Time and Work, Work and Wages

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INTRODUCTION

In our everyday life, we come across many situations demanding timely completion of work assignments. We complete those earlier or later based on the needs. Accordingly, manpower is increased or decreased. To explain, the time allowed and the manpower engaged, for a certain work, are inversely proportional to each other, that is, more the number of manpower involved, lesser is the time required to complete a work. We also come across situations where 'time and work' or 'men and work' are directly proportional to each other.

For solving problems on 'time and work', the following general rules are adhered:

1. If 'A' can do a piece of work in n days, then at a uniform rate of working 'A' will finish $\frac{1}{n}$ work in one day.
2. If $\frac{1}{n}$ of a work is done by 'A' in one day, then 'A' will take n days to complete the full work.
3. If 'A' does $\frac{1}{n}$ of a work in 1 hour, then to complete the full work, 'A' will take $\frac{n}{m}$ hours.
4. If 'A' does three times faster work than 'B', then ratio of work done by A and B is 3:1 and ratio of time taken by A and B is 1:3.
5. A, B and C can do a piece of work in T_1, T_2 and T_3 days, respectively. If they have worked for D_1, D_2 and D_3 days respectively, then

   Amount of work done by A $= \frac{D_1}{T_1}$

   Amount of work done by B $= \frac{D_2}{T_2}$

   Amount of work done by C $= \frac{D_3}{T_3}$

   Also, the amount of work done by A, B and C, together

   $$= \frac{D_1}{T_1} + \frac{D_2}{T_2} + \frac{D_3}{T_3}.$$

   which will be equal to 1, if the work is complete.

SOME BASIC FORMULAE

1. If A can do a piece of work in X days and B can do the same work in Y days, then both of them working together will do the same work in $\frac{XY}{X+Y}$ days.

Explanation:

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

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

Then, (A + B)'s 1 day's work $= \frac{1}{X} + \frac{1}{Y} = \frac{X+Y}{XY}$.

$\therefore$ A and B together can complete the work in $= \frac{XY}{X+Y}$ days.

Illustration 1: A can finish a piece of work by working alone in 6 days; B, while working alone, can finish the same work in 12 days. If both of them work together, then in how many days, the work will be completed?

Solution: Here, $X = 6$ and $Y = 12$.

∴ By working together, A and B will complete the work in $= \frac{XY}{X+Y}$ days $= \frac{6\times12}{6+12}$ days, i.e., 4 days.

> 2. If A, B and C, while working alone, can complete a work in X, Y and Z days, then they will together complete the work in $\frac{XYZ}{XY+YZ+ZX}$ days.

Explanation:

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

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

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

∴ (A + B + C)'s 1 day's work

$$= \frac{1}{X}+\frac{1}{Y}+\frac{1}{Z}=\frac{XY+YZ+ZX}{XYZ}.$$

So, A, B and C together can complete the work in

$$= \left(\frac{XYZ}{XY+YZ+ZX}\right)\text{days.}$$

Illustration 2: A, B and C can complete a piece of work in 10, 15 and 18 days. In how many days, would all of them complete the same work working together?
Solution: Here, $X = 10$, $Y = 15$ and $Z = 18$.
Therefore, the work will be completed in

$$= \frac{XYZ}{XY+YZ+ZX}\text{ days}$$

$$= \frac{10\times15\times18}{10\times15+15\times18+18\times10}\text{ days}$$

i.e., $\frac{2700}{600}$ or, $4\frac{1}{2}$ days.

> 3. Two persons, A and B, working together, can complete a piece of work in X days. If A, working alone, can complete the work in Y days, then B, working alone, will complete the work in $\frac{XY}{Y-X}$ days.

Explanation:

A and B together can complete the work in X days.

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

Similarly, A's 1 day's work $= \frac{1}{Y}$.

Therefore, B's 1 day's work $= \frac{1}{X}-\frac{1}{Y}=\frac{Y-X}{XY}$.

∴ B alone can com plete the work in $\left(\frac{XY}{Y-X}\right)$ days.

∴ B alone will complete the work in

$= \frac{XY}{Y-X}$ days $= \frac{15\times20}{20-15}$, i.e., 60 days.

Illustration 3: A and B, working together, take 15 days to complete a piece of work. If A alone can do this work in 20 days, then how long would B take to complete the same work?
Solution: Here, $X = 15$ and $Y = 20$.

> 4. If A and B, working together, can finish a piece of work in X days, B and C in Y days, C and A in Z days, then
>
> (a) A, B and C working together, will complete the job in $\left(\frac{2XYZ}{XY+YZ+ZX}\right)$ days.
>
> (b) A alone will complete the job in $\left(\frac{2XYZ}{XY+YZ-ZX}\right)$ days.
>
> (c) B alone will complete the job in $\left(\frac{2XYZ}{ZX+XY-YZ}\right)$ days.

Explanation:

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

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

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

So, [(A + B) + (B + C) + (C + A)]'s 1 day's work $= \frac{1}{X}+\frac{1}{Y}+\frac{1}{Z}$.

or, 2(A + B + C)'s 1 day's work $= \left(\frac{1}{X}+\frac{1}{Y}+\frac{1}{Z}\right)$

or, (A + B + C)'s 1 day's work $= \frac{1}{2}\left(\frac{1}{X}+\frac{1}{Y}+\frac{1}{Z}\right)$

i.e., $\left(\frac{XY+YZ+ZX}{2XYZ}\right)$

∴ A, B and C, working together, will complete the work in $\left(\frac{2XYZ}{XY+YZ+ZX}\right)$ days.

Also, A's 1 day's work = (A + B + C)'s 1 day's work − (B + C)'s 1 day's work

$$= \frac{1}{2}\left(\frac{1}{X}+\frac{1}{Y}+\frac{1}{Z}\right)-\frac{1}{Y} = \frac{1}{2}\left(\frac{1}{X}-\frac{1}{Y}+\frac{1}{Z}\right)$$

$$= \frac{XY+YZ-ZX}{2XYZ}.$$

So, A alone can do the work in $\left(\frac{2XYZ}{XY+YZ-ZX}\right)$ days.

Similarly, B alone can do the work in $\left(\frac{2XYZ}{YZ+ZX-XY}\right)$ days

and C alone can do the work in $\left(\frac{2XYZ}{ZX+XY-YZ}\right)$ days.

Illustration 4: A and B can do a piece of work in 12 days, B and C in 15 days, C and *A* in 20 days. How long would each of them would take separately to complete the same work?

Solution: Here, $X = 12$, $Y = 15$ and $Z = 20$.

∴ A alone can do the work in

$$= \frac{2XYZ}{XY+YZ-ZX}$$

$$= \frac{2\times12\times15\times20}{12\times15+15\times20-20\times12} \text{ days}$$

or, $\frac{7200}{240}$, i.e., 30 days.

B alone can do the work in

$$= \frac{2XYZ}{YZ+ZX-XY} \text{ days}$$

$$= \frac{2\times12\times15\times20}{15\times20+20\times12-12\times15} \text{ days}$$

or, $\frac{7200}{360}$, i.e., 20 days.

C alone can do the work in

$$= \frac{2XYZ}{ZX+XY-YZ} \text{ days}$$

$$= \frac{2\times12\times15\times20}{20\times12+12\times15-15\times20} \text{ days}$$

or, $\frac{7200}{120}$, i.e., 60 days.

5. (a) If A can complete a work in X days and B is k times efficient than A, then the time taken by both A and B, working together, to complete the work is $\frac{x}{1+k}$.

   (b) If A and B, working together, can complete a work in X days and B is k times efficient than A, then the time taken by

   (i) A, working alone, to complete the work is $(k + 1)\ X$.

   (ii) B, working alone, to complete the work is $\left(\frac{k+1}{k}\right)X$.

Illustration 5: Harbans Lal can do a piece of work in 24 days. If Bansi Lal works twice as fast as Harbans Lal, then how long would they take to complete the work working together?

Solution: Here, $X = 24$ and $k = 2$.

∴ Time taken by Harbans Lal and Bansi Lal, working together, to complete the work

$$= \left(\frac{X}{1+k}\right) \text{days.}$$

$$= \left(\frac{24}{1+2}\right) \text{ days, i.e., 8 days.}$$

Illustration 6: A and B together can do a piece of work in 3 days. If A does thrice as much work as B in a given time, find, how long A alone would take to do the work?

Solution: Here, $X = 3$ and $k = 3$.

∴ Time taken by A, working alone, to complete the work

$$= \left(\frac{k+1}{k}\right)X = \left(\frac{3+1}{3}\right)3 = 4 \text{ days.}$$

6. If A working alone takes a days more than A and B working alone takes b days more than A and B together, then the number of days taken by A and B, working together, to finish a job is given by $\sqrt{ab}$.

Illustration 7: A alone would take 8 hours more to complete the job than if both A and B worked together. If B worked alone, he took $4\frac{1}{2}$ hours more to complete the job than A and B worked together. What time would they take if both A and B worked together?

Solution: Here, $a = 8$ and $b = \frac{9}{2}$.

∴ Time taken by A and B, working together, to complete the job

$$= \sqrt{ab} \text{ days}$$

$$= \sqrt{8\times\frac{9}{2}} \quad \text{or,} \quad 6 \text{ days.}$$

7. If A is k times more efficient than B and is, therefore, able to complete a work in l days less than B, then
   (a) A and B, working together, can finish the work in $\frac{kl}{k^2-1}$ days.
   (b) A, working alone, can finish the work in $\frac{l}{k-1}$ days.
   (c) B, working alone, can finish the work in $\frac{kl}{k-1}$ days.

Illustration 8: A is thrice as good a workman as B and takes 10 days less to complete a piece of work than B takes. Find out time in which B alone can complete the work.

Solution: Here, $k = 3$ and $l = 10$.

$\therefore$ Time taken by B, working alone, to complete the work

$$= \frac{kl}{k-1} \text{ days}$$

$$= \frac{3\times 10}{3-1} \text{ days, i.e., 15 days.}$$

8. If A can complete $\frac{a}{b}$ part of work in X days, then $\frac{c}{d}$ part of the work will be done in $\frac{b\times c\times X}{a\times d}$ days.

Illustration 9: A completes $\frac{3}{4}$ of a work in 12 days. In how many days he would complete $\frac{1}{8}$ of the work?

Solution: Here, $a = 3$, $b = 4$, $X = 12$, $c = 1$ and $d = 8$.

Therefore, number of days required to complete $\frac{1}{8}$ of the work

$$= \frac{b\times c\times X}{a\times d} = \frac{4\times 1\times 12}{3\times 8} = 2 \text{ days.}$$

9. (a) There are two groups of people with same level of efficiency. In one group, M_1 persons can do W_1 works in D_1 time and in the other group, M_2 persons can do W_2 works in D_2 time. The relationship between the two groups is given by
   $M_1D_1W_2 = M_2D_2W_1$
   (b) There are two groups of people with same efficiency. In group, M_1 persons can do W_1 works in D_1 time working t_1 hours a day and M_2 persons can do W_2 works in D_2 time working t_2 hours a day. The relationship between the two groups is given by
   $M_1D_1t_1W_2 = M_2D_2t_2W_1$.

Illustration 10: If 10 persons can complete 2/5 of a work in 8 days, then find out the number of persons required to complete the remaining work in 12 days.

Solution: We have, $M_1 = 10$, $W_2 = \frac{2}{5}$, $D_1 = 8$

$M_2 = ?$, $W_2 = \frac{3}{5}$, $D_2 = 12$.

$\therefore \quad M_1D_1W_2 = M_2D_2W_1$

$\Rightarrow \quad 10 \times 8 \times \frac{23}{5} = M_2 \times 12 \times \frac{2}{5}$

$\Rightarrow \quad M_2 = 10.$

Illustration 11: If 10 persons can cut 20 trees in 3 days by working 12 hours a day. Then, in how many days can 24 persons cut 32 trees by working 4 hours a day?

Solution: We have, $M_1 = 10$, $W_1 = 20$, $D_1 = 3$, $t_1 = 12$

$M_2 = 24$, $W_2 = 32$, $D_2 = ?$, $t_2 = 4$

$\therefore \quad M_1D_1t_1W_2 = M_2D_2t_2W_1$

$\Rightarrow \quad 10 \times 3 \times 12 \times 32 = 24 \times D_2 \times 4 \times 20$

$\Rightarrow \quad D_2 = 6$ days.

10. If a men and b women can do a piece of work in n days, then c men and d women can do the work in
$$\left(\frac{nab}{bc+ad}\right) \text{ days.}$$

Illustration 12: 12 men or 15 women can do a work in 14 days. In how many days, 7 men and 5 women would complete the work?

Solution: Here, $a = 12$, $b = 15$, $n = 14$, $c = 7$ and $d = 5$.

Required number of days

$$= \frac{nab}{bc+ad} = \left(\frac{14\times 12\times 15}{15\times 7+12\times 5}\right) \text{days}$$

$$= \frac{168}{11} \text{ days} \quad \text{or,} \quad 15\frac{3}{11} \text{ days.}$$

EXERCISE 1

1. 10 men can complete a piece of work in 15 days and 15 women can complete the same work in 12 days. If all the 10 men and 15 women work together, in how many days will the work will be completed?

(a) $6\frac{2}{3}$ days (b) $8\frac{1}{3}$ days

(c) $7\frac{2}{3}$ days (d) None of these

2. A can do a piece of work in 30 days while B can do it in 40 days. A and B working together can do it in:

(a) $15\frac{2}{7}$ days (b) $17\frac{1}{7}$ days

(c) $18\frac{3}{7}$ days (d) None of these

3. A can do 1/3 of a work in 5 days and B can do 2/5 of the work in 10 days. In how many days both A and B together can do the work?

