

28. Let A completes the work in  $x$  days alone. and 'B' completes the work in  $y$  days.

$$\therefore \text{A's one day work} = \frac{1}{x}$$

$$\text{B's one day work} = \frac{1}{y}$$

$$\therefore \text{(A+B)'s one day work} = \frac{1}{x} + \frac{1}{y}$$

$\therefore$  A and B i.e. A+B complete the work in 15 days.

$$\therefore \text{Their one day work} = \frac{1}{15}$$

Hence,

$$\boxed{\frac{1}{x} + \frac{1}{y} = \frac{1}{15}} \quad \text{--- (I)}$$

We are given that,

A's one day work =  $1\frac{1}{2}$  times of B's one day work

$$\frac{1}{x} = \frac{3}{2} \text{ times of B's one day work}$$

$$\frac{1}{x} = \frac{3}{2} \times \frac{1}{y}$$

$$\boxed{\frac{1}{x} = \frac{3}{2y}} \quad \text{--- (II)}$$

Substituting,

$$\frac{1}{x} = a \text{ and } \frac{1}{y} = b \text{ in}$$

equations I and II;

$$a + b = \frac{1}{15} \quad [\text{from I}]$$

$$\therefore 15a + 15b = 1 \quad \text{--- (III)}$$

and,

$$a = \frac{3}{2}b \quad [\text{from II}]$$

$$\therefore 2a = 3b$$

$$\therefore 2a - 3b = 0 \quad \text{--- (IV)}$$

Multiplying equation (IV) by 5

$$10a - 15b = 0 \quad \text{--- (V)}$$

Adding (III) and (V)

$$\begin{array}{r} + 15a + 15b = 1 \quad \text{--- (III)} \\ 10a - 15b = 0 \quad \text{--- (V)} \\ \hline \end{array}$$

$$25a = 1$$

$$\therefore a = \frac{1}{25}$$

$$\therefore 3b = 2a \quad (\text{from IV})$$

$$3b = 2 \times \frac{1}{25}$$

$$\therefore 3b = \frac{2}{25}$$

$$\therefore b = \frac{2}{25 \times 3}$$

$$\boxed{\therefore b = \frac{2}{75}}$$

Now, we have  $a = \frac{1}{25}$  and  $b = \frac{2}{75}$

$$\therefore \frac{1}{x} = \frac{1}{25}$$

$$\text{and } \frac{1}{y} = \frac{2}{75} \quad \left[ \begin{array}{l} \therefore a = \frac{1}{x} \\ b = \frac{1}{y} \end{array} \right]$$

$$\therefore x = 25 \text{ days}$$

$$\therefore y = \frac{75}{2}$$

$$\therefore y = 37\frac{1}{2} \text{ days}$$

$\therefore$  A and B will complete the work in 25 days and  $37\frac{1}{2}$  days alone, respectively.