete the work in 40 days and he deployed 20 men for his work. 8 days before the scheduled time he realized that 1/3ʳᵈ of the work was still to be done. How many more men were required to complete the work in stipulated time?

a) 16          b) 15          c) 20

d) 25          e) None of these

41) B and C are equally efficient, but the efficiency of A is half of each B and C. A and B started a work and 3 days later C joined them. If A alone can do the work in 14 days, then in how many more days the work will be completed?

a) 1          b) 2          c) 3

d) 4.5          e) None of these

42) A and B together can complete a piece of work in 4 days. If A alone can complete the same work in 12 days, in how many days can B alone complete that work?

a) 6 days          b) 12          c) 8 days

d) 9 days          e) None of these

43) 4 men and 2 boys can finish a piece of work in 5 days. 3 women and 4 boys can finish the same work in 5 days. Also 2 men and 3 women can finish the same work in 5 days. In how many days 1 man, 1 woman and one boy can finish the work, at their double efficiency?

a) $4\frac{8}{13}$          b) $4\frac{7}{13}$          c) $3\frac{7}{13}$

d) Data inadequate      e) None of these

44) A and B undertake to do a piece of work for Rs.600. A alone can do it in 6 days while B alone can do it in 8 days. With the help of C, they finish it in 3 days. Find the share of each.

a) Rs.80          b) Rs.75          c) Rs.90

d) Rs.82          e) None of these

45) Tap A can fill the empty tank in 12 hours, but due to a leak in the bottom it is filled in 15 hours, if the tank is full and then tap A is closed then in how many hours the leak can empty it?
a) 45 hours      b) 48 hours      c) 52 hours
d) 60 hours      e) None of these

46) A is twice as good a workman as B and together they finish a piece of work in 18 days. In how many days will A alone finish the work?
a) 72 days      b) 30 days      c) 27 days
d) 32 days      e) None of these

47) Pipe A basically used as inlet pipe and pipe B is used as outlet pipe. Pipes A and B both are opened simultaneously, all the time. When pipe A fills the tank and B empty the tank, it will take double the time than when both the pipes fill the tank. When pipe B is used for filling the tank, its efficiency remains constant. What is the ratio of efficiency of pipe A and pipe B respectively?
a) 3 : 1      b) 5 : 2      c) 1 : 3
d) 3 : 2      e) None of these

48) 45 men can complete a work in 16 days. Six days after they started working. 30 more men joined them. How many days will they now take to complete the remaining work?
a) 18 days      b) 12 days      c) 9 days
d) 6 days      e) None of these

49) Two pipes A and B can fill a cistern in 15 hours and 10 hours respectively. A tap C can empty the full cistern in 30 hours. All the three taps were open for 2 hours, when it was remembered that the emptying tap had been left open. It was then closed. How many hours more would it take for the cistern to be filled?
a) 30 min.      b) 1.2 hours      c) 24 min.
d) 35 min.      e) None of these

50) A tyre has two punctures. The first puncture alone would have made the tyre flat in 9 minutes and the second alone would have done it in 6 minutes. If air leaks out at a constant rate, how long does it take both the punctures together to make it flat?
a) $1\frac{1}{2}$      b) $3\frac{1}{2}$      c) $3\frac{3}{5}$
d) $4\frac{1}{4}$      e) None of these

51) A single reservoir supplies the petrol to the whole city, while the reservoir is fed by a single pipeline filling the reservoir with the stream of uniform volume. When the reservoir is full and if 40,000 litres of petrol is used daily, the supply fails in 90 days. If 32,000 litres of petrol is used daily, it fails in 60 days. How much petrol can be used daily without the supply every failing?
a) 64000 litres      b) 56000 litres      c) 78000 litres
d) 60000 litres      e) None of these

52) A is 50% more efficient than B. C does half of the work done by A and B together. If C alone does the work in 40 days, then A, B and C together can do the work in :
a) $13\frac{1}{3}$ days      b) 15 days      c) 20 days
d) 30 days      e) None of these

53) The total number of men, women and children working in a factory is 18. They earn Rs.4000 in a day. If the sum of the wages of all men, all women and all children is in the ratio of 18 :

10 : 12 and if the wages of an individual man, woman and child is in the ratio 6 : 5 : 3, then how much a woman earn in a day?

a) Rs.400         b) Rs.250         c) Rs.150

d) Rs.120         e) None of these

54) P can complete a work in 12 days working 8 hours a day. Q can complete the same work in 8 days working 10 hours a day. If both P and Q work together, working 8 hours a day, in how many days can they complete the work?

a) $5\frac{5}{11}$         b) $5\frac{6}{11}$         c) $6\frac{5}{11}$

d) $6\frac{6}{11}$         e) None of these

55) Eklavya can do the 6 times the actual work in 36 days while Faizal can do the one-fourth of the original work in 3 days. In how many days will both working together complete the 3 times of the originalwork?