(a) $13\frac{2}{3}$ days (b) $9\frac{3}{8}$ days

(c) $18\frac{5}{8}$ days (d) None of these

4. A, B and C can complete a piece of work in 6, 12 and 24 days. They altogether will complete the work in:

(a) $5\frac{2}{7}$ days (b) $4\frac{3}{7}$ days

(c) $3\frac{3}{7}$ days (d) None of these

5. A works thrice as good as B and is, therefore, able to finish a piece of work in 60 days less than B. Find the time in which they can complete it, working together.

(a) $22\frac{3}{4}$ days (b) $22\frac{1}{2}$ days

(c) 24 days (d) None of these

6. Ramesh takes twice as much time as Mahesh and thrice as much time as Suresh to complete a job. If working together, they can complete the job in 4 days, then the time taken by each of them separately to complete the work is:

(a) 36, 24 and 16 days (b) 20, 16 and 12 days
(c) 24, 42 and 18 days (d) None of these

7. Sita takes twice as much time as Gita to complete a work and Rita does it in the same time as Sita and Gita together. If all three working together can finish the work in 6 days, then the time taken by each of them to finish the work is:

(a) 18, 36, and 12 days
(b) 20, 38 and 14 days
(c) 24, 42 and 18 days
(d) None of these

8. 5 men can complete a work in 3 days, 4 women can complete the same work in 3 days and 5 children can do it in 3 days. 1 man, 1 woman and 1 child, working together, can complete the work in:

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

9. A and B can complete piece of work in 6 days and A alone can complete it in 9 days. The time taken by B alone to complete the work is:

(a) 20 days (b) 18 days
(c) 24 days (d) None of these

10. A and B can complete a piece of work in 30 days, B and C in 40 days while C and A in 60 days. A, B, C together can complete the work in:

(a) $24\frac{3}{4}$ days (b) $28\frac{2}{3}$ days

(c) $26\frac{2}{3}$ days (d) None of these

11. A and B can complete a piece of work in 18 days; B and C in 24 days; C and A in 36 days. A alone can complete the work in:

(a) 48 days (b) 56 days
(c) 40 days (d) None of these

12. Ajay and Sunil together can complete a piece of work in 10 days, Sunil and Sanjay in 15 days and Sanjay and Ajay in 20 days. They worked together for 6 days, and then Ajay leaves. Sunil and Sanjay worked together for 4 more days, and Sunil leaves. How long will Sanjay take to complete the work?

(a) 12 days (b) 10 days
(c) 16 days (d) None of these

13. Anu can complete a work in 10 days. Manu is 25% more efficient than Anu, and Sonu is 60% more efficient than Manu. Working together, how long would they take to finish the job?

(a) $3\frac{5}{8}$ days (b) $5\frac{6}{7}$ days

(c) $2\frac{6}{17}$ days (d) None of these

14. A and B completes job in 12 days while A, B and C can complete it in 8 days. C alone will finish the job in:

(a) 24 days (b) 36 days
(c) 28 days (d) None of these

15. Bansal, Gupta and Singhal together can complete a work in 4 days. If Bansal and Gupta together can complete the work in $4\frac{4}{5}$ days, Gupta and Singhal togehter can do it in 8 days, then Gupta alone can complete the work in:

(a) 16 days (b) 12 days
(c) 20 days (d) None of these

16. Nikita, Nishita and Kavita can complete a work in $2\frac{2}{3}$ days. If Nishita and Kavita can complete it in 4 days, and Nishita alone can do it in 6 days, then Nikita and Nishita can complete the work in:

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

(c) $3\frac{3}{7}$ days (d) None of these

17. A is twice as good a workman as B. Working together they finish a piece of work in 1 day. A alone can finish the work in:

(a) 28 days (b) 21 days
(c) 24 days (d) None of these

18. Bindal can finish a work in 10 days. Jindal is twice as efficient as Bindal. If they work together, in how many days, the work will be completed?

(a) $3\frac{1}{3}$ days (b) $5\frac{2}{3}$ days

(c) $4\frac{1}{3}$ days (d) None of these

19. A alone would take 27 days more to complete the job than if both A and B would together. If B worked alone, he took 3 days more to complete the job than A and B worked together. What time would they take if both A and B worked together?

(a) 7 days (b) 9 days
(c) 11 days (d) None of these

20. A is 4 times as fast as B and is, therefore, able to complete a work in 45 days less than B. A and B, working together, can complete the work in:

(a) 12 days (b) 16 days
(c) 8 days (d) None of these

21. If A can complete a work in 16 days, then in how many days can he complete $\frac{3}{4}$ of the work?

(a) 16 days (b) 20 days
(c) 12 days (d) None of these

22. Working 7 hours daily 24 men can complete a piece of work in 27 days. In how many days would 14 men complete the same piece of work working 9 hours daily?

(a) 36 days (b) 30 days
(c) 32 days (d) None of these

23. 10 men can cut 15 trees in 2 hours. If 2 men leave the job, then many trees will be cut in 3 hours?

(a) 20 trees (b) 18 trees
(c) 24 trees (d) None of these

24. 45 men completes a piece of work in 30 days working 12 hours a day. In how many days will 60 men complete the work working 10 hours a day?

(a) 27 days (b) 30 days
(c) 24 days (d) None of these

25. The work done by a woman in 8 hours is equal to the work done by a man in 6 hours and by a boy in 12 hours. If working 6 hours per day 9 men can complete a work in 6 days, then in how many days can 12 men, 12 women and 12 boys together finish the same work working 8 hours per day?

(a) $2\frac{1}{2}$ days (b) $1\frac{1}{2}$ days

(c) $3\frac{1}{2}$ days (d) None of these

26. 4 men or 6 women can finish a piece of work in 20 days. In how many days can 6 men and 11 women finish the same work?

(a) 9 days (b) 6 days
(c) 7 days (d) None of these

27. 10 men can finish a piece of work in 10 days, whereas it takes 12 women to finish it in 10 days. If 15 men and 6 women undertake to complete the work, how many days will they take to complete it?

(a) 7 days (b) 5 days
(c) 9 days (d) None of these

28. A can complete a piece of work in 10 days, while B alone can complete it in 15 days. They work together for 5 days and rest of the work is done by C in 2 days. If they receive ₹450 for the whole work, how should they divide the money?

(a) ₹250, ₹100, ₹100 (b) ₹225, ₹150, ₹75
(c) ₹200, ₹150, ₹100 (d) ₹175, ₹175, ₹100

29. The first man alone can complete this work in 7 days. The second man alone can do this work in 8 days. If they are working together to complete this work in 3 days and also taking help of a boy, then how should the money be divided?

(a) ₹600, ₹500, ₹300 (b) ₹600, ₹525, ₹275
(c) ₹600, ₹550, ₹250 (d) ₹500, ₹525, ₹375

30. A does half as much work as B in 3/4 of the time. If together they take 18 days to complete a work, then how much time shall B take to complete it?

(a) 30 days (b) 35 days
(c) 40 days (d) None of these

31. Two men, A and B, working together, completed a piece of work. If worked individually, it would have taken them 30 and 40 days to complete the work. If they have received a payment of ₹2100, then B's share is:

(a) ₹900 (b) ₹1200
(c) ₹800 (d) ₹1300

32. Two men undertake a piece of work for ₹600. Individually, they can complete the work in 6 days and 8 days, respectively. With the assistance of a boy they completed the work in 3 days. The boy's share should be:

(a) ₹300 (b) ₹225
(c) ₹75 (d) ₹100

33. A can do a piece of work in 8 days. A undertook to it for ₹320. With the help of B, he finishes the work in 6 days. B's share is:

(a) ₹80 (b) ₹240
(c) ₹100 (d) ₹120

34. Five men and 2 boys, working together, can complete four times as much work per hour as a man and a boy completes working together. The work completed by a man and a boy should be in the ratio:

(a) 1:2 (b) 2:1
(c) 1:3 (d) 4:1

35. A, B and C can do a piece of work in 16, 32 and 48 days, respectively. They started working together, but C left after working 4 days and B left 2 days before the completion of work. Total number of days taken for completion of work was:

(a) 8 days (b) $9\frac{1}{9}$ days

(c) 11 days (d) $10\frac{4}{9}$ days

36. A and B, working separately, can complete a piece of work in 9 and 12 days, respectively. If they work for a day alternately, A beginning, in how many days the work will be completed?

(a) $10\frac{1}{2}$ days (b) $10\frac{1}{4}$ days

(c) $10\frac{2}{3}$ days (d) $10\frac{1}{2}$ days

37. A and B can complete a piece of work in 45 and 40 days, respectively. They began the work together, but A leaves after some days and B completed the remaining work in 23 days. After how many days did A leave?

(a) 6 days (b) 8 days
(c) 9 days (d) 12 days

38. A and B, working together, can complete a piece of work in 12 days B and C working together can complete the same piece of work in 16 days. A worked at it for 5 days and B worked at it for 7 days. C finished the remaining work in 13 days. How many days would C alone take to complete it?

(a) 10 days (b) 24 days
(c) 32 days (d) 40 days

39. A can complete a piece of work in 90 days. He starts working, but having some other engagements leaves after 5 days. Thereafter, B completes this work in 21 days. How many days would A and B take to complete this work working together?

(a) 15 days (b) 16 days
(c) 17 days (d) 11 days

40. A can do a piece of work in 30 days, B in 50 days and C in 40 days. If A is assisted by B on one day and by C on the next day alternately, the work will be completed in:

(a) $17\frac{32}{35}$ days (b) $19\frac{2}{3}$ days

(c) $16\frac{31}{37}$ days (d) $18\frac{1}{3}$ days

EXERCISE–2
(BASED ON MEMORY)

1. 56 men can complete a piece of work in 24 days. In how many days can 42 men complete the same piece of work?

(a) 18 (b) 32
(c) 98 (d) 48
(e) None of these

[Bank of Maharashtra PO, 2008]

2. Four examiners can examine a certain number of answer papers in 10 days by working 5 hours a day. For how many hours a day would 2 examiners have to work in order to examine twice the number of answer papers in 20 days?

(a) 8 hours (b) $7\frac{1}{2}$ hours
(c) 10 hours (d) $8\ \frac{1}{2}$ hours
(e) None of these

[Bank of Maharashtra PO, 2008]

3. 'A' can complete a piece of work in 12 days. 'A' and 'B' together can complete the same piece of work in 8 days. In how many days can 'B' alone complete the same piece of work?

(a) 15 days (b) 18 days
(c) 24 days (d) 28 days
(e) None of these

[SBI PO, 2008]

4. 4 men, 5 women and 3 children together can complete a piece of work in 16 days. In how many days can 10 women alone complete the piece of work if 10 men alone can complete it in 24 days?

(a) 18 (b) 15
(c) 12 (d) Cannot be determined
(e) None of these

[Bank of Maharashtra PO, 2007]

5. 15 men can do a piece of work in 6 days. How many men would be required to do the same work in 7.5 days?

(a) 10 (b) 16
(c) 12 (d) 20
(e) None of these

[Corporation Bank PO, 2007]

6. 'A' alone can complete a piece of work in 8 days. Work done by 'B' alone in one day is half of the work done by 'A' alone in one day. In how many days can the work be completed if 'A' and 'B' work together?

(a) $6\ \frac{1}{2}$ (b) $5\ \frac{1}{2}$
(c) $5\frac{1}{3}$ (d) $6\ \frac{1}{2}$
(e) None of these

[PNB Management Trainee, 2007]

7. 24 men can complete a piece of work in 16 days. The same work can be completed by 8 women in 72 days, whereas 24 children take 32 days to complete it. If 10 men, 15 women and 24 children work together, in how many days can the work be completed?

(a) 18 (b) 8
(c) 22 (d) 12
(e) None of these

[Allahabad Bank PO, 2007]

8. 8 men alone can complete a piece of work in 12 days, 4 women alone can complete the same piece of work in 48 days and 10 children alone can complete the piece of work in 24 days. In how many days can 10 men, 4 women and 10 children together complete the piece of work?

(a) 5 (b) 15
(c) 28 (d) 6
(e) None of these

[CBI PO, 2006]

9. 'A' can complete a piece of work in 12 days. 'A' and 'B' together can complete the same piece of work in 4 days. In how many days can 'B' alone complete the same piece of work?

(a) 6 days (b) 8 days
(c) 15 days (d) 18 days
(e) None of these

[Bank of Maharashtra PO, 2006]

10. 9 children can complete a piece of work in 360 days. 18 men can complete the same piece of work in 72 days and 12 women can complete the piece of work in 162 days. In how many days can 4 men, 12 women and 10 children together complete the piece of work?

(a) 124 (b) 81
(c) 68 (d) 96
(e) None of these

[Corporation Bank PO, 2006]

11. A and B together can do a work in 8 days, B and C together in 6 days, while C and A together in 10 days. If they all work together, then the work will be completed in:

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

(c) $5\frac{5}{47}$ days (d) $4\frac{4}{9}$ days

[SSC (GL) Prel. Examination, 2005]

12. A work could be completed in 100 days by some workers. However, due to the absence of 10 workers, it was completed in 110 days. The original number of workers was:

(a) 100 (b) 110
(c) 55 (d) 50

[SSC (GL) Prel. Examination, 2005]

13. A and B can do a piece of work in 12 days, B and C in 8 days and C and A in 6 days. How long would B take to do the same work alone?

