

Day-05

① Ramesh walks \rightarrow 5km in 30min

$$S = \frac{d}{t}$$

$$S = \frac{3}{0.5\text{hr}} = 6 \text{ km/hr} \text{ speed}$$

② Train travels \rightarrow 50km/hr
Shreya \rightarrow ?

$$d = s \times t$$

$$= 50 \times 3$$

$$[t = 150\text{ km}]$$

③ Train travel at 50 km/hr
How far will it go in 3hr

Distance = Speed \times Time

$$= 50 \times 3$$

$$[d = 150\text{ km}]$$

④ A cyclist covers 20km in
1hr 30min what is his
Speed?

$$1\text{ hr } 30\text{ min} = 1.5 \text{ hr}$$

$$\text{Speed} = \frac{20}{1.5}$$

$$[S = 13.33\text{ km/hr}]$$

$$1 \text{ hr } 30 \text{ min} = 1.5 \text{ hr}$$

$$\text{Speed} = \frac{90}{1.5}$$

$$[S = 13.33 \text{ km/hr}]$$

⑤ A boat goes 10 km downstream in 1 hr, what is its speed downstream?

$$\text{Speed} = \frac{10 \text{ km}}{1 \text{ hr}}$$

$$[S = 10 \text{ km/hr}]$$

⑥ If a boat speed in still water is 15 km/hr and stream speed is 5 km/hr. What is its speed upstream?

Upstream Speed = $15 - 5$
 $= 10 \text{ km/hr}$

⑦ A man walks 4 km upstream in 2 hr what is his upstream speed?

$$\text{Speed} = \frac{4}{2}$$

$$= 2 \text{ km/hr}$$

⑧ Down Stream Speed = $24/2$
= 12 km/hr
Stream Speed = $12 - 10 = 2 \text{ km/hr}$

⑨ Speed = $300/5$
 $s = 60 \text{ km/hr}$

⑩ Speed = $60/3$
 $s = 20 \text{ km/hr}$

⑪ Time = Distance \div Speed
= $240/60$
 $t = 4 \text{ hrs}$

⑫ upstream speed = $30/3$
= 10 km/hr

Downstream Speed = $30/2$
= 15 km/hr

Bat. Speed = $(15+10)/2$

= 12.5 km/hr

Stream Speed = $(15-10)/2$
= 2.5 km/hr

$$\textcircled{13} \text{ upstream} = 90 - 5 = 15 \text{ km/hr}$$
$$= 15 \frac{\text{km}}{\text{hr}}$$

$$\text{downstream} = 90 + 5$$
$$= 95 \text{ km/hr}$$

$$\textcircled{14} \text{ speed} = \text{Distance} \div \text{Time}$$
$$= 120 \div 9$$
$$= 13.33 \text{ m/s}$$

$$\text{Convert to km/hr} =$$
$$13.33 \times 18.15$$
$$= 48 \text{ km/hr}$$

$$\textcircled{15} \text{ relative speed} = (120 + 140)/10$$
$$= 260/10$$
$$= 26 \text{ m/s}$$

$$\textcircled{16} \text{ upstream speed} = 90/4 = 5 \text{ km/hr}$$
$$\text{downstream speed} = 90/3$$
$$= 6.67 \text{ km/hr}$$

$$\text{Boat speed} = (5 + 6.67)/2$$
$$= 5.8 \text{ km/hr}$$

$$\text{Stream speed} = (16.67) - 5/2$$
$$= 0.83 \text{ km/hr}$$

$$\textcircled{17} \quad \begin{aligned} \text{Downstream Speed} &= 5 + 2 \\ &= 7 \text{ km/hr} \end{aligned}$$