a) 6         b) 10         c) 12

d) 15         e) None of these

56) A and B can together finish a work in 30 days. They worked together for 20 days and then B left. After another 20 days, A finished the remaining work. In how many days A alone can finish the job?

a) 40         b) 50         c) 54

d) 60         e) None of these

57) Aman and Raman are two workers. Working together they can complete the whole work in 10 hours. If the Aman worked for 2.5 hours and Raman worked for 8.5 hours, still there was half of the work to be done. In how many hours Aman working alone, can complete the whole work?

a) 24 hours         b) $17\frac{1}{7}$ hours         c) 40 hours

d) Data inadequate         e) None of these

58) 5 men and 2 boys working together can do four times as much work as a man and a boy. Working capacities of a man and a boy are in the ratio :

a) 1 : 2         b) 2 : 1         c) 1 : 3

d) 3 : 1         e) None of these

59) A alone can do a piece of work in 6 days and B alone in 8 days. A and B undertook to do it for Rs.3200. With the help of C, they completed the work in 3 days. How much is to be paid to C?

a) Rs.375         b) Rs.400         c) Rs.600

d) Rs.800         e) None of these

60) If there is leakage also which is capable of draining out the liquid drom the tank at half of the rate of outlet pipe, then what is the time taken to fill the empty tank when both the pipes are opened?

a) 3 hours         b) $3\frac{2}{3}$ hours         c) 4 hours

d) Data inadequate         e) None of these

61) A, B and C are employed to do a piece of work for Rs.529. A and B together are supposed to do $\frac{19}{23}$ of the work and B and C together $\frac{8}{23}$ of the work. What amount should A be paid?

a) Rs.315         b) Rs.345         c) Rs.355

d) Rs.375         e) None of these

62) A and B can do a job together in 7 days. A is $1\frac{3}{4}$ times as efficient as B. The same job can be done by A alone in :
a) $9\frac{1}{3}$ days
b) 11 days
c) $12\frac{1}{4}$ days
d) $16\frac{1}{3}$ days
e) None of these

63) A, B and C can do a piece of work in 36, 54 and 72 days respectively. They started the work but A left 8 days before the completion of the work while B left 12 days before the completion. The number of days for which C worked is :
a) 4
b) 8
c) 12
d) 24
e) None of these

64) A and B together can complete a work in 12 days. A alone can complete it in 20 days. If B does the work only for half a day daily, then in how many days A and B together will complete the work?
a) 10 days
b) 11 days
c) 15 days
d) 20 days
e) None of these

65) 10 women can complete a work in 7 days and 10 children take 14 days to complete the work. How many days will 5 women and 10 children take to complete the work?
a) 3
b) 5
c) 7
d) Data inadequate
e) None of these

66) 12 men complete a work in 9 days. After they have worked for 6 days, 6 more men join them. How many days will they take to complete the remaining work?
a) 2 days
b) 3 days
c) 4 days
d) 5 days
e) None of these

67) A, B and C together earn Rs.300 per day, while A and C together earn Rs.188 and B and C together earn Rs.152. The daily earning of C is :
a) Rs.40
b) Rs.68
c) Rs.112
d) Rs.150
e) None of these

**Solutions:**

1.      Option D

A's 1 day's work $\qquad = \frac{1}{15}$

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

(A + B)'s 1 day's work $\qquad = \left[\frac{1}{15} + \frac{1}{20}\right] = \frac{7}{60}$

(A + B)'s 4 day's work $\qquad = \left[\frac{7}{60} \times 4\right] = \frac{7}{15}$

Therefore, Remaining work $\qquad = \left[1 \quad \frac{7}{15}\right] = \frac{8}{15}$

2.      Option C

(A + B + C)'s 1 day's work $\qquad = \frac{1}{4}$

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

B's 1 day's work $= \frac{1}{12}$

C's 1 day's work $= \frac{1}{4} \left[\frac{1}{16} + \frac{1}{12}\right] = \left[\frac{1}{4} \quad \frac{7}{48}\right] = \frac{5}{48}$

So, C alone can do the work in $\frac{48}{5} = 9\frac{3}{5}$

3.  Option B

A's 2 day's work $= \left[\frac{1}{20} \times 2\right] = \frac{1}{10}$

(A + B + C)'s 1 day's work $= \left[\frac{1}{20} + \frac{1}{30} + \frac{1}{60}\right] = \frac{6}{60} = \frac{1}{10}$

Work done in 3 days $= \left[\frac{1}{10} + \frac{1}{10}\right] = \frac{1}{5}$

Now, $\frac{1}{5}$ work is done in 3 days.

Whole work will be done in (3 × 5) = 15 days

4.  Option B

Ratio of times taken by A and B = 1 : 3
The time difference is (3   1) 2 days while B take 3 days and A takes 1 day.
If difference of time is 2 days, B takes 3 days.