(a) 24 days (b) 32 days
(c) 40 days (d) 48 days

[SSC (GL) Prel. Examination, 2005]

14. A man and a boy received ₹800 as wages for 5 days for the work they did together. The man's efficiency in the work was three times that of the boy. What are the daily wages of the boy?

(a) ₹76 (b) ₹56
(c) ₹44 (d) ₹40

[SSC (GL) Prel. Examination, 2005]

15. A completes $\frac{7}{10}$ of a work in 15 days. He completes the remaining work with the help of B in 4 days. The time required for A and B together to complete the entire work is:

(a) $10\frac{1}{3}$ days (b) $12\frac{2}{3}$ days

(c) $13\frac{1}{3}$ days (d) $8\frac{1}{4}$ days

[SSC (GL) Prel. Examination, 2005]

16. A man, a woman and a boy can together complete a piece of work in 3 days. If a man alone can do it in 6 days and a boy alone can do it in 18 days, how long will a woman alone take to complete the work?

(a) 9 days (b) 21 days
(c) 24 days (d) 27 days

[SSC (GL) Prel. Examination, 2000]

17. A and B can do a piece of work in 10 days, B and C in 15 days and A and C in 20 days. C alone can do the work in:

(a) 60 days (b) 120 days
(c) 80 days (d) 30 days

[SSC (GL) Prel. Examination, 2002]

18. A can cultivate $\frac{2}{5}$ of a land in 6 days and B can cultivate $\frac{1}{3}$ of the same land in 10 days. Working together, A and B can cultivate $\frac{4}{5}$ of the land in:

(a) 4 days (b) 5 days
(c) 8 days (d) 10 days

[SSC (GL) Prel. Examination, 2002]

19. A does half as much work as B in $\frac{1}{6}$ of the time. If together they take 10 days to complete a work, how many days shall B take to do it alone?

(a) 70 days (b) 30 days
(c) 40 days (d) 50 days

[SSC (GL) Prel. Examination, 2002]

20. A can do a piece of work in 4 hours, B and C can do it in 3 hours; A and C can do it in 2 hours. How long will B alone take to do it?

(a) 10 hours (b) 12 hours
(c) 8 hours (d) 24 hours

[SSC (GL) Prel. Examination, 2002]

21. A does $\frac{4}{5}$ of a piece of work in 20 days; he then calls in B and they finish the remaining work in 3 days. How long will B alone take to do the whole work?

(a) $37\frac{1}{2}$ days (b) 37 days

(c) 40 days (d) 23 days

[SSC (GL) Prel. Examination, 2002]

22. A can finish a work in 18 days and B can do the same work in half the time taken by A. Then, working together what part of the same work can they finish in a day?

(a) $\frac{1}{6}$ (*b*) $\frac{2}{5}$

(c) $\frac{1}{9}$ (d) $\frac{2}{7}$

[SSC (GL) Prel. Examination, 2002]

23. A and B can finish a piece of work in 30 days, B and C can finish it in 15 days while C and A can

finish it in 10 days. Time taken by them together to do this work is:

(a) 5 days (b) $2\frac{1}{2}$ days

(c) $7\frac{1}{2}$ days (d) 10 days

[SSC (GL) Prel. Examination, 2002]

24. A can do $\frac{1}{4}$ part of a work in 10 days, B can do 40% of the work in 40 days and C can do $\frac{1}{3}$ of the work in 13 days. Who will complete the work first?

(a) A (b) B
(c) C (d) A and C both

[SSC (GL) Prel. Examination, 2002]

25. 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) 12 days (b) 4 days
(c) 8 days (d) 6 days

[SSC (GL) Prel. Examination, 2002]

26. 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 can A alone finish the job?

(a) 50 days (b) 60 days
(c) 40 days (d) 65 days

[SSC (GL) Prel. Examination, 2003]

27. If 72 men can build a wall 280 m long in 21 days, how many men will take 18 days to build a similar type of wall of length 100 m?

(a) 30 (b) 10
(c) 18 (d) 28

[SSC (GL) Prel. Examination, 2003]

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

(a) $\frac{49}{4}$ days (b) $\frac{49}{3}$ days

(c) 11 days (d) $\frac{28}{3}$ days

[SSC (GL) Prel. Examination, 2003]

29. If 3 men or 4 women can plough a field in 43 days, how long will 7 men and 5 women take to plough it?

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

[SSC (GL) Prel. Examination, 2003]

30. 8 men can do a work in 12 days. After 6 days of work, 4 more men were engaged to finish the work. In how many days would the remaining work be completed?

(a) 2 (b) 3
(c) 4 (d) 5

[SSC (GL) Prel. Examination, 2003]

31. 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 is done by A in:

(a) 5 days (b) 6 days

(c) 10 days (d) $10\frac{1}{2}$ days

[SSC (GL) Prel. Examination, 2003]

32. A and B undertook to do a piece of work for ₹4500. A alone could do it in 8 days and B alone in 12 days. With the assistance of C they finished the work in 4 days. Then C's share of the money is:

(a) ₹2250 (b) ₹1500
(c) ₹750 (d) ₹375

[SSC (GL) Prel. Examination, 2003]

33. If 6 persons working 8 hours a day earn ₹8400 per week, then 9 persons working 6 hours a day will earn per week:

(a) ₹8400 (b) ₹16800
(c) ₹9450 (d) ₹16200

[SSC (GL) Prel. Examination, 2003]

34. 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 the work in:

(a) 15 days (b) 20 days
(c) 25 days (d) 30 days

[SSC (GL) Prel. Examination, 2003]

35. 24 men can complete a work in 16 days. 32 women can complete the same work in 24 days. 16 men and 16 women started working and worked for 12 days. How many more men are to be added to complete the remaining work in 2 days?

(a) 48 (b) 24
(c) 36 (d) 16

[Bank of Baroda PO, 1999]

36. 10 men can complete a piece of work in 15 days and 15 women can complete the same work in 12 days. If all the 10 men and 15 women work together, in how many days will the work get completed?

(a) 6 (b) $7\frac{2}{3}$

(c) $6\frac{2}{3}$ (d) None of these

[SBI Associates PO, 1999]

37. 25 men and 15 women can complete a piece of work in 12 days. All of them start working together and after working for 8 days the women stopped working. 25 men completed the remaining work in 6 days. How many days will it take for completing the entire job if only 15 women are put on the job?

(a) 60 days (b) 88 days
(c) 94 days (d) 50 days
(e) None of these

[Guwahati PO, 1999]

38. 'A' completes a work in 12 days. 'B' completes the same work in 15 days. 'A' started working alone and after 3 days B joined him. How many days will they now take together to complete the remaining work?

(a) 5 (b) 8
(c) 6 (d) 4
(e) None of these

[BSRB Calcutta PO, 1999]

39. 10 men and 15 women finish a work in 6 days. One man alone finishes that work in 100 days. In how many days will a woman finish the work?

(a) 125 days (b) 150 days
(c) 90 days (d) 225 days
(e) None of these

[BSRB Hyderabad PO, 1999]

40. The work done by a woman in 8 hours is equal to the work done by a man in 6 hours and by a boy in 21 hours. If working 6 hours per day 9 men can complete a work in 6 days then in how many days can 12 men, 12 women and 12 boys together finish the same work working 8 hours per day?

(a) $1\frac{1}{3}$ days (b) $3\frac{2}{3}$ days

(c) 3 days (d) $1\frac{1}{2}$ days

(e) None of these

[BSRB Patna PO, 2001]

41. 7 men and four boys can complete a work in 6 days. A man completes double the work than a boy. In how many days will 5 men and 4 boys complete the work?

(a) 5 (b) 4
(c) 6 (d) Cannot be determined
(e) None of these

[IBPS Bank PO, 2002]

42. Vinod can complete a job in 15 hours. Vinay alone can complete the same job in 10 hours. Vinod works for 9 hours and then the remaining job is completed by Vinay. How many hours will it take Vinay to complete the remaining job alone?

(a) 4 (b) 5
(c) 6 (d) 2

[IBPS Jr Executive, 2002]

43. 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?

(a) 28 (b) 21
(c) 14 (d) 7

[SSC (GL) Examination, 2010]

44. X is three 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:

(a) 15 days (b) 10 days

(c) $7\frac{1}{2}$ days (d) 5 days

[SSC (GL) Examination, 2011]

45. 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?

(a) 6 days (b) 12 days
(c) 4 days (d) 8 days

[SSC (GL) Examination, 2011]

46. A is thrice as good a workman as B, therefore, A is able to finish a piece of work in 60 days less that B. The time (in days) in which they can do it working together is:

(a) 22 (b) $22\frac{1}{2}$

(c) 23 (d) $23\frac{1}{4}$

[SSC (GL) Examination, 2011]

47. 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?

(a) 10 (b) 20
(c) 30 (d) 60

[SSC (GL) Examination, 2011]

48. '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 actual number of men is:

(a) 6 (b) 10
(c) 12 (d) 15

[SSC (GL) Examination, 2011]

49. A does half as much work as B in $\frac{3}{4}$ of the time. If together they take 18 days to complete a work. How much time shall B take to do it alone?

(a) 30 days (b) 35 days
(c) 40 days (d) 45 days

[SSC (GL) Examination, 2011]

50. A and B working separately can do a piece of work in 9 and 12 days, respectively. If they work for a day alternately with A beginning, the work would be completed in:

(a) $10\frac{2}{3}$ days (b) $10\frac{1}{2}$ days

(c) $10\frac{1}{4}$ days (d) $10\frac{1}{3}$ days

[SSC (GL) Examination, 2011]

51. A daily wage earner gets a daily wage at the rate of ₹150 per day subject to the condition that he will have to pay a penalty at the rate of ₹25 per day for the days he is absent. At the end of 60 days, he receives an amount of ₹7,600. The number of days A worked is:

(a) 54 days (b) 52 days
(c) 51 days (d) 48 days

[UPPCS Examination, 2012]

52. 6 men can complete a piece of work in 12 days. 8 women can complete the same piece of work in 18 days, whereas 15 children can complete the piece of work in 10 days. 4 men, 12 women and 20 children work together for 2 days. If only men were to complete the remaining work in 1 day how many men would be required?

(a) 36 (b) 24
(c) 18 (d) Cannot be determined

[Bank of India PO Examination, 2010]

53. 2 men alone or three women alone can complete a piece of work in 4 days. In how many days can 1 woman and 1 man together complete the same piece of work?

(a) 6 days (b) $\frac{24}{5}$ days

(c) $\frac{12}{1.75}$ days (d) Cannot be determined

[Corporation Bank PO Examination, 2011]

54. 4 girls can complete a piece of work in 8 days, the same work 3 boys can complete in 9 days, 7 men in 2 days and 5 women in 4 days. Who among them have the minimum capacity of work?

(a) Boy (b) Girl
(c) Man (d) Woman

[Union Bank of India PO Examination, 2011]

55. Work done by A in one day is half of the work done by B in one day. Work done by B is half of the work done by C in one day. If C alone can complete the work in 7 days, in how many days can A, B and C together complete the work?

(a) 28 (b) 14
(c) 4 (d) 21

[SBI PO Examination, 2008]

56. 8 men and 4 women together can complete a piece of work in 6 days. Work done by a man in one day is double the work done by a woman is one day. If 8 men and 4 women started working and after 2 days, 4 men left and 4 new women joined. In how many more days will the work be completed?

(a) 5 days (b) 8 days
(c) 6 days (d) 4 days

[United Bank of India PO Examination, 2009]

57. B and C together can complete a work in 8 days, A and B together can complete the same work in 12 days, and A and C together can complete the same work in 16 days. In, how many days can A, B and C together complete the same work?

(a) $3\frac{9}{13}$ (b) $7\frac{5}{13}$

(c) $7\frac{5}{12}$ (d) $3\frac{5}{12}$

[Andhra Bank PO Examination, 2009]

58. 8 men can complete a piece of work in 20 days. 8 women can complete the same work in 32 days. In how many days will 5 men and 8 women together complete the same work?

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

[CBI (PO) Examination, 2010]

59. A, B and C are employed to do a piece of work for ₹575. A and C are supposed to finish $\frac{19}{23}$ of the work together. Amount shall be paid to B is:

(a) ₹210 (b) ₹100
(c) ₹200 (d) ₹475

[SSC, 2014]

60. A man is twice as fast as a woman and a woman is twice as fast as a boy in doing a work. If all of them, a man, a woman and a boy, can finish the work in 7 days, in how many days a boy will do it alone?

(a) 49 (b) 7
(c) 6 (d) 42

[SSC, 2014]

61. A, B and C can do a job in 6 days, 12 days and 15 days, respectively. After $\frac{1}{8}$ of the work is completed, C leaves the job. Rest of the work is done by A and B together. Time taken to finish the work is:

(a) $5\frac{5}{6}$ days (b) $5\frac{1}{4}$ days
(c) $3\frac{1}{2}$ days (d) $3\frac{3}{4}$ days

[SSC, 2014]

62. 15 men take 20 days to complete a job working 8 hours a day. The number of hours a day should 20 men take to complete the job in 12 days is:

(a) 5 hours (b) 10 hours
(c) 15 hours (d) 18 hours

[SSC, 2014]

63. Raj and Ram working together to do a piece of work in 10 days. Raj alone can do it in 12 days. Ram alone will do the work in:

(a) 20 days (b) 40 days
(c) 50 days (d) 60 days

[SSC, 2014]

64. If x men can do a piece of work in x days, then the number of days in which y men can do the same work is:

(a) xy days (b) $\frac{y^2}{x}$ days
(c) $\frac{x^2}{y}$ days (d) x_2y days

[SSC, 2013]

65. 3 persons undertake to complete a piece of work for ₹1,200. The first person can complete the work in 8 days, second person in 12 days and third person in 16 days. They complete the work with the help of a fourth person in 3 days. What does the fourth person get?