$$\text{Time} = 10 / 7 = 1.43 \text{ hr}$$

$$t = \underline{1 \text{ hour } 26 \text{ min}}$$

\textcircled{18}

$$1^{\text{st}} \text{ total distance} = 120 \text{ km}$$

$$\text{Time for 1st part} = 60 / 40$$

$$\text{Time for 2nd part} = \frac{60}{60} = \underline{1 \text{ hr}}$$

$$\text{Total time} = \underline{2.5 \text{ hrs}}$$

$$\text{Avg Speed} = \frac{\text{Total distance}}{\text{Total time}}$$

$$= 120 \div 2.5$$

$$\underline{48 \text{ km/hr}}$$

$$\textcircled{19} \quad \begin{aligned} \text{Downstream Speed} &= 48 / 3 \\ &= 16 \text{ km/hr} \end{aligned}$$

$$\text{Upstream Speed} = 48 / 4$$

$$= 12 \text{ km/hr}$$

$$\text{Speed of boat} = (16 + 12) / 2$$

$$= 14 \text{ km/hr}$$

$$\text{Speed of Stream} = (16 - 12) / 2$$

$$= \underline{2 \text{ km/hr}}$$

\textcircled{20} \quad \text{Total distance} = 120 + 200

$$\text{Speed of boat} = (16+12)/2 \\ = 14 \text{ km/hr}$$

$$\text{Speed of Stream } (16-12)/2 \\ = 2 \text{ km/hr}$$

Q. Total distance = $100 + 200 \\ = 300 \text{ m}$

$$\text{Speed} = 60 \text{ km/hr} \quad (60 \times 1000)/3600 \\ = 16.67 \text{ m/s}$$

$$\text{Time} = 300 / 16.67 \approx 18 \text{ second}$$

Q. Let the boat speed = $x \text{ km/hr}$
 Then downstream = $x+2$

$$\text{upstream} = x-2$$

$$\text{Time} = 30 / (x+2) + 20 / (x-2) = 5$$

Solve:

$$\frac{30}{x+2} + \frac{20}{x-2} = 5$$

$$5x^2 - 50x = 0$$

$$x(x-10) = 0$$

$$\underline{\underline{x=10}}$$

$$\text{Speed of boat} = 10 \text{ km/hr}$$

$$\textcircled{22} \text{ Relative Speed} = 60 + 40 \\ = 100 \text{ km/hr}$$

$$100 \times 1000 / 3600 \\ = 27.78 \text{ km/hr/s}$$

$$\textcircled{23} \text{ Let boat speed} = x \text{ km/hr} \\ \text{Then upstream speed} = x - 2 \\ \text{Downstream} = x + 2 \\ \text{Time diff} = 2 \text{ hrs}$$

$$\frac{90}{x-2} - \frac{90}{x+2} = 2 \times (x-2)(x+2)$$

$$\textcircled{24} \quad 180 = 2x^2 - 8$$

$$88 \Rightarrow x^2 = 44$$

$$x = \sqrt{44, 6.63}$$

$$\textcircled{25} \text{ Speed} = 72 \text{ km/hr} \\ = (72 \times 1000) / 3600 = 20 \text{ m/s}$$

$$\text{length of train} = 20 \times 12 = 240 \text{ m} \\ \text{Total length (train + platform)}$$

$$= 20 \times 18 \\ = 360 \text{ m}$$

$$\text{platform length} = 360 - 240 \\ = 120 \text{ m}$$

$$= 80 \times 18$$

$$= 360 \text{ m}$$

$$\text{platform length} = 360 \div 240 \\ = \underline{120 \text{ m}}$$

(25) Let stream speed = $x \text{ km/hr}$

$$\text{Then upstream} = 80 - x$$

$$\text{Downstream} = 80 + x$$

$$\frac{40}{80+x} = \frac{-40}{80-x} = 1$$

$$\therefore \text{Multiply by } (80-x)(80+x)$$
$$40(80+x) = -40(80-x)$$
$$= (80^2 - x^2)$$

$$800 + 40x = 800 - 40x \\ = 400 - x^2$$

$$800 + 40x - 800 + 40x \\ = 400 - x^2$$

$$80x = 400 - x^2$$

$$= x^2 + 80x - 400$$

$$= 1$$

Solve quadratic

$$x = \frac{80 \pm \sqrt{80^2 + 4 \times 400}}{2}$$

$$4.72 \text{ km/hr}$$