If difference of time is 60 days, B takes $\left[\frac{3}{2} \times 60\right]$ = 90 days

So, A takes 30 days to do the work.

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

B's 1 day's work $= \frac{1}{90}$

(A + B)'s 1 day's work $= \left[\frac{1}{30} + \frac{1}{90}\right] = \frac{4}{90} = \frac{2}{45}$

A and B together can do the work in $\frac{45}{2} = 22\frac{1}{2}$ days

5.  Option B

C's 1 day's work $= \frac{1}{3} \left[\frac{1}{6} + \frac{1}{8}\right] = \frac{1}{3} \quad \frac{7}{24} = \frac{1}{24}$

A's wages : B's wages : C's wages $= \frac{1}{6} : \frac{1}{8} : \frac{1}{24} = 4 : 3 : 1$

C's share (for 3 days) $= Rs. \left[3 \times \frac{1}{24} \times 3200\right] = Rs.400$

6.  Option A

Let 1 man's 1 day's work = x and 1 boy's 1 day's work = y
Then, 6x + 8y $= \frac{1}{10}$ and 26x + 48y $= \frac{1}{2}$

Solving these two equations, we get : x $= \frac{1}{100}$ and y $= \frac{1}{200}$

(15 men + 20 boy)'s 1 day's work $= \left[\frac{15}{100} + \frac{20}{200}\right] = \frac{1}{4}$

15 men and 20 boys can do the work in 4 days.

7.  Option C

A's 1 hour's work $\qquad = \dfrac{1}{4}$

(B + C)'s 1 hour's work $\qquad = \dfrac{1}{3}$

(A + C)'s 1 hour's work $\qquad = \dfrac{1}{2}$

(A + B + C)'s 1 hour's work $\qquad = \left[\dfrac{1}{4} + \dfrac{1}{3}\right] = \dfrac{7}{12}$

B's 1 hour's work $\qquad = \left[\dfrac{7}{12}\ \dfrac{1}{2}\right] = \dfrac{1}{12}$

B alone will take 12 hours to do the work.

8.  Option C

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

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

(A + B + C)'s 1 day's work $\qquad = \left[\dfrac{1}{10} + \dfrac{1}{50}\right] = \dfrac{6}{50} = \dfrac{3}{25}$ ........ (i)

A's 1 day's work $\qquad$ = (B + C)'s 1 day's work ........ (ii)

From (i) and (ii), we get 2 × (A's 1 day's work) = $\dfrac{3}{25}$

A's day's work $\qquad = \dfrac{3}{50}$

B's 1 day's work= $\left[\dfrac{1}{10}\ \dfrac{3}{50}\right] = \dfrac{2}{50} = \dfrac{1}{25}$

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

9.  Option C

Whole work is done by A in $\left[20 \times \dfrac{5}{4}\right]$ = 25 days

Now, $\left[1\ \dfrac{4}{5}\right]$ i.e., $\dfrac{1}{5}$ work is done by A and B in 3 days.

Whole work will be done by A and B in (3 × 5) = 15 days.

A's 1 day's work $\qquad = \dfrac{1}{25}$, (A + B)'s 1 day's work = $\dfrac{1}{15}$

B's 1 day's work $\qquad = \left[\dfrac{1}{15}\ \dfrac{1}{25}\right] = \dfrac{4}{150} = \dfrac{2}{75}$

So, B alone would do the work in $\dfrac{75}{2}$ =37 $\dfrac{1}{2}$ days

10. Option D

(P + Q + R)'s 1 hour's work $\qquad = \left[\dfrac{1}{8} + \dfrac{1}{10} + \dfrac{1}{12}\right] = \dfrac{37}{120}$

Work done by P, Q and R in 2 hours $\qquad = \left[\dfrac{37}{120} \times 2\right] = \dfrac{37}{60}$

Remaining work $\qquad = \left[1\ \dfrac{37}{60}\right] = \dfrac{23}{60}$

(Q + R)'s 1 hour's work $\qquad = \left[\dfrac{1}{10} + \dfrac{1}{12}\right] = \dfrac{11}{60}$

Now, $\dfrac{11}{60}$ work is done by Q and R in 1 hour.

So, $\dfrac{23}{60}$ work will be done by Q and R in $\left[\dfrac{60}{11} \times \dfrac{23}{60}\right] = \dfrac{23}{11}$ hours $\approx$ 2 hours

So, the work will be finished approximately 2 hours after 11 A.M., i.e., around 1 P.M.

11. Option C

B's 10 day's work $= \left[\frac{1}{15} \times 10\right] = \frac{2}{3}$

Remaining work $= \left[1 - \frac{2}{3}\right] = \frac{1}{3}$

Now, $\frac{1}{18}$ work is done by A in 1 day.

$\frac{1}{3}$ work is done by A in $\left[18 \times \frac{1}{3}\right]$ = 6 days.

12.    Option B

Let 1 man's 1 day's work = x and 1 woman's 1 day's work = y.