(a) ₹180 (b) ₹200
(c) ₹225 (d) ₹250

[SSC, 2013]

66. Two workers A and B working together completed a job in 5 days. If A worked twice as efficiently as he actually did and B worked $\frac{1}{3}$ as efficiently as he actually did, the work would have been completed in 3 days. To complete the job alone, A would require:

(a) $5\frac{1}{5}$ days (b) $6\frac{1}{4}$ days
(c) $7\frac{1}{2}$ days (d) $8\frac{3}{4}$ days

[SSC, 2013]

67. A can do a piece of work in 20 days and B in 30 days. They work together for 7 days and then both leave the work. Then C alone finishes the remaining work in 10 days. In how many days will C finish the full work?

(a) 25 days (b) 30 days
(c) 24 days (d) 20 days

[SSC, 2013]

68. Sunil completes a work in 4 days, whereas Dinesh completes the work in 6 days. Ramesh works $1\frac{1}{2}$ times as fast as Sunil. The three together can complete the work in:

(a) $1\frac{5}{12}$ days (b) $1\frac{5}{7}$ days
(c) $1\frac{3}{8}$ days (d) $1\frac{5}{19}$ days

[SSC, 2013]

69. A farmer can plough a field working 6 hours per day in 18 days. The worker has to work how many hours per day to finish the same work in 12 days?

(a) 7 (b) 9
(c) 11 (d) 13

[SSC, 2013]

70. Two men can do a piece of work in x days. But y women can do it in 3 days. Then the ratio of the work done by 1 man and 1 woman is:

(a) $3y:2x$ (b) $2x:3y$
(c) $x:y$ (d) $2y:3x$

[SSC Assistant Grade III, 2013]

71. A and B can do a job alone in 12 days and 15 days respectively. A starts the work and after 6 days B also joins to finish the work together. For how many days B actually worked on the job?

(a) $3\frac{1}{3}$ (b) $9\frac{1}{3}$
(c) $5\frac{2}{3}$ (d) $6\frac{3}{8}$

[SSC Assistant Grade III, 2012]

72. A does $\frac{1}{5}$ of a work in a week. B finishes the same in a fortnight. B starts the work and works only for 3 days. Thereafter A completes the job. He will finish it in:

(a) 10 days (b) 7 days
(c) 12 days (d) 28 days

[SSC, 2012]

73. A can do a certain work in 12 days. B is 60% more efficient than A. How many days will B and A together take to do the same job?

(a) $\frac{80}{13}$ (b) $\frac{70}{13}$
(c) $\frac{75}{13}$ (d) $\frac{60}{13}$

[SSC, 2012]

74. 2 men and 4 boys can do a piece of work in 10 days, while 4 men and 5 boys can do it in 6 days. Men and boys are paid wages according to their output. If the daily wage of a man is ₹40, then the ratio of daily wages of a man and a boy will be:

(a) 5:3 (b) 5:2
(c) 7:4 (d) 7:3

[SSC, 2012]

75. A, B and C can do a piece of work in 30, 20 and 10 days respectively. A is assisted by B on one day and by C on the next day, alternately. How long would the work take to finish?

(a) $9\frac{3}{8}$ days (b) $4\frac{4}{8}$ days
(c) $8\frac{4}{13}$ days (d) $3\frac{9}{13}$ days

[SSC, 2012]

76. A can do a piece of work in 24 days, B in 32 days and C in 64 days. All begin to do it together, but A leaves after 6 days before the completion of the work. How many days did the work last?

(a) 15 (b) 20
(c) 18 (d) 30

[SSC, 2011]

77. P, Q, R are employed to do a work for ₹5750. P and Q together finished $\frac{19}{23}$ of work and Q and R together finished $\frac{8}{23}$ of work. Wage of Q in rupees, is:

(a) 2850 (b) 3750
(c) 2750 (d) 1000

[SSC, 2011]

78. A can complete a piece of work in 12 days. B is 60% more efficient than A. The number of days, that B will take to complete the same work, is:

(a) 6 (b) $7\frac{1}{2}$
(b) 8 (d) $8\frac{1}{2}$

[SSC, 2010]

79. A and B together can complete a piece of work in 12 days and B and C together in 15 days. If A is twice as good a workman as C, then in how many days will B alone complete the same work?

(a) 30 (b) 25
(c) 24 (d) 20

[SSC, 2010]

80. 4 men and 6 women together can complete a work in 8 days while 3 men and 7 women together can complete it in 10 days. 20 women working together will complete it in:

(a) 36 days (b) 32 days
(c) 24 days (d) 20 days

[SSC, 2010]

81. A, B and C have to type 506 pages to finish an assignment.A can type a page in 12 minutes, B in 15 minutes and C in24 minutes. If they divide the task into three parts so thatall three of them spend equal amount of time in typing,what is the number of pages that B should type?

(a) 172 (b) 176
(c) 154 (d) 168
(e) 164

[IBPS PO/MT, 2014]

82. 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 40 days. What is the 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?

(a) 2:5 (b) 2:7
(c) 3:7 (d) 1:5
(e) 3:5

[IBPS PO/MT, 2012]

83. Amit and Sujit together can complete an assignment of data entry in five days. Sujit's speed is 80% of Amit's speed and the total key depressions in the assignment are 5,76,000. What is Amit's speed in key depressions per hour if they work for 8 hours a day?

(a) 4800 (b) 6400
(c) 8000 (d) 7200
(e) None of these

[SBI Associates Banks PO, 2011]

84. Four examiners can examine a certain number of answer papers in 10 days by working for five hours a day. For how many hours in a day would two examiners have to work in order to examine twice the number of answer papers in 20 days?

(a) 8 hours (b) $7\frac{1}{2}$ hours
(c) 10 hours (d) $8\frac{1}{2}$ hours
(e) None of these

[Andhra Bank PO, 2011]

85. 2 men alone or three women alone can complete a piece of work in 4 days. In how many days can 1 woman and one man together complete the same piece of work?

(a) 6 days (b) $\frac{24}{5}$ days
(c) $\frac{12}{1.75}$ days (d) Cannot be determined
(e) None of these

[Corporation Bank PO, 2011]

86. Four examiners can examine a certain number of answer papers in 10 days by working for 5 hours a day. For how many hours in a day would 2 examiners have to work in order to examine twice the number of answer papers in 20 days?

(a) 8 hours (b) $7\frac{1}{2}$ hours
(c) 10 hours (d) $8\frac{1}{2}$ hours
(e) None of these

[Punjab and Sind Bank PO, 2011]

87. 12 men complete a piece of work in 24 days. In how many days can 8 men complete the same piece of work?

(a) 28 (b) 36
(c) 48 (d) 52
(e) None of these

[IDBI Bank PO, 2009]

88. If A works alone, he would take 4 days more to complete the job than if both A and B worked together. If B worked alone, he would take 16 days more to complete the job than if A and B work together. How many days would they take to complete the work if both of them worked together?

(a) 10 days (b) 12 days
(c) 6 days (d) 8 days

[SSC, 2011]

89. 250 men can finish a work in 20 days working 5 hours a day. To finish the work within 10 days working 8 hours a day, the minimum number of men required is:

(a) 310 (b) 300
(c) 313 (d) 312

[SSC, 2011]

90. 2 men and 5 women can do a work in 12 days. 5 men and 2 women can do that work in 9 days. Only 3 women can finish the same work in:

(a) 36 days (b) 21 days
(c) 30 days (d) 42 days

[SSC, 2011]

ANSWER KEYS

EXERCISE–1

1. (a)	**2.** (b)	**3.** (b)	**4.** (c)	**5.** (b)	**6.** (c)	**7.** (a)	**8.** (b)	**9.** (b)	**10.** (c)	**11.** (a)	**12.** (b)	**13.** (c)
14. (a)	**15.** (b)	**16.** (c)	**17.** (b)	**18.** (a)	**19.** (b)	**20.** (a)	**21.** (c)	**22.** (a)	**23.** (b)	**24.** (a)	**25.** (b)	**26.** (b)
27. (b)	**28.** (b)	**29.** (b)	**30.** (a)	**31.** (a)	**32.** (c)	**33.** (a)	**34.** (b)	**35.** (d)	**36.** (b)	**37.** (c)	**38.** (b)	**39.** (a)
40. (a)												

EXERCISE–2

1. (b)	**2.** (c)	**3.** (c)	**4.** (d)	**5.** (c)	**6.** (c)	**7.** (d)	**8.** (d)	**9.** (a)	**10.** (b)	**11.** (c)	**12.** (b)	**13.** (d)
14. (d)	**15.** (c)	**16.** (a)	**17.** (b)	**18.** (c)	**19.** (c)	**20.** (b)	**21.** (a)	**22.** (a)	**23.** (d)	**24.** (c)	**25.** (d)	**26.** (b)
27. (a)	**28.** (c)	**29.** (d)	**30.** (c)	**31.** (c)	**32.** (c)	**33.** (c)	**34.** (c)	**35.** (b)	**36.** (c)	**37.** (e)	**38.** (a)	**39.** (d)
40. (d)	**41.** (e)	**42.** (a)	**43.** (c)	**44.** (a)	**45.** (a)	**46.** (b)	**47.** (c)	**48.** (c)	**49.** (a)	**50.** (c)	**51.** (b)	**52.** (a)
53. (b)	**54.** (b)	**55.** (c)	**56.** (a)	**57.** (b)	**58.** (a)	**59.** (b)	**60.** (a)	**61.** (c)	**62.** (b)	**63.** (d)	**64.** (c)	**65.** (c)
66. (b)	**67.** (c)	**68.** (d)	**69.** (b)	**70.** (a)	**71.** (a)	**72.** (d)	**73.** (d)	**74.** (b)	**75.** (a)	**76.** (b)	**77.** (d)	**78.** (b)
79. (d)	**80.** (d)	**81.** (b)	**82.** (d)	**83.** (c)	**84.** (c)	**85.** (b)	**86.** (c)	**87.** (b)	**88.** (d)	**89.** (c)	**90.** (a)	

EXPLANATORY ANSWERS

EXERCISE–1

1. (a) Here, $X = 15$ and $Y = 12$

$\therefore$ Working together, 10 men and 15 women will complete the work in

$$= \frac{XY}{X+Y} \text{ days}$$

$$= \frac{15\times 12}{15+12}, \text{ i.e., } \frac{20}{3} \text{ or, } 6\frac{2}{3} \text{ days.}$$

2. (b) Here, $X = 30$ and $Y = 40$.

$\therefore$ A and B working together can do the work in

$$= \frac{XY}{X+Y} \text{ days.}$$

$$= \frac{30\times 40}{30+40} \text{ days, i.e., } \frac{120}{7} \text{ or, } 17\frac{1}{7} \text{ days.}$$

3. (b) A can do the complete work in $5 \times 3 = 15$ days.

B can complete the complete work in $10 \times \frac{5}{2} = 25$ days.

Here, $X = 15$ and $Y = 25$.

$\therefore$ A and B, working together, can complete the work in

$$= \frac{XY}{X+Y} \text{ days}$$

$$= \frac{15\times 25}{15+25} \text{ days, i.e., } \frac{75}{8} \text{ or, } 9\frac{3}{8} \text{ days.}$$

4. (c) Here, $X = 6$, $Y = 12$ and $Z = 24$.

$\therefore$ Working together, A, B and C will complete the work in

$$= \frac{XYZ}{XY+YZ+ZX} \text{ days}$$

$$= \frac{6\times 12\times 24}{6\times 12+12\times 24+24\times 6} \text{ days,}$$

i.e., $\frac{24}{7}$ days, or, $3\frac{3}{7}$ days.

5. (b) Let, B take x days to do the work. Then, A takes $(x - 60)$ days to complete the work.

Since ratio of work done by A and B is 3:1, ratio of time taken by A and B is 1:3.

We have, $\frac{x-60}{x} = \frac{1}{3}$

$\Rightarrow \quad 3(x - 60) = x \quad$ or, $\quad x = 90.$

$\therefore$ Time taken by B to complete the work = 90 days and time taken by A to complete the work = $\frac{90}{3} = 30$ days.

$\therefore$ A and B, working together, will complete the work in

$$= \frac{XY}{X+Y} \text{ days}$$

$$= \frac{90 \times 30}{90+30} \text{ days, i.e., } \frac{45}{2}$$

or, $22\frac{1}{2}$ days.

6. (c) Let, Ramesh take x days to complete the work.

Then, Mahesh takes $\frac{x}{2}$ and Suresh takes $\frac{x}{3}$ days to complete the same piece of work.

$\therefore$ Ramesh, Mahesh and Suresh, working together, will complete the work in

$$= \frac{XYZ}{XY+YZ+ZX} \text{ days} = \frac{x + \frac{x}{2} \times \frac{x}{3}}{x \times \frac{x}{2} + \frac{x}{2} \times \frac{x}{3} + x \times \frac{x}{3}} \text{ days}$$

i.e., $\frac{x^3/6}{x^2}$ or, $\frac{x}{6}$ days.

