

Ex 3.6 Question 2

20 let speed of boat in still water = x km/h
 speed of stream = y km/h

upstream
 $S = (x - y)$ km/h
 $d = 4$ km
 $t = 2$ hr
 $S = d/t$
 $x - y = \frac{4}{2}$
 $\Rightarrow x - y = 2 \dots \textcircled{1}$

downstream
 $S = (x + y)$ km/h
 $d = 20$ hr
 $t = 2$ hr
 $S = d/t$
 $x + y = \frac{20}{2}$
 $\Rightarrow x + y = 10 \dots \textcircled{11}$

$\textcircled{1} + \textcircled{11}$
 $x - y = 2$
 $x + y = 10$

 $2x = 12$
 $\Rightarrow x = 6$

Sub $\textcircled{1}$
 $6 - y = 2$
 $\Rightarrow y = 6 - 2$
 $= 4$

\therefore speed of boat in still water = 6 km/h
 speed of stream = 4 km/h

21 let time taken by 1 woman to do work = x days
 \therefore work done in 1 day = $\frac{1}{x}$ days
 let time taken by 1 man to do work = y days
 \therefore work done in 1 day = $\frac{1}{y}$ days

acc to condition I

$\frac{2}{x} + \frac{5}{y} = \frac{1}{4} \dots \textcircled{1}$

acc to condition II

$\frac{3}{x} + \frac{6}{y} = \frac{1}{3} \dots \textcircled{11}$

put $\frac{1}{x} = a$, $\frac{1}{y} = b$ in eqns $\textcircled{1}$ and $\textcircled{11}$

$2a + 5b = \frac{1}{4} \dots \textcircled{11} \times 3$

$3a + 6b = \frac{1}{3} \dots \textcircled{11} \times 2$

$\textcircled{11} \times 3 - \textcircled{11} \times 2$

$6a + 15b = \frac{3}{4}$

$6a + 12b = \frac{2}{3}$

 $3b = \frac{3}{4} - \frac{2}{3}$

$\Rightarrow b = \frac{9-8}{12 \times 3}$

$= \frac{1}{36}$

Sub $\textcircled{11}$

$3a + 6 \times \frac{1}{36} = \frac{1}{3}$

$\Rightarrow 3a = \frac{1}{3} - \frac{1}{6}$

$\Rightarrow a = \frac{2-1}{6 \times 3}$

$\Rightarrow a = \frac{1}{18}$

$a = \frac{1}{18} \quad b = \frac{1}{36}$

$\frac{1}{x} = \frac{1}{18} \quad \frac{1}{y} = \frac{1}{36}$

$\Rightarrow x = 18 \quad \Rightarrow y = 36$

Time by women = 18 days

Time by 1 Man = 36 days