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

Solving the two equations, we get x = $\frac{11}{400}$ , y = $\frac{1}{400}$

1 woman's 1 day's work $= \frac{1}{400}$

10 women's 1 day's work $= \left[\frac{1}{400} \times 10\right] = \frac{1}{40}$

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

13.    Option D

(A + B)'s 20 day's work $= \left[\frac{1}{30} \times 20\right] = \frac{2}{3}$

Remaining work $= \left[1 - \frac{2}{3}\right] = \frac{1}{3}$

Now, $\frac{1}{3}$ work is done by A in 20 days.

Therefore, the whole work will be done by A in (20 × 3) = 60 days.

14.    Option A

P can complete the work in (12 × 8) hrs. = 96 hrs.
Q can complete the work in (8 × 10) hrs. = 80 hrs.

P's 1 hour's work = $\frac{1}{96}$ and Q's 1 hour's work = $\frac{1}{80}$

[P + Q)'s 1 hour's work = $\left[\frac{1}{96} + \frac{1}{80}\right] = \frac{11}{480}$

So, both P and Q will finish the work in $\left[\frac{480}{11}\right]$ hrs.

Number of days of 8 hours each = $\left[\frac{480}{11} \times \frac{1}{8}\right] = \frac{60}{11}$ days = $5\frac{5}{11}$ days

15.    Option C

1 woman's 1 day's work $= \frac{1}{70}$

1 child's 1 day's work $= \frac{1}{140}$

(5 women + 10 children)'s day's work $= \left[\frac{5}{70} + \frac{10}{140}\right] = \left[\frac{1}{14} + \frac{1}{14}\right] = \frac{1}{7}$

5 women and 10 children will complete the work in 7 days.

16.    Option B

Work done by X in 4 days $= \left[\frac{1}{20} \times 4\right] = \frac{1}{5}$

Remaining work $= \left[1 \quad \frac{1}{5}\right] = \frac{4}{5}$

(X + Y)'s 1 day's work $= \left[\frac{1}{20} + \frac{1}{12}\right] = \frac{8}{60} = \frac{2}{15}$

Now, $\frac{2}{15}$ work is done by X and Y in 1 day.

So, $\frac{4}{5}$ work will be done by X and Y in $\left[\frac{15}{2} \times \frac{4}{5}\right]$ = 6 days

Hence, total time taken = (6 + 4) days = 10 days

17.    Option B

Ration of times taken by A and B = 100 : 130 = 10 : 13
Suppose B takes x days to do the work.

Then, 10 : 13:: 23 : x $\qquad$ x = $\left[\frac{23 \times 13}{10}\right]$ $\qquad$ x = $\frac{299}{10}$

A's 1 day's work $= \frac{1}{23}$

B's 1 day's work $= \frac{10}{299}$

(A + B)'s 1 day's work $= \left[\frac{1}{23} + \frac{10}{299}\right] = \frac{23}{299} = \frac{1}{13}$

Therefore, A and B together can complete the work in 13 days.

18.    Option C

Number of pages typed by Ravi in 1 hour $= \frac{32}{6} = \frac{16}{3}$

Number of pages typed by Kumar in 1 hour $= \frac{40}{5} = 8$

Number of pages typed by both in 1 hour $= \left[\frac{16}{3} + 8\right] = \frac{40}{3}$

Time taken by both to type 110 pages $= \left[110 \times \frac{3}{40}\right]$ hours

$= 8\frac{1}{4}$ hours or 8 hours 15 minutes

19.    Option C

If A can do a piece of work in n days, then A's 1 day's work $= \frac{1}{n}$

(A + B + C)'s 1 day's work $= \left[\frac{1}{24} + \frac{1}{6} + \frac{1}{12}\right] = \frac{7}{24}$

**Formula:** If A's 1 day's work $= \frac{1}{n}$, then A can finish the work in n days.

So, all the three together will complete the job in $\left[\frac{24}{7}\right]$ days $= 3\frac{3}{7}$

20.    Option B

Ration of times taken by Sakshi and Tanya = 125 : 100 = 5 : 4
Suppose Tanya takes x days to do the work.

5 : 4::20 : x $\qquad$ x = $\left[\frac{4 \times 20}{5}\right]$

    x = 16 days

Hence, Tanya takes 16 days to complete the work.

21.    Option B

Suppose A, B and C take x, $\frac{x}{2}$ and $\frac{x}{3}$ days respectively to finish the work.

Then, $\left[\frac{1}{x} + \frac{2}{x} + \frac{3}{x}\right] = \frac{1}{2}$

$\frac{6}{x} = \frac{1}{2}$

x = 12

So, B takes (12/2) = 6 days to finish the work.

22.    Option C

(A + B)'s 1 day's work        $= \left[\frac{1}{15} + \frac{1}{10}\right] = \frac{1}{6}$

Work done by A and B in 2 days $= \left[\frac{1}{6} \times 2\right] = \frac{1}{3}$

Remaining work        $= \left[1 - \frac{1}{3}\right] = \frac{2}{3}$

Now, $\frac{1}{15}$ work is done by A in 1 day.