Given, $\frac{x}{6} = 4.$

$\therefore \quad x = 24$

$\therefore$ Ramesh takes 24 days, Mahesh takes $\frac{24}{2}$ or 12 days, and Suresh takes $\frac{24}{3}$ or 8 days to complete the work.

7. (a) Let, Gita takes x days to complete the work. Then, Sita takes $2x$ days to complete the same piece of work.

$\therefore$ Time taken by Rita to complete the work

$$= \frac{XY}{X+Y} \text{ days}$$

$$= \frac{x \times 2x}{x+2x} \text{ days, or, } \frac{2x}{3} \text{ days.}$$

$\therefore$ Working together, Gita, Sita and Rita will complete the work in

$$= \frac{XYZ}{XY+YZ+ZX} \text{ days}$$

$$= \frac{x \times 2x \times \frac{2x}{3}}{x \times 2x + 2x \times \frac{2x}{3} + \frac{2x}{3} \times x} \text{ days, or, } \frac{x}{3} \text{ days.}$$

Given, $\frac{x}{3} = 6. \quad \therefore \quad x = 18$ days.

$\therefore$ Gita takes 18 days, Sita takes 36 days, and Rita takes 12 days to complete the work.

8. (b) 1 Man can complete the work in $5 \times 2 = 10$ days.

1 woman can complete the work in $4 \times 3 = 12$ days.

1 child can complete the work in $5 \times 3 = 15$ days.

$\therefore$ 1 man, 1 woman and 1 child, working together, can complete the work in

$$= \frac{XYZ}{XY+YZ+ZX} \text{ days}$$

$$= \frac{10 \times 12 \times 15}{10 \times 12 + 12 \times 15 + 15 \times 10} = 4 \text{ days.}$$

9. (b) Here, $X = 6$ and $Y = 9$.

$\therefore$ B alone will complete the work in $= \frac{XY}{Y-X}$ days

$= \frac{6 \times 9}{9-6}$, i.e., 18 days.

10. (c) Here, $X = 30$, $Y = 40$ and $Z = 60$.

$\therefore$ A, B and C together will finish the work in

$$= \left(\frac{2XYZ}{XY+YZ+ZX}\right) \text{ days}$$

$$= \left(\frac{2 \times 30 \times 40 \times 60}{30 \times 40 + 40 \times 60 + 60 \times 30}\right) \text{ days}$$

or, $\frac{144000}{5400}$, i.e., $26\frac{2}{3}$ days.

11. (a) Here, $X = 18$, $Y = 24$ and $Z = 36$.

$\therefore$ A alone can do the work in

$$= \left(\frac{2XYZ}{XY+YZ-ZX}\right) \text{ days}$$

$$= \left(\frac{2 \times 18 \times 24 \times 36}{18 \times 24 + 24 \times 36 - 36 \times 18}\right) \text{ days}$$

or, $\frac{31104}{648}$, i.e., 48 days.

12. (b) Ajay, Sunil and Sanjay, working together, can complete the work in

$$= \left(\frac{2XYZ}{XY+YZ+ZX}\right) \text{days}$$

$$= \left(\frac{2 \times 10 \times 15 \times 20}{10 \times 15 + 15 \times 20 + 20 \times 10}\right) \text{days}$$

or, $\frac{6000}{650}$, i.e., $\frac{120}{13}$ days.

$\therefore$ Work done by all of them together in 6 days

$$= 6 \times \frac{13}{120}, \text{ i.e., } \frac{13}{20}.$$

Also, work done by Sunil and Sanjay in 4 days $= \frac{4}{15}$.

$\therefore$ Remaining work $= 1 - \left(\frac{13}{20} + \frac{4}{15}\right) = \frac{1}{12}$, which is to be done by Sanjay.

Now, Ajay, Sunil and Sanjay, can complete the work in $\frac{120}{13}$ days. Ajay and Sunil can complete the work in 10 days.

$\therefore$ Sanjay alone can complete the work in

$= \dfrac{\frac{120}{13}\times 10}{10-\frac{120}{13}}$ days = 120 days.

$\therefore$ $\dfrac{1}{12}$ of the work is done by Sanjay in $\dfrac{120}{12}$ = 10 days.

13. (c) Since Anu can complete the work in 10 days, Manu can complete the work in = $10\times\dfrac{100}{125}$ = 8 days. Also, Sonu can complete the work in = $8\times\dfrac{100}{160}$ = 5 days.

$\therefore$ Anu, Manu and Sonu will complete the work in

$$= \frac{XYZ}{XY+YZ+ZX} \text{ days}$$

$$= \left(\frac{10\times 8\times 5}{10\times 8+8\times 5+5+10}\right) \text{ days}$$

or, $\dfrac{400}{170}$, i.e., $2\dfrac{6}{17}$ days.

14. (a) C alone will finish the job in

$$= \frac{XY}{Y-X} \text{ days} = \frac{8\times 12}{12-8} \text{ days}$$

[Here, X = 8 and Y = 12]

= 24 days.

15. (b) Bansal, Gupta and Singhal together can finish the work in 4 days.

Bansal and Gupta together can do it in $\dfrac{24}{5}$ days.

Gupta and Singhal together can do it in 8 days. Therefore, Bansal alone can complete the work in

$$= \frac{XY}{Y-X} \text{ days}$$

$$= \left(\frac{8\times 4}{8-4}\right) \text{ days}$$

[Here, X = 4 and Y = 8]

= 8 days.

Also, Singhal alone can complete the work in

$$= \left(\frac{XY}{Y-X}\right) \text{ days} = \left(\frac{\frac{24}{5}\times 4}{\frac{24}{5}-4}\right) \text{days}$$

$\left[\text{Here, } X = 4 \text{ and } Y = \dfrac{24}{5}\right]$

= 24 days.

$\therefore$ Bansal and Singhal can complete the work in

$$= \left(\frac{XY}{X+Y}\right) \text{days} = \left(\frac{24\times 8}{24+8}\right) \text{days}$$

[Here, X = 24 and Y = 8]

= 6 days.

$\therefore$ Gupta alone can complete the work in

$$= \left(\frac{XY}{Y-X}\right) \text{days} = \left(\frac{4\times 6}{6-4}\right) \text{days}$$

[Here, X = 4 and Y = 6]

= 12 days.

16. (c) Nishita and Kavita complete the work in 4 days and Nishita alone does it in 6 days.

$\therefore$ Kavita alone can do the work in

$$= \left(\frac{XY}{Y-X}\right) \text{days} = \left(\frac{4\times 6}{6-4}\right) \text{days}$$

[Here, X = 4 and Y = 6]

= 12 days.

$\therefore$ Nikita and Nishita can complete the work in

$$= \left(\frac{XY}{Y-X}\right) \text{days} = \left(\frac{\frac{8}{3}\times 12}{12-\frac{8}{3}}\right) \text{days}$$

$\left[\text{Here, } X = \dfrac{8}{3} \text{ and } Y = 12\right]$

$= \dfrac{96}{28} = 3\dfrac{3}{7}$ days.

17. (b) Here, X = 14 and K = 2.

$\therefore$ A alone can finish the work in

$= \left(\dfrac{K+1}{K}\right)X$ days $= \left(\dfrac{2+1}{2}\right)$ 14 days, i.e., 21 days.

18. (a) Here, X = 10 and K = 2.

$\therefore$ The time taken by Bindal and Jindal, working together, to complete the work

$= \dfrac{X}{1+K} = \dfrac{10}{1+2}$, i.e., $\dfrac{10}{3}$, or, $3\dfrac{1}{3}$ days.

19. (b) Here, a = 27 and b = 3.

$\therefore$ Time taken by A and B, working together, to complete the job

$= \sqrt{ab}$ days $= \sqrt{27\times 3}$, or, 9 days.

20. (a) Here, k = 4 and l = 45.

Therefore, A and B, working together, can complete the work in

$= \dfrac{kl}{k^2-1}$ days $= \dfrac{4\times 45}{16-1}$ days, i.e., 12 days.

21. (c) Here, a = 1, b = 1, X = 16, c = 3 and d = 4.

Therefore, number of days required to complete $\dfrac{3}{4}$ of the work

$= \dfrac{b\times c\times X}{a\times d} = \dfrac{1\times 3\times 16}{1\times 4}$ = 12 days.

22. (a) We have, M_1 = 24, D_1 = 27, W_1 = 1, t_1 = 7
M_2 = 14, D_2 = ?, W_2 = 1, t_2 = 9

$\therefore \quad M_1D_1t_1W_2 = M_2D_2t_2W_1$

$\Rightarrow \quad 24 \times 27 \times 7 \times 1 = 14 \times D_2 \times 9 \times 1$

$\Rightarrow \quad D_2 = 36$ days.

23. (b) We have, $M_1 = 10$, $D_1 = 2$, $W_1 = 15$

$M_2 = 10 - 2 = 8$, $D_2 = 3$, $W_2 = ?$

$\therefore \quad M_1D_1W_2 = M_2D_2W_1$

$\Rightarrow \quad 10 \times 2 \times W_2 = 8 \times 3 \times 15$

$\Rightarrow \quad W_2 = 18$ trees.

Thus, 18 trees will be cut in 3 hours.

24. (a) We have, $M_1 = 45$, $D_1 = 30$, $t_1 = 12$, $W_1 = 1$

$M_2 = 60$, $D_2 = ?$, $t_2 = 10$, $W_2 = 1$

$\therefore \quad M_1D_1t_1W_2 = M_2D_2t_2W_1$

$\Rightarrow \quad 45 \times 30 \times 12 \times 1 = 60 \times D_2 \times 10 \times 1$

$\Rightarrow \quad D_2 = 27$ days.

25. (b) Given, 8 women = 6 Men = 12 Boys

$\therefore$ 12 Men + 12 Women + 12 Boys

= 12 Men + 9 Men + 6 Men = 27 Men

We have, $M_1 = 9$, $D_1 = 6$, $t_1 = 6$, $W_1 = 1$

$M_2 = 27$, $D_2 = ?$, $t_2 = 8$, $W_2 = 1$

$\therefore \quad M_1D_1t_1W_2 = M_2D_2t_2W_1$

$\Rightarrow \quad 9 \times 6 \times 6 \times 1 = 27 \times D_2 \times 8 \times 1$

$\Rightarrow \quad D_2 = \frac{3}{2}$ days, or, $1\frac{1}{2}$ days.

26. (b) Here, $a = 4$, $b = 6$, $n = 20$, $c = 6$ and $d = 11$.

$\therefore$ Required number of days

$= \left(\frac{nab}{bc + ad}\right)$ days $= \left(\frac{20 \times 4 \times 6}{6 \times 6 + 4 \times 11}\right)$ days

= 6 days.

27. (b) Here, $a = 10$, $b = 12$, $n = 10$, $c = 15$ and $d = 6$.

$\therefore$ Required number of days

$= \left(\frac{nab}{bc + ad}\right)$ days

$= \left(\frac{10 \times 10 \times 12}{12 \times 15 + 10 \times 6}\right)$ days

= 5 days.

28. (b) (A + B)'s 5 day's work $= 5\left(\frac{1}{10} + \frac{1}{15}\right) = \frac{5}{6}$

Remaining work $= 51 - \frac{5}{6} = \frac{1}{6}$

$\therefore$ C's 2 days' work $= \frac{1}{6}$

Now, A's 5 days' work:B's 5 days' work

$\therefore$ C's 2 days' work $= \frac{5}{10} : \frac{5}{15} : \frac{1}{6} = 3:2:1$

$\therefore$ A's share $= ₹\left(450 \times \frac{3}{6}\right) = ₹225$

B's share $= ₹\left(450 \times \frac{2}{6}\right) = ₹150$

C's share = ₹[450 − (225 + 150)] = ₹75

29. (b) Wages of the first man for 3 days

= work done by him in 3 days × ₹1400

$= \frac{3}{7} \times 1400 = ₹600$

Wages of second man for 3 days

= work done by him in 3 days × ₹1400

$= \frac{3}{8} \times 1400 = ₹525$

$\therefore$ Wages of the boy for 3 days

= ₹1400 − ₹(600 + 525) = ₹275

$\therefore$ Their shares will be ₹600, ₹525 and ₹275, respectively.

30. (a) Suppose, B takes x days to do the work

$\therefore$ A takes $\left(2 \times \frac{3}{4}x\right)$, i.e., $\frac{3x}{2}$ days to do it.

Now, (A + B)'s 1 day's work $= \frac{1}{18}$

$\therefore \quad \frac{1}{x} + \frac{2}{3x} = \frac{1}{18}$, or, $x = 30$.

31. (a) A's 1 days' work $= \frac{1}{30}$

B's 1 days' work $= \frac{1}{40}$

$\therefore$ Share of A and B should be in the ratio

$\frac{1}{30} : \frac{1}{40} = 4:3$

$\therefore$ B's share $= ₹\left(\frac{3}{7} \times 2100\right) = ₹900.$

32. (c) The first man's 3 days' work $= \frac{3}{6} = \frac{1}{2}$

The second man's 3 days' work $= \frac{3}{8}$

The boy's 3 days' work $= 1 - \left(\frac{1}{2} + \frac{3}{8}\right) = \frac{1}{8}$

$\therefore$ They should get money in the ratio

$\frac{1}{2} : \frac{3}{8} : \frac{1}{8}$ i.e., 4:3:1

$\therefore$ The boy's share $= ₹\frac{1}{8} \times 600 = ₹75.$

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

A's 1 days' work $= \frac{1}{8}$

$\therefore$ B's 1 days' work $= \frac{1}{6} - \frac{1}{8} = \frac{1}{24}$

$\therefore$ Money should be divided in the ratio

$\frac{1}{8}:\frac{1}{24} = 3:1$

$\therefore$ B gets = ₹$\left(\frac{1}{4}\times 320\right)$ = ₹80.

