

CH 1 TIME AND WORK

ANSWERS AND EXPLANATIONS

EXERCISE 1

1. (e) \therefore 15 men can do 1 work in 3 days.
 \therefore 1 man can do 1 work in 3×15 days.
 \therefore 10 men can do the same work in

$$\frac{3 \times 15}{10} = \frac{9}{2} = 4\frac{1}{2} \text{ days}$$

2. (c) \therefore 16 men can complete 1 work in 8 days.
 \therefore 1 man can complete 1 work in 8×16
 \therefore 12 men can complete the same work in

$$\frac{16 \times 8}{12} = \frac{32}{3} = 10\frac{2}{3} \text{ days.}$$

3. (b) \therefore 17 men can complete 1 work in 12 days
 \therefore 1 man can complete the work in 12×17 days
 \therefore 6 men can complete the work in

$$\frac{12 \times 17}{6} = 34 \text{ days}$$

4. (c) Number of days = $\frac{12 \times 8}{12 - 8}$
 $= 24$ days

5. (e) Required number of days

$$= \frac{6 \times 12}{6 + 12}$$

$$= 4 \text{ days}$$

6. (a) 112 men can complete the whole work in

$$8 \times 3 = 24 \text{ days}$$

\therefore Required no. of days

$$= \frac{12 \times 24}{16} = 18$$

7. (c) Part processed by computer A in 1 minute = $\frac{1}{3}$

Part processed by computer B in 1 minute = $\frac{1}{5}$

Part processed by computer C in 1 minute

$$= \frac{42}{60} - \frac{1}{3} - \frac{1}{5}$$

$$= \frac{42 - 20 - 12}{60} = \frac{10}{60} = \frac{1}{6}$$

Hence, computer C will process 1 input 6 minutes.

8. (b) Required no. of binders

$$= \frac{800 \times 21 \times 15}{1400 \times 20} = 9$$

9. (d) Required no. of days

$$= \frac{9800}{350} = 28 \text{ days}$$

10. (a) In an hour, George and Sonia together can copy

$$\frac{1}{6} + \frac{1}{8} = \frac{7}{24} \text{ of a 50-page manuscript.}$$

i.e. In an hour they together can copy $\frac{7}{48}$ of the

100-page manuscript.

i.e. They together can copy a 100-page manuscript in

$$\frac{48}{7} \text{ hours, i.e. } 6\frac{6}{7} \text{ hours.}$$

11. (b) A's 1 day's work

$$= \frac{1}{10} \text{ and B's 1 day's work} = \frac{1}{15}$$

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

$$= \left(\frac{1}{10} + \frac{1}{15} \right) = \frac{1}{6}$$

So, both together will finish the work in 6 days.



12. (a) (A + B)'s 1 day's work = $\frac{1}{12}$ th part of whole work.

B's 1 day's work = $\frac{1}{28}$ th part of whole work.

\therefore A's 1 day's work

$$= \frac{1}{12} - \frac{1}{28} = \frac{1}{21} \text{ th part of whole work.}$$

\therefore A alone can finish the work in 21 days

13. (d) (Man + Son)'s one day's work = $\frac{1}{8}$

$$\text{Man's one day's work} = \frac{1}{10}$$

$$\Rightarrow \text{Son's one day's work} = \frac{1}{8} - \frac{1}{10} = \frac{1}{40}$$

\therefore Son can do it in 40 days.

14. (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

$$\frac{18}{5} = 3\frac{3}{5} \text{ min.}$$

15. (a) A's one day's work = $\frac{1}{3}$ rd work.

B's one day's work = $\frac{1}{6}$ th work.

$$(A + B)'s \text{ one day's work} = \frac{1}{3} + \frac{1}{6} = \frac{1}{2} \text{ nd work}$$

\therefore A and B together can complete the work (knit a pair of socks) in 2 days.

\therefore They together knit two pair of socks in 4 days.

16. (a) Use direct formula as given

$$\frac{1}{\frac{1}{A} + \frac{1}{B} + \frac{1}{C}}$$

So time required when they work together.

$$= \frac{1}{\frac{1}{56} + \frac{1}{84} + \frac{1}{280}} = 30 \text{ hours}$$

17. (a) We have $W =$ work to be done = Destruction of the city = $X \times 7$ plane days, where $X =$ original number of planes. Also, $W = (X - 12) \times 10$ plane days.