$\frac{2}{3}$ work will be done by A in $\left[15 \times \frac{2}{3}\right]$ = 10 days

Hence, the total time taken        = (10 + 2) = 12 days.

23.    Option A

2 (A + B + C)'s 1 day's work        $= \left[\frac{1}{30} + \frac{1}{24} + \frac{1}{20}\right] = \frac{15}{120} = \frac{1}{8}$

Therefore, (A + B + C)'s 1 day's work        $= \frac{1}{2 \times 8} = \frac{1}{16}$

Work done by A, B, C in 10 days $= \frac{10}{16} = \frac{5}{8}$

Remaining work        $= \left[1 - \frac{5}{8}\right] = \frac{3}{8}$

A's 1 day's work        $= \left[\frac{1}{16} - \frac{1}{24}\right] = \frac{1}{48}$

Now, $\frac{1}{48}$ work is done by A in 1 day.

So, $\frac{3}{8}$ work will be done by A in $\left[48 \times \frac{3}{8}\right]$ = 18 days.

24.    Option A

Ratio of rates of working of A and B        = 2 : 1

So, ratio of times taken        = 1 : 2

B's 1 day's work        $= \frac{1}{12}$

A's 1 day's work        $= \frac{1}{6}$ ; (2 times of B's work)

(A + B)'s 1 day's work        $= \left[\frac{1}{6} + \frac{1}{12}\right] = \frac{3}{12} = \frac{1}{4}$

So, A and B together can finish the work in 4 days.

25.    Option B

(20 × 16) women can complete the work in 1 day.

1 woman's 1 day's work        $= \frac{1}{320}$

(16 × 15) men can complete the work in 1 day.

1 man's 1 day's work $= \frac{1}{240}$

So, required ratio $= \frac{1}{240} : \frac{1}{320}$

$= \frac{1}{3} : \frac{1}{4}$

= 4 : 3 (cross multiplied)

26. Option C

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

(A + B)'s 1 day's work $= \frac{1}{8}$

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

(A + C)'s 1 day's work $= \left[2 \times \frac{1}{6}\right] \quad \left[\frac{1}{8} + \frac{1}{12}\right]$

$= \left[\frac{1}{3} \quad \frac{5}{24}\right]$

$= \frac{3}{24}$

$= \frac{1}{8}$

So, A and C together will do the work in 8 days.

27. Option C

(B + C)'s 1 day's work $= \left[\frac{1}{9} + \frac{1}{12}\right] = \frac{7}{36}$

Work done by B and C in 3 days $= \left[\frac{7}{36} \times 3\right] = \frac{7}{12}$

Remaining work $= \left[1 \quad \frac{7}{12}\right] = \frac{5}{12}$

Now, $\frac{1}{24}$ work is done by A in 1 day.

So, $\frac{5}{12}$ work is done by A in $\left[24 \times \frac{5}{12}\right]$ = 10 days.

28. Option A

Work done by X in 8 days $= \left[\frac{1}{40} \times 8\right] = \frac{1}{5}$

Remaining work $= \left[1 \quad \frac{1}{5}\right] = \frac{4}{5}$

Now, $\frac{4}{5}$ work is done by Y in 16 days.

Whole work will be done by Y in $\left[16 \times \frac{5}{4}\right]$ = 20 days.

X's 1 day's work = $\frac{1}{40}$, Y's 1 day's work = $\frac{1}{20}$

(X + Y)'s 1 day's work = $\left[\frac{1}{40} + \frac{1}{20}\right] = \frac{3}{40}$

Hence, X and Y will together complete the work in $\left[\frac{40}{3}\right] = 13\frac{1}{3}$ days.

29. Option B

(A's 1 day's work) : (B's 1 day's work) = $\frac{7}{4}$ : 1 = 7 : 4

Let A's and B's 1 day's work be 7x and 4x respectively.

Then , 7x + 4x = $\frac{1}{7}$  11x = $\frac{1}{7}$  x = $\frac{1}{77}$

A's 1 day's work = $\left[\frac{1}{77} \times 7\right] = \frac{1}{11}$

30. Option A

Efficiency of P : Q = 3 : 1
Required number of days of P : Q = 1 : 3
i.e., if P requires x days then Q requires 3x days
but     3x   x = 60
2x = 60
x = 30 and 3x = 90
Thus P can finish the work in 30 days and Q can finish the work in 90 days.