34. **(b)** Obviously,

$(5M + 2B) = 4(1M + 1B)$

$\therefore$ $M = 2B$

$\therefore$ Work done by a man and a boy are in the ratio 2:1.

35. **(d)** (A + B + C)'s 1 day's work

$$= \frac{1}{16}+\frac{1}{32}+\frac{1}{48}=\frac{11}{96}$$

Work done in first 4 days = $\frac{11}{96}\times 4 = \frac{11}{24}$

For last two days, A works alone

$\therefore$ Work done in last 2 days = $\frac{1}{16}\times 2 = \frac{1}{8}$

Rest of the work i.e.,$\left(1-\frac{11}{24}-\frac{1}{8}=\frac{5}{12}\right)$ is done by A and B together.

(A + B)'s 1 day's work = $\frac{1}{16}+\frac{1}{32}=\frac{3}{32}$

$\therefore$ $\frac{5}{12}$ work is finished in $\frac{32}{3}\times\frac{5}{12}=\frac{40}{9}$ days

$\therefore$ Total number of days in which the whole work is finished = $4+2+\frac{40}{9}=10\frac{4}{9}$ days.

36. **(b)** (A + B)'s 2 days' work = $\frac{1}{9}+\frac{1}{12}=\frac{7}{36}$

Evidently, the work done by A and B during 5 pairs of days

$$= 5\times\frac{7}{36}=\frac{35}{36}$$

Remaining work = $1-\frac{35}{36}=\frac{1}{36}$.

Now, on 11th day, it is A's turn

Now, $\frac{1}{9}$ work is done by A in 1 day

$\therefore$ $\frac{1}{36}$ work will be done by A in $9\times\frac{1}{36}=\frac{1}{4}$ day.

So, total time taken = $10\frac{1}{4}$ days.

37. **(c)** B's 23 days' work = $\frac{23}{40}$

Remaining work = $1-\frac{23}{40}=\frac{17}{40}$

Now, (A + B)'s 1 day's work = $\frac{1}{45}+\frac{1}{40}=\frac{17}{360}$

$\frac{17}{360}$ work is done by A and B in 1 day.

$\therefore$ $\frac{17}{40}$ work is done by A and B in $\frac{360\times 17}{17\times 40}=9$ days

So, A left after 9 days.

38. **(b)** Suppose, C alone can do this work in x days

$\therefore$ C will do $\frac{1}{x}$ work in 1 day

Now, work done by (B + C) in 1 day = $\frac{1}{16}$.

$\therefore$ Work done by B in 1day = $\left(\frac{1}{16}-\frac{1}{x}\right)$.

And, work done by (A + B) in 1 day = $\frac{1}{12}$.

$\therefore$ Work done by A in 1 day = $\frac{1}{12}-\left(\frac{1}{16}-\frac{1}{x}\right)$

$$= \frac{1}{48}+\frac{1}{x}$$

As per the to question,

Work done by A in 5 days + work done by B in 7 days + work done by C in 13 days = whole work

$\therefore$ $5\left(\frac{1}{48}+\frac{1}{x}\right)+7\left(\frac{1}{16}-\frac{1}{x}\right)+\frac{13}{x} = 1$

or, $\frac{5}{48}+\frac{5}{x}+\frac{7}{16}-\frac{7}{x}+\frac{13}{x} = 1$

or, $\frac{26}{48}+\frac{11}{x} = 1$, or, $\frac{11}{x}=1-\frac{26}{48}$

or, $\frac{11}{x}=\frac{22}{48}$, or, $x = 24$

$\therefore$ C alone would complete this work in 24 days.

39. **(a)** Work done by A in 5 days = $\frac{5}{40}=\frac{1}{8}$.

$\therefore$ Remaining work = $1-\frac{1}{8}=\frac{7}{8}$.

$\therefore$ B completes $\frac{7}{8}$ work in 21 days.

$\therefore$ B would complete one work in $\frac{21\times 8}{7}=24$ days.

Here, $x = 40$, $y = 24$.

$\therefore$ Working together, A and B would complete this work in

$=\frac{xy}{x+y}=\frac{40\times 24}{40+24}=\frac{40\times 24}{64} = 15$ days.

40. **(a)** (A + B)'s 1 day's work $= \frac{1}{30}+\frac{1}{50}=\frac{8}{150}$.

$\therefore$ (A + C)'s 1 day's work $= \frac{1}{30}+\frac{1}{40}=\frac{7}{120}$.

$\therefore$ Work done in first two days $= \frac{8}{150}+\frac{7}{120}=\frac{67}{600}$.

Work done in $8 \times 2 = 16$ days $= \frac{67\times 8}{600}=\frac{67}{75}$.

Work left $= 1-\frac{67}{75}=\frac{8}{75}$.

On the 17th day, (A + B) will work and they will complete $\frac{8}{150}$ work.

$\therefore$ Work left $= \frac{8}{75}-\frac{8}{150}=\frac{8}{150}=\frac{4}{75}$.

On the 18th day, (A + C) will work and they will finish it in $\frac{120}{7}\times\frac{4}{75}=\frac{32}{35}$ days.

$\therefore$ The whole work will be done in $17\frac{32}{35}$ days.

EXERCISE–2
(BASED ON MEMORY)

1. **(b)** Required number of days $= 24\left(\frac{56}{42}\right)= 32$

2. **(c)** Required number of hours $= \frac{4\times 2\times 10\times 5}{2\times 1\times 20}$
$= 10$ hours

3. **(c)** Work of A for 1 day $= \frac{1}{2}$

Work of (A + B) for 1 day $= \frac{1}{8}$

$\therefore$ Work of B for 1 day $= \frac{1}{8}-\frac{1}{12}=\frac{1}{24}$

$\therefore$ B alone can complete the same work in 24 days

4. **(d)** Since work done by children in a day is not given (directly or indirectly) we cannot get the required value.

5. **(c)** Required men $= 15\left(\frac{6}{7.5}\right)=12$

6. **(c)** A does the work in 8 days.
B does the work in 16 days.

$\therefore$ A + B do the work in $\frac{8\times 16}{8+16}=\frac{16}{3}=5\frac{1}{3}$ days

7. **(d)** We have 24×16 men $= 8 \times 72$ women
$= 24 \times 32$ children
$\Rightarrow 2$ men $= 3$ women $= 4$ children
Now, 10 men + 15 women + 24 children
$= 10$ men $+ 15\left(\frac{2}{3}\right)$ men $+ 24\left(\frac{2}{4}\right)$ men $= 32$ men

$\therefore$ required number of days $= \frac{24\times 16}{32} = 12$ days

8. **(d)** From the given information we get
Work done by (8×12) men
$= (4 \times 48)$ women $= (10 \times 24)$ children
i.e., work done by
1 man = 2 women = 2.5 children
Now, the required time to finish the work
$= \frac{10\times 24}{10\times 2.5+4\times \frac{2.5}{2}+10}=\frac{10\times 14}{40} = 6$ days

9. **(a)** Suppose the work consists of making 12 pillars. Since 'A' can complete the work in 12 days, this implies that 'A' can make one pillar in a day. Similarly, we get that 'A' and 'B' together can make three pillars in a day. Hence we can conclude that 'B' can make two pillars in a day. Hence, the total work (12 pillars) can be completed by 'B' in $(12 \div 2 =) 6$ days.

10. **(b)** From the given information, we get
9×360 children or 18×72 men or 12×162 women can finish the work in one day.
Hence we get
Efficiency of 2 men = efficiency of 3 women
= efficiency of 5 children
Hence, the required number of days to finish the work
$= \frac{9\times 360}{\frac{5}{2}\times 4+\frac{5}{3}\times 12+10}=\frac{9\times 360}{40} = 81$ days

11. **(c)** (A + B)'s one day's work $= \frac{1}{8}$

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

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

$\therefore$ (A + B + C)'s one day's work
$=\frac{1}{2}\left[\frac{1}{8}+\frac{1}{6}+\frac{1}{10}\right]$
$=\frac{1}{2}\left[\frac{15+20+12}{120}\right]=\frac{47}{240}$

$\therefore$ A, B and C together can finish the whole work in $\frac{240}{47}=5\frac{5}{47}$ days

12. **(b)** Let the original number of workers be x.

$\therefore$ x workers can do the work in 100 days

$(x - 10)$ workers can do the work in 110 days

$\Rightarrow$ $100x = 110(x - 10)$

$\Rightarrow$ $10x = 1100 \Rightarrow x = 110$

13. **(d)** (A + B)'s one day's work $= \frac{1}{12}$

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

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

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

$= \frac{1}{2}\left[\frac{1}{6}+\frac{1}{8}+\frac{1}{12}\right]$ ...(1)

$= \frac{1}{2}\left[\frac{8+6+4}{48}\right] = \frac{9}{48}$ ...(2)

(1) and (2) $\Rightarrow$ B's one day's work

$= \frac{9}{48} - \frac{1}{6} = \frac{1}{48}$

$\therefore$ B alone can finish the whole work in 48 days.

14. **(d)** 1 man = 3 boys

[Given]: Wages for five days = ₹800

$\therefore$ Wages for one day $= \frac{800}{5} =$ ₹160

The wages of ₹160 are to be divided among the man and boy in the ratio 1:3.

$\therefore$ Wages of the boy per day

$= \frac{1}{4} \times 160 =$ ₹40

15. **(c)** A does $\frac{7}{10}$ in 15 days.

$\Rightarrow$ A alone can do the whole work in $\frac{150}{7}$ days.

$\Rightarrow$ A's one day's work $= \frac{7}{150}$

A and B together can do $\frac{3}{10}$ of the work in 4 days.

$\therefore$ A and B together can complete the work in $\frac{40}{3}$ days.

$\Rightarrow$ (A + B)'s one day's work $= \frac{3}{40}$

$\therefore$ B's one day's work $= \frac{3}{40} - \frac{7}{150}$

$= \frac{45-28}{600} = \frac{17}{600}$

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

$= \frac{7}{150} + \frac{17}{600} = \frac{45}{600} = \frac{3}{40}$

$\Rightarrow$ A and B together can finish the whole work in $\frac{40}{3} = 13\frac{1}{3}$ days.

16. **(a)** Woman's one day's work

$= \frac{1}{3} - \frac{1}{6} - \frac{1}{18} = \frac{6-3-1}{18} = \frac{1}{9}$.

17. **(b)** $(A + B + C)$ will do the same piece of work in

$\frac{10 \times 15 \times 20 \times 2}{10 \times 15 + 15 \times 20 + 20 \times 10} = \frac{120}{13}$ days.

18. **(c)** 'A' can cultivate full part of the land in $\frac{6 \times 5}{2}$ days.

'B' can cultivate full part of the land in $(10 \times 3) = 30$ days.

Hence, the required time to do $\frac{4}{5}$ part when 'A' and 'B' work together $= \left(\frac{15 \times 30}{30 + 15}\right) \times \frac{4}{5} = 8$ days.

19. **(c)** Efficiency of A is three times that of B. Hence, time required to finish the work by

B (alone) = $(3 + 1) \times 10 = 40$ days.

20. **(b)** A can do a piece of work in 4 hours

A and C can do it in 2 hours.

$\therefore$ C alone can do it in $\left(\frac{4 \times 2}{4-2} = 4\right)$ hours

B and C can do it in 3 hours.

$\therefore$ B alone can do it in $\left(\frac{4 \times 3}{4-3} = 12\right)$ hours.

21. **(a)** A does the whole work in $\frac{5}{4} \times 20 = 25$ days.

Remaining work $\left(1 - \frac{4}{5}\right) = \frac{1}{5}$, is done by A and B in 3 days.

$\therefore$ Whole work is done by A and B in $(5 \times 3 = 15)$ days.

$\therefore$ B alone can do the whole work in $\left(\frac{25 \times 15}{25-15}\right) = 37\frac{1}{2}$ days.

22. **(a)** $\frac{18+9}{18 \times 9} = \frac{1}{6}$.

23. **(d)** (A + B)'s one day's work $= \frac{1}{30}$

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

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

$\therefore$ 2(A + B + C)'s one day's work

$= \frac{1}{30} + \frac{1}{15} + \frac{1}{10} = \frac{1+2+3}{30} = \frac{1}{5}$

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

24. **(c)** A can finish the work in 40 days.

B can finish the work in 100 days.

C can finish the work in 39 days.

25. (d) (A + B + C)'s one day's work = $\frac{1}{2}$

Let C can finish the work in x days.

$\therefore$ A can finish the work in $3x$ days.

$\Rightarrow$ B can finish the work in $\frac{3x}{2}$ days.

$\therefore$ (A + B + C)'s one day's work = $\frac{1}{3x}+\frac{2}{3x}+\frac{1}{x}$

$\therefore$ $\frac{1}{3x}+\frac{2}{3x}+\frac{1}{x}=\frac{1}{2}$

$\Rightarrow$ $\frac{3x}{2}=6$

$\Rightarrow$ $x=4$

$\therefore$ B alone can do the whole work in 6 days.

26. (b) A and B together do $\frac{20}{30}=\frac{2}{3}$ part of the work in 20 days.

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

$\therefore$ A alone can do the work in $20 \times 3 = 60$ days.