Now the work done is same in the two cases (destruction of same city)

$$\Rightarrow X \times 7 = (X - 12) \times 10$$

$$\Rightarrow X = 40 \text{ planes.}$$

18. (b) $12M \times 18 = 12W \times 18 \times \frac{4}{3}$

$$\therefore W = \frac{3}{4}M$$

$$10M + 8W = 10M + 8 \times \frac{3}{4}M = 16M$$

\therefore 16 men can complete the same work

$$\text{in } \frac{12 \times 18}{16} = \frac{27}{2} = 13\frac{1}{2} \text{ days}$$

19. (e) $M = 2B$

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

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

\therefore 18 boys complete the work in 6 days.

\therefore 14 boys complete the work in

$$\frac{6 \times 18}{14} = 7\frac{5}{7} \text{ days.}$$

Note: 7 men and 4 boys complete the work in 6 days.

We have to find out the no. of days in which 5 men and 4 boys complete the work. Here, we see that 4 boys are common in both the cases, therefore, 5 men will take more time to complete the work, i.e., more than 6 days, which is not given in any options. Therefore, without calculating we can say that our answer is (e).

20. (d) $8W = 6M = 12B$

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

\therefore 9 men can complete the work by working 1 hour



per day in 6×6 days

\therefore 27 men working 8 hours per day

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

21. (a) The part of job that Suresh completes in 9 hours

$$= \frac{9}{15} = \frac{3}{5}$$

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

Remaining job can be done by Ashutosh in

$$\frac{2}{5} \times 10 = 4 \text{ hours}$$

22. (d) 15 women's work of a day $= \frac{1}{6} - \frac{1}{10} \Rightarrow \frac{1}{15}$ part

\therefore for 1 whole part a woman will take

$$= 15 \times 15 = 225 \text{ days.}$$

23. (b) $m_1 \times d_1 \times t_1 \times w_2 = m_2 \times d_2 \times t_2 \times w_1$

$$24 \times 10 \times 8 \times 1 = m_2 \times 6 \times 10 \times 1$$

$$\Rightarrow m_2 = \frac{24 \times 10 \times 8}{6 \times 10} = 32 \text{ men}$$

EXERCISE 2

1. (d) \therefore A can do $\frac{3}{4}$ of the work in 12 days

\therefore A can do $\frac{1}{8}$ of the work in

$$12 \times \frac{4}{13} \times \frac{1}{8} \text{ days} = 2 \text{ days}$$

2. (a) A's 1 day's work

$$= \frac{1}{18} \text{ and B's 1 day's work} = \frac{1}{9}$$

$$\therefore (A+B)'s \text{ 1 day's work} = \left(\frac{1}{18} + \frac{1}{9} \right) = \frac{1}{6}$$

3. (d) Let the time taken by Bhavika and Ritika together be x days

\therefore time taken by Bhavika alone $= x + 8$ days

and time taken by Ritika alone $= x + \frac{9}{2}$ days

$$\therefore \text{1 day's work is } \frac{1}{x+8} + \frac{1}{x+\frac{9}{2}} = \frac{1}{x}$$

$$\Rightarrow \frac{1}{x+8} + \frac{2}{2x+9} = \frac{1}{x}$$

$$\Rightarrow \frac{2}{2x+9} = \frac{1}{x} - \frac{1}{x+8}$$

$$\Rightarrow \frac{2}{2x+9} = \frac{8}{x(x+8)}$$

$$\Rightarrow 2(x^2 + 8x) = 8(2x+9)$$

$$\Rightarrow 2x^2 + 16x = 16x + 72$$

$$\Rightarrow 2x^2 = 72$$

$$\Rightarrow x = 6 \text{ days}$$

4. (b) (A+B)'s 5 days' work

$$= 5 \left(\frac{1}{25} + \frac{1}{20} \right) = \frac{45}{100} = \frac{9}{20}$$

$$\text{Remaining work} = \left(1 - \frac{9}{20} \right) = \frac{11}{20}$$

$\frac{11}{20}$ of the work would be finished by B in

$$\frac{\frac{11}{20}}{\frac{1}{20}} = 11 \text{ days.}$$

5. (a) 50 men complete 0.4 work in 25 days.

Applying the work rule,

$$m_1 \times d_1 \times w_2 = m_2 \times d_2 \times w_1$$

we have,

$$50 \times 25 \times 0.6 = m_2 \times 25 \times 0.4$$

$$\text{or } m_2 = \frac{50 \times 25 \times 0.6}{25 \times 0.4} = 75 \text{ men}$$

Number of additional men required

$$= (75 - 50) = 25$$