31. Option B

| Filling efficiency | = 5% | $5 = \frac{100}{20}$ |
| Emptying efficiency | = 1.66% | $1.66 = \frac{100}{60}$ |
| Net efficiency | = 5   1.66 = 3.33% | |

Required time to full the tub = $\frac{100}{3.33}$ = 30 minutes

32. Option C

Efficiency of A = 7.14%
Efficiency of B = 4.76%
Efficiency of A + B = 11.9%
Number of days required by A and B, working together = $\frac{100}{11.9}$ = 8.4 days

33. Option A

Efficiency of A + B = 33.33% $\left[ = \frac{100}{3}\right]$
Ratio of efficiency of A and B = 3 : 1
Efficiency of A = $\frac{3}{4}$ × 33.33 = 25%
Number of days taken by A = 4 = $\frac{100}{25}$ = 4

34. Option A

3 days before the completion of the work Aman left the work means in last 3 days only Suneeta has worked alone.
So, in last 3 days worked done by Suneeta = $3 \times \frac{1}{21} = \frac{1}{7}$
So, the rest $\left[1   \frac{1}{7}\right] = \frac{6}{7}$ work was done by Aman and Suneeta both.
Number of days in which Aman and Suneeta worked together = $\frac{6/7}{5/42} = \frac{36}{5} = 7\frac{1}{5}$ days

35. Option A

Karan's efficiency = 10%
Sohan's efficiency = 5%
Work done by Karan and Sohan together in 3 days = 15 × 3 = 45%
Now, number of days in which B completed rest (55%) work alone = $\frac{55}{5}$ = 11

Total number of days in which B worked = 3 + 11 = 14

Now number of days required by B, when A and B both worked together = $\frac{100}{15}$ =6 $\frac{2}{3}$

Required difference in number of days = (11) $\left[6\frac{2}{3}\right]$

$= \frac{13}{3} = 4\frac{1}{3}$ days

36.    Option B

A's share        = Rs.250
B's share        = Rs.100
It means the ratio of efficiency of A : B = 250 : 100 = 5 : 2
Ratio of days taken by A and B = 2x : 5x
Now, 5x   2x = 9        x = 3
Number of days taken by A = 6 (efficiency = 16.66%)
Number of days taken by B = 15 (efficiency = 6.66%)
Therefore number of days taken by A and B, working together = $\frac{100}{23.33} = \frac{300}{70} = 4\frac{2}{7}$ days

37.    Option A

A + B = 70%

B + C = 50%        $\left[A + B + B + C \quad (A + B + C) = B\right]$

                   70 + 50   100 = 20%

B = 20%
A = 50%
C = 30%
Hence, A is most efficient.

38.    Option C

Work done                = $\frac{1}{5}$

Remaining work           = $\frac{4}{5}$

4 (20 × 75) = 40 × x
x = 150
Therefore 75 men should be increased.

39.    Option E

Work done by 2 men = 3 women = 4 boys
1 man = 2 boys
1 women = $\frac{4}{3}$ boys
Boys × days = 4 × 52 (boys   days)
Again 1 man + 1 woman + 1 boy = 2 + $\frac{4}{3}$ + 1 = $\frac{13}{3}$ boys

40.    Option C

Work done $= \dfrac{2}{3}$

Remaining work $= \dfrac{1}{3}$, which is half of $\dfrac{2}{3}$

$\dfrac{1}{2} \times (20 \times 32) = 8 \times x$

x = 40 men

Therefore, 20 more men were required.

41.    Option A

Number of days taken by A to complete work alone      = 14 days
Number of days taken by B to complete work alone      = 7 days
Number of days taken by C to complete work alone      = 7 days
One day's work of A and B      $= \dfrac{1}{14} + \dfrac{1}{7} = \dfrac{3}{14}$
And one day's work of A, B and C $= \dfrac{1}{14} + \dfrac{1}{7} + \dfrac{1}{7} = \dfrac{5}{14}$
3 day's work of A and B $= 3 \times \dfrac{3}{14} = \dfrac{9}{14}$

Remaining work      $= \dfrac{5}{14}$      $\left[ 1 - \dfrac{9}{14} \right]$

This remaining work will be done by A, B and C $= \dfrac{5/14}{5/14} = 1$ day

42.    Option A

(A + B)'s 1 day's work      $= \dfrac{1}{4}$, As 1 day's work $= \dfrac{1}{12}$

B's 1 day's work $= \left[ \dfrac{1}{4} - \dfrac{1}{12} \right] = \dfrac{1}{6}$

Hence, B alone can complete the work in 6 days.