27. (a) Required number of men

$$=72\times\frac{21}{18}\times\frac{100}{280}=30.$$

28. (c) Ratio of the efficiencies of

Babu : Asha

4 : 7

Ratio of the no. of days taken by Babu and Asha to complete the job = 7:4

Also, $\frac{28x^2}{11x}=7$ or, $x=\frac{11}{4}$

$\therefore$ Asha alone can do the work in $4\times\frac{11}{4}=11$ days.

29. (d) 3 M = 4 W

$7\text{M} + 5\text{W} = 7\text{M} + \frac{5\times 3\text{M}}{4} = 7\text{M}+\frac{15\text{M}}{4}=\frac{43\text{M}}{4}$

$\because$ 3 men plough a field in 43 days

$\therefore$ $\frac{43}{4}$ men plough a field in $\frac{43\times 3\times 4}{43}=12$ days.

30. (c) Part of the work done by 8 men in 6 days

$$=\frac{6}{12}=\frac{1}{2}$$

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

Required number of days = $\frac{1}{2}\times 8 = 4$ days.

31. (c) Part of work done by B and C in 3 days

$$=3\left(\frac{1}{9}+\frac{1}{12}\right)=\frac{7}{12}$$

Remaining work = $1-\frac{7}{12}=\frac{5}{12}$

Remaining work is done by A in = $\frac{5}{12}\times 24 = 10$ days.

32. (c) C alone can do the work in

$\frac{1}{4}-\left(\frac{1}{8}+\frac{1}{12}\right)=\frac{1}{4}-\frac{5}{24}=\frac{6-5}{24}=\frac{1}{24}$

i.e., 24 days

Ratio of their wages = $\frac{1}{8}:\frac{1}{12}:\frac{1}{24}$ = 3:2:1

C's share = $\frac{1}{6}\times 4500$ = ₹750.

33. (c) Required sum = $8400\times\frac{6}{8}\times\frac{9}{6}$ = ₹9450.

34. (c) A, B and C together can do the work in

$=\frac{10\times 50}{60}=\frac{25}{3}$ days.

Suppose, A alone could do it in 'x' days.

Then, (B + C) together can also do it in 'x' days

i.e., $\frac{x\times x}{2x}=\frac{25}{3}$

$\Rightarrow$ $x=\frac{50}{3}$ days

$\therefore$ B alone can do it in $\frac{1}{10}-\frac{3}{50}=\frac{5-3}{50}=\frac{1}{25}$

i.e., 25 days.

35. (b) 24 men complete the work in 16 days.

$\therefore$ 16 men complete $\left(\frac{16}{24}\times\frac{12}{16}\right)=\frac{1}{2}$ part of work in 12 days.

32 women complete the work in 24 days.

$\therefore$ 16 women complete $\frac{16}{32}\times\frac{14}{24}=\frac{7}{24}$ part of work in (12+2) = 14 days.

So, the remaining part of the work which is done by 16 men + 16 women and the required additional no. of men in 2 days

$$=1-\left(\frac{1}{2}+\frac{7}{24}\right)=\frac{1}{2}-\frac{7}{24}=\frac{5}{24}\ \text{(Part)}$$

Now, in 2 days $\frac{5}{24}$ part of work is done by

$24\times\frac{16}{2}\times\frac{5}{24}=40$ men

Hence, the required no. of men = 40 − 16 = 24.

36. (c) 10 men + 15 women in 1 day do $\frac{1}{15}+\frac{1}{12}=\frac{9}{60}$ work

$\therefore$ Time taken = $\frac{60}{9}$ days = $\frac{2}{3}$ days.

38. **(a)** Work done by 'A' in 3 days = $\frac{1}{12}\times 3=\frac{1}{4}$

$\therefore$ Remaining work = $1-\frac{1}{4}=\frac{3}{4}$

Work done by A and B together = $\frac{12\times 15}{27}=\frac{20}{3}$ days

$\therefore$ Remaining work is done by A and B together in

$$=\frac{3}{4}\times\frac{20}{3}=5 \text{ days.}$$

40. **(d)** $\because$ $8W = 6M = 12B$

$\therefore$ $12M + 12W + 12B \Rightarrow 12M + 9M + 6M = 27M$

$\because$ 9 men can complete the work working 1 hour per day in 6×6 days

$\therefore$ 27 men working 8 hours per day

$$=\frac{6\times 6\times 9}{27\times 8}=1\frac{1}{2}\text{ days.}$$

41. **(e)** $\because$ $M = 2B$

$\therefore$ $7M + 4B = 14B + 4B = 18B$

and $5M + 4B = 10B + 4B = 14B$

$\because$ 18 boys complete the work in 6 days

$\therefore$ 14 boys complete the work in $=\frac{6\times 18}{14}=7\frac{5}{7}$ days.

42. **(a)** The part of job that Vinod completes in 9 hours $=\frac{9}{15}=\frac{3}{5}$

Remaining job = $1-\frac{3}{5}=\frac{2}{5}$

Remaining job can be done by Vinay in $\frac{2}{5}\times 10=4$ hours.

43. **(c)**

Work	Days	Men
1 ↓	12 ↓	7
2 ↓	8 ↓	x ↓

Therefore,

1:2::7:x 8:12

$\Rightarrow$ $1 \times 8 \times x = 2 \times 12 \times 7$

$8x = 168$

$$x=\frac{168}{8}=21$$

Hence, number of additional men

$= 21 - 7 = 14$

44. **(a)** If X can complete the work in a days then

$3a - a = 40 \rightarrow a = 20$

$\therefore$ Work done by $(X + Y)$ for

1 day $\frac{1}{20}+\frac{1}{60}=\frac{4}{60}=\frac{1}{15}$

$\therefore$ X and Y together will complete the work in 15 days.

45. **(a)** Work done by A for 3 days = $\frac{3}{12}=\frac{1}{4}$

$\therefore$ Remaining work = $1-\frac{1}{4}=\frac{3}{4}$

$\therefore$ Work done by (A + B) for 1 day = $\frac{3}{4}\times\frac{1}{3}=\frac{1}{4}$

$\therefore$ Work done by B for 1 day = $\frac{1}{4}-\frac{1}{12}=\frac{2}{12}=\frac{1}{6}$

$\therefore$ B alone will complete the work in 6 days.

46. **(b)** Let the number of days taken by A to complete the work be x days.

Therefore, days taken by B to complete the same $= 3x$ days.

So, $3x - x = 60$

$\Rightarrow$ $2x = 60$

$\Rightarrow$ $x = 30$

and $3x = 3 \times 30 = 90$

Therefore, (A + B)'s 1 day's work

$$=\frac{1}{30}+\frac{1}{90}=\frac{3+1}{90}=\frac{4}{90}=\frac{2}{25}$$

Hence, A and B together will do the work in

$\frac{45}{2}=22\frac{1}{2}$ days.

47. **(c)** (P + Q)'s 1 day's work = $\frac{1}{12}$ ···(1)

(Q + R)'s 1 day's work = $\frac{1}{15}$ ···(2)

(R + P)'s 1 day's work = $\frac{1}{20}$ ···(3)

Adding equations (1), (2) and (3), we get

2(P + Q + R)'s 1 day's work

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

$$=\frac{12}{60}=\frac{1}{5}$$

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

$$=\frac{1}{10} \quad \cdots(4)$$

Therefore, P's 1 day's work on subtracting Eq. 4 from Eq. 2, we get

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

Hence, P will take 30 days to complete the work.

48. **(c)**

Men	Days
x	30
$x+6$ ↑	20 ↓

$x + 6$:x::30:20

$\Rightarrow$ $\frac{x+6}{x}=\frac{30}{20}=\frac{3}{2}$

$\Rightarrow \quad 2(x + 6) = 3x$

$\Rightarrow \quad 2x + 12 = 3x$

$\Rightarrow \quad 3x - 2x = 12$

$\Rightarrow \quad x = 12$ men

49. (a) Let, the number of days taken by B to complete the work be x.

Therefore, number of days taken by A to complete the work

$$= \frac{3x}{4} = \frac{1}{2}$$

Then time taken by A to complete the work

$$= 2 \times \frac{3x}{4} = \frac{3x}{2} \text{ days}$$

Thus, (A + B)'s 1 day's work

$$= \frac{1}{x} + \frac{2}{3x} = \frac{3+2}{3x} = \frac{5}{3x}$$

$$\Rightarrow \quad \frac{5}{3x} = \frac{1}{18}$$

$\Rightarrow \quad 3x = 90$

$$\Rightarrow \quad x = \frac{90}{3} = 30$$

Hence, time taken by B to complete the work = 30 days.

50. (c) Portion of work done by A and B in first in two days

$$= \frac{1}{9} + \frac{1}{12} = \frac{4+3}{36} = \frac{7}{36}$$

Portion of work done in the first 10 days = $\frac{35}{36}$

Remaining work = $\frac{1-35}{36} = \frac{36-35}{36} = \frac{1}{36}$

Therefore, time taken by

A = $\frac{1}{36} \times 9 = \frac{1}{4}$ day

Hence, total time = $10 + \frac{1}{4}$

$$= \frac{40+1}{4} = \frac{41}{4} = 10\frac{1}{4} \text{ days}$$

51. (b) Let, the daily wage earner absents x days, then as per the question,

$60 \times 150 - 175 \times x = 7600$

$\Rightarrow \quad 9000 - 175x = 7600$

$\Rightarrow \quad 175x = 1400$

$\therefore \quad x = 8$

Hence, the daily wage earner worked for 52 days.

52. (a) Males : Females : Children

$6 \times 12 : 8 \times 18 : 18 \times 10$

72:144:180

2:4:5

So, 2 Males = 4 Females = 5 Children

4 Males + 12 Females + 20 Children

= 4 + 6 + 8 = 18 Males

$\because$ 6 males finished a piece of work in 12 days.

$\therefore$ 18 males finished the work = $\frac{12 \times 6}{18} = 4$ days

Work in 2 days = $\frac{2}{4} = \frac{1}{2}$

Rest of the work will be finished in a day by

$= 18 \times 2 = 36$ males

53. (b) $2M = 3W$

$\therefore \quad 1M = \frac{3}{2}W$

$\therefore \quad 1M + 1W = \frac{3}{2}W + 1W = \frac{5}{2}W$

Number of days = $\frac{3 \times 4}{5/2} = \frac{24}{5}$ days

54. (b) (8×4) girls = (9×3) boys = (7×2) men = (5×4) Women

$\Rightarrow$ 32 girls = 27 boys = 14 men = 20 women

Hence, girls have minimum capacity of work among them.

55. (c) Suppose, A does a work in x days.

B does similar work in $\frac{x}{2}$ days and C does in $\frac{x}{4}$ days.

$\because \quad \frac{x}{4} = \frac{7}{1}$

$\Rightarrow \quad x = 4 \times 7$

$x = 28$

$\because \quad \frac{1}{28} + \frac{1}{14} + \frac{1}{7} = \frac{1+2+4}{28}$

$$= \frac{7}{28} = \frac{1}{4}$$

So, A, B and C together will complete the work in 4 days.

56. (a) 1 male = 2 females

8 males and 4 females = 20 females

After 2 days, 4 males have left the work and 4 new females joined as their replacement = 4 males + 8 females

= 8 + 8 females

= 16 females

$M_1 = 20$ females

$D_1 = 6 - 2 = 4$ days

$M_2 = 16$ females

$D_2 = ?$

$M_1D_1 = M_2D_2$

$20 \times 4 = 16 \times D_2$

$$D_2 = \frac{20 \times 4}{16}$$

$D_2 = 5$ days

57. (b) B and C together can complete a work in = $\frac{1}{8}$

A and B together can complete a work in = $\frac{1}{12}$

A and C together can complete a work in = $\frac{1}{16}$

Work completed by 2(A + B + C) in a day

$= \frac{1}{8}+\frac{1}{12}+\frac{1}{16}$

$= \frac{6+4+3}{48} = \frac{13}{48}$

Work completed by (A + B + C) in day

$= \frac{13}{48\times 2} = \frac{13}{96}$

So, A, B and C together can complete the work in $\frac{96}{13}$ days $= 7\frac{5}{13}$ days.

58. **(a)** 8×20 men $= 8 \times 32$ women

5 men = 8 women

Now, 5 men + 8 women = 8 + 8 = 16 women

$D_1 \times M_1 = M_2 \times D_2$

8×32 women $= 16 \times D_2$

$D_2 = \frac{32\times 8}{16}$

= 16 days

59. **(b)** Work done for B

$= 1-\frac{19}{23}=\frac{23-19}{23}=\frac{4}{23}$

$\therefore \quad (A+C):B=\frac{19}{23}:\frac{4}{23}=19:4$

$\therefore$ Sum of ratios = 19 + 4 = 23

$\therefore$ B's share $= \frac{4}{23}\times 575 = ₹100$

60. **(a)** According to the question,

1 man = 2 women = 4 boys

$\therefore$ 1 man + 1 woman + 1 boy

= (4 +2 + 1) boys = 7 boys

$\therefore \quad M_1D_1 = M_2D_2$

$\Rightarrow \quad 7\times 7 = 1\times D_2 \Leftrightarrow \quad D_2 = 49$ days

61. **(c)** Remaining work $= 1-\frac{1}{8}=\frac{7}{8}$

(A + B)'s 1 day's work $= \frac{1}{6}+\frac{1}{12}=\frac{2+1}{12}=\frac{3}{12}=\frac{1}{4}$

$\therefore$ Time taken in doing $\frac{7}{8}$ part of the work

$= \frac{7}{8}\times 4 = \frac{7}{2} = 3\frac{1}{2}$ days

62. **(b)** Quicker Method:

$M_1D_1T_1 = M_2D_2T_2$

$\Rightarrow \quad 15\times 20\times 8 = 20\times 12\times T_2$

$\Rightarrow \quad T_2 = \frac{15\times 20\times 8}{20\times 12} = 10$ hours

63. **(d)** (Raj + Ram)'s 1 day's work $= \frac{1}{10}$

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

$\therefore$ Ram's 1 day work $= \frac{1}{10}-\frac{1}{12}=\frac{6-5}{60}=\frac{1}{60}$

$\therefore$ Required time = 60 days

64. **(c)** Quicker Method:

$M_1D_1 = M_2D_2$

$\Rightarrow \quad x\cdot x = y\cdot D_2$

$\Rightarrow \quad D_2 = \frac{x^2}{y}$ days

65. **(c)** Let the fourth person complete the entire work in x days.

