

> TIME AND WORK SOLUTION

1.
$$\begin{array}{l} 24M \rightarrow 16 \\ 8W \rightarrow 72 \\ 24C \rightarrow 32 \end{array} \left. \vphantom{\begin{array}{l} 24M \\ 8W \\ 24C \end{array}} \right\} 24 \times 288 \left\langle \begin{array}{l} 18 \\ 12 \\ 9 \end{array} \right.$$

\therefore Required Time = $\frac{24 \times 288}{18 \times 10 + 12 \times 15 + 9 \times 24}$
= 12 days

2.
$$\begin{array}{l} 9C \rightarrow 360 \\ 18M \rightarrow 72 \\ 12W \rightarrow 162 \end{array} \left. \vphantom{\begin{array}{l} 9C \\ 18M \\ 12W \end{array}} \right\} 36 \times 360 \times 9 \left\langle \begin{array}{l} 36 \\ 90 \\ 60 \end{array} \right.$$

\therefore Required Time = $\frac{36 \times 360 \times 9}{36 \times 10 + 90 \times 4 + 60 \times 12}$
= 81 days.

3. As, A and B worked together for 20 days. So remaining work can be finished by both in 10 days and remaining work finished by A in 20 days.

Now, $10(A + B) = 20A$
 $\Rightarrow 10B = 10A$
 $\Rightarrow \frac{A}{B} = \frac{1}{1} = 1 : 1$

Total work = $30 \times (1 + 1) = 60$
Required time = $\frac{60}{1} = 60$ days.

4.
$$\begin{array}{l} A + B \rightarrow 10 \\ C \rightarrow 50 \end{array} \left. \vphantom{\begin{array}{l} A + B \\ C \end{array}} \right\} 50 \left\langle \begin{array}{l} 5 \\ 1 \end{array} \right.$$

Efficiency of A = Efficiency of B + Efficiency of C
 $\Rightarrow A - B = C$
 $\Rightarrow A - B = 1$... (i)
 $A + B = 5$... (ii)

From equation (i) and (ii) we get, $A = 3$ and $B = 2$

\therefore Required time = $\frac{50}{2} = 25$ days.

5.
$$\begin{array}{l} A \rightarrow 12 \\ B \rightarrow 15 \end{array} \left. \vphantom{\begin{array}{l} A \\ B \end{array}} \right\} 60 \left\langle \begin{array}{l} 5 \\ 4 \end{array} \right.$$

\therefore Required Time = $\frac{60 - 5 \times 3}{9} = \frac{45}{9} = 5$ days

6. $10 \times 6 \times 18 = 15 \times 12 \times h_2$
 $\therefore h_2 = 6$ hrs.

7.
$$\begin{array}{l} \text{Vinod} \rightarrow 15 \\ \text{Vinay} \rightarrow 10 \end{array} \left. \vphantom{\begin{array}{l} \text{Vinod} \\ \text{Vinay} \end{array}} \right\} 60 \left\langle \begin{array}{l} 4 \\ 6 \end{array} \right.$$

\therefore Required Time = $\frac{60 - 4 \times 9}{6} = \frac{24}{6} = 4$ hrs.

8.
$$\begin{array}{l} 12M \rightarrow 4 \\ 15W \rightarrow 4 \end{array} \left. \vphantom{\begin{array}{l} 12M \\ 15W \end{array}} \right\} 60 \times 4 \left\langle \begin{array}{l} 5 \\ 4 \end{array} \right.$$

\therefore Number of women = $\frac{240 - 5 \times 6 \times 2}{3 \times 4} = 15$

9. Ratio of efficiency = $\frac{1}{2} = 2 : 3$
 $\frac{3}{4}$

Total work = $5 \times 18 = 90$
Required time = $\frac{90}{3} = 30$ days.

10.
$$\begin{array}{l} A \rightarrow 16 \\ B \rightarrow 10 \end{array} \left. \vphantom{\begin{array}{l} A \\ B \end{array}} \right\} 80 \left\langle \begin{array}{l} 5 \\ 8 \end{array} \right.$$

\therefore A and B worked for 6 days
 \therefore Remaining work = $80 - (5 + 8)6 = 2$
 \therefore Remaining work finished by C in 3 days.
 \therefore Efficiency of C = $\frac{2}{3}$
 \therefore Time taken by C = $\frac{80}{\frac{2}{3}} = 120$ days.

11. Let 'n' be the number of men
 $n \times 60 = (n - 8)70$
 $\Rightarrow 560 = 70n - 60n \Rightarrow 10n = 560$
 $\Rightarrow n = 56$

Alternatively $\frac{8 \times 70}{10} = 56$

12.
$$\begin{array}{l} A \rightarrow 16 \times 5 = 80 \\ B \rightarrow 12 \times 4 = 48 \end{array} \left. \vphantom{\begin{array}{l} A \\ B \end{array}} \right\} 240 \left\langle \begin{array}{l} 3 \\ 5 \end{array} \right.$$

\therefore Required Time = $\frac{240}{8 \times 6} = 5$ days.

13. Required number of days = $\frac{(45 - 30) \times 120}{150} = 12$

14.
$$\begin{array}{l} A \rightarrow 12 \\ B \rightarrow 18 \\ C \rightarrow 24 \end{array} \left. \vphantom{\begin{array}{l} A \\ B \\ C \end{array}} \right\} 72 \left\langle \begin{array}{l} 6 \\ 4 \\ 3 \end{array} \right.$$

\therefore Required Time = $\frac{72 - (6 \times 4) + (4 \times 2)}{4 + 3} = \frac{56}{7} = 8$

15. $\frac{40 \times 8 \times 15}{1} = \frac{60 \times 4 \times D}{2}$
 $D = 40$ days