43.    Option E

Efficiency of 4 men and 2 boys      = 20%
Efficiency of 3women and 4 boys      = 20%
Efficiency of 2 men and 3 women      = 20%

So, Efficiency of 6 men, 6 women and 6 boys      = 60%
So, efficiency of 1 man, 1 woman and 1 boy            = 10%
Now, since they will work at double their efficiency
Efficiency of 1 man, 1 woman and 1 boy = 20%
Required number of days                  = 5

44.    Option B

C's 1 day's work      $= \dfrac{1}{3} - \left[ \dfrac{1}{6} + \dfrac{1}{8} \right] = \dfrac{1}{24}$
A : B : C = Ratio of their 1 day's work $= \dfrac{1}{6} : \dfrac{1}{8} : \dfrac{1}{24} = 4 : 3 : 1$

A's share Rs. $\left[ 600 \times \dfrac{4}{8} \right]$ = Rs.300, B's share = Rs. $\left[ 600 \times \dfrac{3}{8} \right]$ = Rs.225

C's share = Rs. $\left[ 600 - (300 + 225) \right]$ = Rs.75

45.    Option D

Efficiency of A = 8.33%
Effective efficiency = 6.66%, when there is leakage
So, efficiency of leakage = 1.66% = (8.33   6.66)
It means due to leakage a full tank will be empty in 60 hours.

46.    Option C

(A's 1 day's work) : (B's 1 day's work) = 2 : 1
(A + B)'s 1 day's work $= \frac{1}{18}$
Divide $\frac{1}{18}$ in the ratio 2 : 1

So, A's 1 day's work $= \left[\frac{1}{18} \times \frac{2}{3}\right] = \frac{1}{27}$
Hence, A alone can finish the work in 27 days.

47.    Option A

Efficiency when both pipes used to fill = A + B
And efficiency when pipe A is used to fill and pipe B is used to empty the tank = A   B
So, $\frac{A + B}{A\ B} = \frac{2}{1}$
$\frac{A}{B} = \frac{3}{1}$
Thus, the ratio of efficiency of pipe A and B = 3 : 1

48.    Option E

(45 × 16) men can complete the work in 1 day.
So, 1 man's 1day's work $= \frac{1}{720}$

45 men's 6 day's work $= \left[\frac{1}{16} \times 6\right] = \frac{3}{8}$ Remaining work $= \left[1\ \frac{3}{8}\right] = \frac{5}{8}$

49.    Option C

Time taken by pipes A and B to fill the whole tank $= \frac{100}{16.66}$ = 6 hours
Capacity filled in 2 hours by pipes A, B and C = 2 × 13.33 = 26.66%
Remaining capacity = 73.33%
This remaining capacity can be filled by A and B $= \frac{73.33}{16.66} = 4\frac{2}{5}$
So, the total time required $= 2 + 4\frac{2}{5} = $ 6 hours 24 minutes
Thus, in this case 24 minutes extra are required.

50.    Option C

1 minute's work of both the punctures $= \left[\frac{1}{9} + \frac{1}{6}\right] = \frac{5}{18}$
So, both the punctures will make the tyre flat in $\frac{18}{5} = 3\frac{3}{5}$ min.

51.    Option B

Let x litre be the per day filling and v litre be the capacity of the reservoir, then

$$90x + v = 40000 \times 90 \qquad .... (1)$$
$$60x + v = 32000 \times 60 \qquad .... (2)$$

Solving eq. (1) and (2), we get

$$x = 56000$$

Hence, 56000 litres per day can be used without the failure of supply.

52. Option A

(A's 1 day's work) : (B's 1 day's work) = 150 : 100 = 3 : 2
Let A's and B's 1 day's work be 3x and 2x respectively.

Then, C's 1 day's work $= \left[\frac{3x + 2x}{2}\right] = \frac{5x}{2}$

So, $\frac{5x}{2} = \frac{1}{40}$ or x $= \left[\frac{1}{40} \times \frac{2}{5}\right] = \frac{1}{100}$

A's 1 day's work $= \frac{3}{100}$ ; B's 1 day's work $= \frac{1}{50}$ ; C's 1 day's work $= \frac{1}{40}$

(A + B + C)'s 1 day's work $= [\frac{3}{100} + \frac{1}{50} + \frac{1}{40}] = \frac{15}{200} = \frac{3}{40}$

So, A, B and C together can do the work in $\frac{40}{3} = 13\frac{1}{3}$ days

53. Option B

Ratio of number of men, women and children $= \frac{18}{6} : \frac{10}{5} : \frac{12}{3} = 3x : 2x : 4x$

So, (3x + 2x + 4x) = 18

So, x = 2

Therefore, number of women = 4

Share of all women $= \frac{10}{40} \times 4000 =$ Rs.1000

(18 + 10 + 12 = 40)

So, Share of each woman $= \frac{1000}{4} =$ Rs.250

54. Option A

P can complete the work in (12 × 8) hrs. = 96 hrs.
Q can complete the work in (8 × 10) hrs. = 80 hrs.

So, P's 1 hour's work $= \frac{1}{96}$ and Q's 1 hour's work $= \frac{1}{80}$

(P + Q)'s 1 hour's work $= \left[\frac{1}{96} + \frac{1}{80}\right] = \frac{11}{480}$

So, both P and Q will finish the work in $\left[\frac{480}{11}\right]$ hrs.