Now, according to the question:

$\frac{3}{8}+\frac{3}{12}+\frac{3}{16}+\frac{3}{x}=1$

$\Rightarrow \quad \frac{1}{x}=\frac{1}{3}-\frac{1}{8}-\frac{1}{12}-\frac{1}{16}=\frac{16-6-4-3}{48}=\frac{1}{16}$

$\therefore \quad x = 16$

Ratio of wages $= \frac{1}{8}:\frac{1}{12}:\frac{1}{16}:\frac{1}{16} = 6:4:3:3$

Sum of ratios = 6 + 4 + 3 + 3

$\therefore$ Fourth person's share $= \frac{3}{16}\times 1200 = ₹225$.

66. **(b)** Let A alone do the work in x days and B alone do the work in y days.

Now according to the question,

$\frac{1}{x}+\frac{1}{y}=\frac{1}{5}$ ...(1)

Again, $\frac{2}{x}+\frac{1}{3y}=\frac{1}{3}$ ...(2)

By equation (2) × 3 – (1), we have

$\frac{6}{x}+\frac{1}{y}-\frac{1}{x}-\frac{1}{y}=1-\frac{1}{5}$

$\Rightarrow \quad \frac{6}{x}-\frac{1}{x}=\frac{4}{5} \Leftrightarrow \quad \frac{6-1}{x}=\frac{4}{5}$

$\Rightarrow \quad x=\frac{25}{4}=6\frac{1}{4}$ days

67. **(c)** Work done by A and B in 7 days

$= \frac{7}{20}+\frac{7}{30}=\frac{21+14}{60}=\frac{35}{60}=\frac{7}{12}$

Remaining work $= 1-\frac{7}{12}=\frac{5}{12}$

$\therefore$ Time taken by C $= \frac{12}{5}\times 10 = 24$ days

68. **(d)** Time taken by Ramesh $= 4\times \frac{2}{3} = \frac{8}{3}$ days

Work done by all the three in 1 day

$= \frac{1}{4}+\frac{1}{6}+\frac{3}{8} = \frac{6+4+9}{24} = \frac{19}{24}$

$\therefore$ Required time $= \frac{24}{19} = 1\frac{5}{19}$ days

69. **(b)** Quicker Method:

$D_1T_1 = D_2T_2$

$\Rightarrow 18\times 6 = 12\times T_2$

$\Rightarrow T_2 = \frac{18\times 6}{12} = 9$ hours

70. **(a)** 1 Man's 1 day's work $= \frac{1}{2x}$

1 Woman's 1 day's work $= \frac{1}{3y}$

$\therefore$ Required ratio $= \frac{1}{2x}:\frac{1}{3y} = 3y:2x$

71. **(a)** (A + B)'s 1 day's work $= \frac{1}{12}+\frac{1}{15} = \frac{5+4}{60} = \frac{3}{20}$

Work done by A in 6 days $= 6\times \frac{1}{12} = \frac{1}{2}$

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

Time taken by (A + B) in doing half of the work

$= \frac{20}{3}\times \frac{1}{2} = \frac{10}{3} = 3\frac{1}{3}$ days

72. **(d)** Time taken by A in doing the work = 35 days

Time taken by B in doing the same work = 15 days

B's 3 days' work $= \frac{3}{15} = \frac{1}{5}$

Remaining work $= 1-\frac{1}{5} = \frac{4}{5}$

$\therefore$ Time taken by A in finishing the remaining work

$= \left(35\times \frac{4}{5}\right) = 28$ days

73. **(d)** Times taken by B in completing the work

$= \left(12\times \frac{100}{160}\right) = \frac{15}{2}$ days

$\therefore$ (A + B)'s 1 day's work $= \frac{1}{12}+\frac{2}{15} = \frac{5+8}{60} = \frac{13}{60}$

Hence the work will be completed in $\frac{60}{13}$ days

74. **(b)** $(2m + 4b) \times 10 = (4m + 5b) \times 6$

$\Rightarrow 20m + 40b \equiv 24m + 30b$

$\Rightarrow 4m = 10b$

$\Rightarrow 2m = 5b$

$\therefore 5b = 2 \times 40$

$\Rightarrow b = \frac{2\times 40}{5} = 16$

$\therefore$ Required ratio = 40:16 = 5:2

75. **(a)** Work done in first two days

$= \frac{2}{30}+\frac{1}{20}+\frac{1}{10} = \frac{1}{15}+\frac{1}{20}+\frac{1}{10} = \frac{4+3+6}{60} = \frac{13}{60}$

Work done in first 8 days $= \frac{13}{60}\times \frac{8}{2} = \frac{52}{60}$

Remaining work $= 1-\frac{52}{60} = \frac{8}{60} = \frac{2}{15}$

Now, it is the turn of A and B,

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

$= \frac{1}{30}+\frac{1}{20} = \frac{2+3}{60} = \frac{1}{12}$

$\therefore$ Remaining work $= \frac{2}{15}-\frac{1}{12} = \frac{8-5}{60} = \frac{3}{60} = \frac{1}{20}$

Now, it is the turn of A and C,

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

$= \frac{1}{30}+\frac{1}{10} = \frac{1+3}{30} = \frac{2}{15}$

$\therefore$ Times taken to complete the remaining work

$= \frac{1}{20}\times \frac{15}{2} = \frac{3}{8}$ days

Total time $= \left(8+1+\frac{3}{8}\right) = 9\frac{3}{8}$ days

76. **(b)** Let, the work be finished in x days.

$\therefore$ work done by A in 6 days + work done by B in $(x - 6)$ days + work done by C in x days = 1

Now, according to the question,

$$\frac{6}{24}+\frac{(x-6)}{32}+\frac{x}{64} = 1$$

$$\Rightarrow \frac{x-6}{32}+\frac{x}{64} = 1-\frac{1}{4} = \frac{3}{4}$$

$$\Rightarrow \frac{2x-12+x}{64} = \frac{3}{4}$$

$$\Rightarrow 3x-12 = \frac{3}{4}\times 64 = 48$$

$$\Rightarrow 3x = 60$$

$$\therefore x = \frac{60}{3} = 20 \text{ days.}$$

77. **(d)** Work done by (P + Q + R) = 1 ...(1)

Work done by $(P+Q) = \frac{19}{23}$ ...(2)

Work done by $(Q+R) = \frac{8}{23}$ ...(3)

From equations (2) + (3) − (1)

$$Q = \frac{19}{23} + \frac{8}{23} - 1 = \frac{27-23}{23} = \frac{4}{23}$$

$$\therefore \text{ Wage of } Q = \frac{4}{23} \times 5750 = ₹1000$$

78. (b) A's work done (in one day) $= x = \frac{1}{12}$

$\therefore$ Work done by B in one day $= \left(x + \frac{x \times 60}{100} \right)$

$= x \times \frac{160}{100} = \frac{1}{12} \times \frac{160}{100} = \frac{2}{15}$

$\therefore$ Time required to complete the same work by B

$= \frac{1}{\frac{2}{15}} = 7\frac{1}{2}$ days

79. (d) Let, one day's work of A, B and C be a, b and c respectively.

Given that, $a + b = \frac{1}{12}$ ...(1)

$b + c = \frac{1}{15}$ ...(2)

And, $a = 2c$ ...(3)

Now, putting the value of a from Eqn. (3) in Eqn. (1), we have,

$2c + b = \frac{1}{12}$ ...(4)

On solving Eqn. (4) and (2), we get

$2c + 2b = \frac{2}{15}$

$2c + b = \frac{1}{12}$

$- \quad - \quad -$

$\therefore b = \frac{2}{15} - \frac{1}{12} = \frac{8-5}{60} = \frac{1}{20}$

$\therefore$ B alone will complete the same work = 20 days.

80. (d) Let a man complete x part in one day and a woman complete y part in one day.

$\therefore$ According to the question,

$4x + 6y = \frac{1}{8}$ ...(1)

$3x + 7y = \frac{1}{10}$ ...(2)

On solving Eqn. (1) and (2), we have $y = \frac{1}{400}$

$\therefore$ One woman will complete $= y = \frac{1}{400}$ partof work in one day.

$\Rightarrow$ 20 women will complete $= \frac{20}{400} = \frac{1}{20}$ part of work in one day.

$\therefore$ Required time = 20 days.

81. (b) All three spend equal amount of time on typing. Required ratio of all the three

$A : B : C = \frac{1}{12} : \frac{1}{15} : \frac{1}{24} = 10 : 8 : 5$

So, the number of pages typed by $B = \frac{8 \times 506}{23} = 176$

82. (d) A and B can finish the work in 20 days.

$\therefore$ A and B's one day's work $= \frac{1}{20}$

B and C can finish the work in 30 days.

$\therefore$ B and C's one day's work $= \frac{1}{30}$

A and C can finish the work in 40 days

A and C's one day's work $= \frac{1}{40}$

Adding, we get 2(A + B + C)'s one day's work

$= \frac{1}{20} + \frac{1}{30} + \frac{1}{40} = \frac{6+4+3}{120} = \frac{13}{120}$

$\therefore$ (A + B + C)'s one day's work $= \frac{13}{120 \times 2} = \frac{13}{240}$

A's one day's work

$= \frac{13}{240} - \frac{1}{30}$

$= \frac{13-8}{240} = \frac{5}{240} = \frac{1}{48}$

$\therefore$ A alone can finish the work in 48 days.

C's one day work $= \frac{13}{240} - \frac{1}{20} = \frac{13-12}{240} = \frac{1}{240}$

$\therefore$ C alone can finish the work in 240 days.

Required ratio $= \frac{48}{240} = 1:5$

83. (c) Ratio of the work done by Sujit and Amit = 4:5

Total key depressions done by Amit

$= \frac{5}{9} \times 576000 = 3,20,000$

Amit's speed in key depressions per hour $= \frac{320000}{8 \times 5}$

$= 8000$

84. (c) $\frac{M_1 D_1 H_1}{W_1} = \frac{M_2 D_2 H_2}{W_2}$

$\Rightarrow \quad \frac{4 \times 10 \times 5}{1} = \frac{2 \times 20 \times H_2}{2}$

$\Rightarrow \quad H_2 = 10$ hours

85. (b) 2 men = 2 women

$1 \text{ man} + 1 \text{ woman} = \left(\frac{3}{2} + 1 \right) \text{ women} = \frac{5}{2} \text{women}$

$\because \quad M_1 D_1 = M_2 D_2$

$\Rightarrow \quad 3\times 4=\frac{5}{2}\times D_2$

$\therefore \quad D_2=\frac{3\times 4\times 2}{5}=\frac{24}{5}$ days

86. (c) Here, there are four quantities, examiner, no. of answer papers, day and hour. We have to calculate hours. Hence the quantity 'hour' should be in the last column. Following relationship exists:

(i) *Less* examiners, *More* hours (inverse)

(ii) *More* answer papers, *more* hours (direct)

(iii) *More* days, *less* hours (inverse)

Hence,

Examiner		Answer Papers		Days		Hours
4	↑	1	↓	10	↑	5
2		2		20		x

Again,

$$\left.\begin{matrix}3:4\\1:2\\20:10\end{matrix}\right\}::5:x$$

or, $2\times 1\times 20\times x=4\times 2\times 10\times 5$

$\therefore \quad x=\frac{4\times 2\times 10\times 5}{2\times 1\times 20}=10$ hours per day

88. (d) Let A and B together complete the work in x days.

Then, time taken by A = $(x + 4)$ days

And, time taken by B = $(x + 16)$ days

Now, according to the question,

$\frac{1}{x+4}+\frac{1}{x+16}=\frac{1}{x}$

$\Rightarrow \quad \frac{x+16+x+4}{(x+4)(x+16)}=\frac{1}{x}$

$\Rightarrow \quad 2x^2+20x=x^2+20x+64$

$\Rightarrow \quad x^2=64 \quad \Rightarrow \quad x=\sqrt{64}=8$ days

89. (c) $M_1D_1T_1=M_2D_2T_2$

$\Rightarrow \quad 250\times 20\times 5=M_2\times 10\times 8$

$\Rightarrow \quad M_2=\frac{250\times 20\times 5}{10\times 8}=312.5$

$\therefore$ Minimum number of men required = 313

90. (a) $(2M+5W)\times 12=(5M+2W)\times 9$

$\Rightarrow \quad 24M+60W=45M+18W$

$\Rightarrow \quad 42W=21M$

$\Rightarrow \quad 2W=1M$

$\therefore \quad 2M+5W=9W$

$\therefore \quad M_1D_1=M_2D_2$

$\Rightarrow \quad 9\times 12=3\times D_2$

$\Rightarrow \quad D_2=\frac{9\times 12}{3}=36$ days