So, Number of days of 8 hours each $= \left[\frac{480}{11} \times \frac{1}{8}\right] = \frac{60}{11}$ days $= 5\frac{5}{11}$ days

55. Option C

Efficiency of Eklavya     = 16.66%
Efficiency of Faizal      = 8.33%
Total efficiency of Eklavya and Faizal  = 25%
So, they can do actual work in 4 days
So, 3 times work requires 12 days.

56. Option D

(A + B)'s 20 day's work = $\left[\frac{1}{30} \times 20\right]$ = $\frac{2}{3}$  Remaining work = [1 − $\frac{2}{3}$] = $\frac{1}{3}$

Now, $\frac{1}{3}$ work is done by A in 20 days.

Whole work will be done by A in (20 × 3) = 60 days

57.     Option B

Efficiency of Aman and Raman          = 10%
Aman worked for 2.5 hours and Raman worked separately 8.5 hours. Which means it can be considered that Aman and Raman worked together for 2.5 hours and Raman worked alone for 6 hours.
Thus, Aman and Raman in 2.5 hours can complete 25% work. It means the remaining (50 − 25) = 25%  of the work was done by Raman in 6 hours.
Therefore, Raman can do 100% work in 24 hours. It means the efficiency of Raman = 4.16%
Therefore, efficiency of Aman = (10 − 4.16) = 5.83%
Thus, Aman require $\frac{100}{5.83}$ = 17$\frac{1}{7}$ hours to complete the work alone.

58.     Option B

Let 1 man's 1 day's work = x and 1 boy's 1 day's work = y
Then, 5x + 2y = 4 (x + y)          x = 2y          $\frac{x}{y} = \frac{2}{1}$

59.     Option B

C's 1 day's work          = $\frac{1}{3}$ − $\left[\frac{1}{6} + \frac{1}{8}\right]$ = $\frac{1}{3}$ − $\frac{7}{24} = \frac{1}{24}$
A's wages : B's wages : C's wages = $\frac{1}{6} : \frac{1}{8} : \frac{1}{24}$ = 4 : 3 : 1
So, C's share = Rs.$\left[\frac{1}{8} \times 3200\right]$ = Rs.400

60.     Option C

Rate of leakage          = 8.33% per hour
Net efficiency          = 50 − (16.66 + 8.33) = 25%
Time required = $\frac{100}{25}$ = 4 hours

61.     Option B

Work done by A          = $\left[1 - \frac{8}{23}\right] = \frac{15}{23}$
So, A : (B + C) = $\frac{15}{23} : \frac{8}{23}$ = 15 : 8
So, A's share = Rs. $\left[\frac{15}{23} \times 529\right]$ = Rs.345

62.     Option B

(A's 1 day's work) : (B's 1 day's work) = $\frac{7}{4}$ : 1 = 7 : 4
Let A's and B's 1 day's work be 7x and 4x respectively.
Then, 7x + 4x = $\frac{1}{7}$          11x = $\frac{1}{7}$          x = $\frac{1}{77}$

So, A's 1 day's work = $\left[\frac{1}{77} \times 7\right] = \frac{1}{11}$

63.     Option D

Suppose the work was finished in x days.
Then, A's (x    8) day's work + B's (x    12) day's work + C's x day's work = 1
$\frac{x\ 8}{36} + \frac{x\ 12}{54} + \frac{x}{72} = 1$          6(x    8) + 4 (x    12) + 3x = 216
So, 13x = 312 or x = 24

64.     Option C

B's 1 day's work          = $\left[\frac{1}{12}\ \frac{1}{20}\right] = \frac{2}{60} = \frac{1}{30}$

Now, (A + B)'s 1 day's work          = $\left[\frac{1}{20} + \frac{1}{60}\right] = \frac{4}{60} = \frac{1}{15}$ [B works for half day only]

So, A and B together will complete the work in 15 days.

65.     Option C

1 woman's 1 day's work = $\frac{1}{70}$ ; 1 child's 1 day's work = $\frac{1}{140}$

(5 women + 10 children)'s 1 day's work = $\left[\frac{5}{70} + \frac{10}{140}\right] = \left[\frac{1}{14} + \frac{1}{14}\right] = \frac{1}{7}$

So, 5 women and 10 children will complete the work in 7 days.

66.     Option A

1 man's 1 day's work          = $\frac{1}{108}$

12 men's 6 day's work          = $\left[\frac{1}{9} \times 6\right] = \frac{2}{3}$  Remaining work = $\left[1\ \frac{2}{3}\right] = \frac{1}{3}$

18 men's 1 day's work          = $\left[\frac{1}{108} \times 18\right] = \frac{1}{6}$

$\frac{1}{6}$ work is done by them in 1 day.

So, $\frac{1}{3}$ work is done by them in $\left[6 \times \frac{1}{3}\right]$ = 2 days

67.     Option A

B's daily earning          = Rs. (300    188) = Rs.112
A's daily earning          = Rs. (300    152) = Rs.148

C's daily earning          = Rs. $\left[300\ (112 + 148)\right]$ = Rs.40