J solution

1. ATQ,

$$\frac{60}{x+y}+\frac{60}{x-y}=\frac{27}{2} \quad \ldots..(i)$$

$$\frac{5}{x+y}=\frac{4}{x-y}$$

$$5x - 5y = 4x + 4y$$

$$x = 9y$$

Put this in equation (i)

$$\frac{60}{10y}+\frac{60}{8y}=\frac{27}{2}$$

or $\frac{27}{2}y=\frac{27}{2}$ or y = 1 km/hr

2. (c)

3. (a)

4. Given.

Speed of boat down stream = 15 km/h

Speed of boat current = 3 km/h

Speed of boat in still water = 12km/h

time taken at upstream

$$=\frac{15}{12-3}$$

$$=\frac{15}{9}\text{h} = 1\text{ h } 40\text{ min}$$

time takenatdownstream

$$=\frac{15}{12+3}=1h$$

total time = 2h 40 min

5. If flows at 4 km/h

So in 15 minutes it travels → 1 km

So vol. of water entering the sea in 15 minutes

8 × 4 × 1000

$$= 32000\ m^3$$

6. Let speed of man and stream is 'V', 'U'

The $\frac{5}{V+U}=\frac{4}{V-U}$

(Travelling distance in same time)

$$5V - 5U = 4V + 4U$$

$$V = 9u \Rightarrow \frac{v}{u}=\frac{9}{1}$$

Let u = x, v = 9x

$$\frac{35}{2x}\left(\frac{1}{5}+\frac{1}{4}\right)=\frac{21}{2}$$

$$\frac{5}{x}\times\frac{9}{20}=3,\ x=\frac{3}{4}=0.75$$

Speed of stream = 1 × 0.75

= 0.75 km/hr

7. ATQ

Speed of current $y = 4km/h$

Distance = 12 km

Speed in upstream

$= (x - y)$ km/hr

Speed in upstream = $(x - y)$ km/hr

Here 'x' is speed of boat in still water

$$\therefore \quad \text{Speed} = \frac{Dis\tan ce}{Time}$$

$$x-4=\frac{12}{5}$$

$$5x-20=12$$

$$5x=32$$

$$x=6.4 \text{ km/hr}$$

Speed in dowstream = $(x + y) = 6.4 + 4 = 10.4$ km/h

$$\therefore \quad \text{Time} = \frac{Dis\tan ce}{Speed}$$

$$\text{Time} = \frac{15}{10.4}=\frac{150}{104}$$

$$= 1\text{ hrs } 26\frac{7}{13}\text{ min}$$

8. (b)

9. Upstream speed, U

$$=\frac{1\text{ km}}{\frac{10}{60}\text{ hr}}=6\text{ km/hr}$$

Downstream speed, D

$$=\frac{1\text{ km}}{\frac{4}{60}\text{ hr}}=15\text{ km/hr}$$

Speed of the stream, $y=\frac{D-U}{2}$

$$=\frac{15-6}{2}=\frac{9}{2}=4.5\text{ km/hr.}$$

10. Speed of Downstream, D = 12 km/h

Speed of Upstream, U = 8 km/h

Speed of boat in still water $=\frac{D+U}{2}=\frac{20}{2}=10$ km/h.

Time taken by the boat in still water

$$=\frac{24\ km}{10\ km/hr}=2.4\text{ hrs}$$

11. Speed of stream, $y = 3$ km/h

Speed of man in still water, $x = 5$ km/h

Downstream speed, D = 8 km/h

$$\text{Downstream time} = \frac{Distance}{Downstream\ speed} = \frac{26}{8}$$

$$= \frac{13}{4} = 3\frac{1}{4} \text{ hrs.}$$

12. Speed of boy in stil water $x = 10$ km/h

Speed of current, $y = 5km/h$

Distance = 60 km.

$\therefore$ Downstream time $= \frac{60}{15} = 4$ hrs.

Option (d) is the answer.

Upstream speed = 5 km/h

Upstream time $= \frac{60}{5} = 12$ hrs.

13. Speed of boat in still water, x = 5 km/h

Speed of stream $y = 3$ km/h

ATQ $\frac{Distance}{8} + \frac{Distance}{2} = 3$ hrs

On solving, Distance = 4 .8 km.

Alternate :

$$T = \frac{2xD}{x^2 - y^2}$$

$$3 = \frac{2 \times 5 \times D}{5^2 - 3^2}$$

$$3 \times 16 = 10 \times D$$

$$D = 4.8 \text{ km.}$$

14. Let the speed of boat in still water = x km/h.

The speed of current, $y = 5$ km/h

Downstream speed = 15 km/h

Downstream speed = 15 km/h

$$x + 5 = 15$$

$$x = 10 \text{ km/h}$$

Upstream speed, U

$$= x - y = 10 - 5$$

$$= 5 \text{ km/h}$$

$$\text{Upstream time} = \frac{Distance}{Upstream\ speed}$$

$$= \frac{15}{5} = 3 \text{ hrs.}$$

15. $\frac{12}{x+y} + \frac{12}{x-y} = 3$

Speed of the current, $y = 3$ km/h

$$\frac{12}{x+3} + \frac{12}{x-3} = 3$$

In such type of question take help from the options to save your valueable time.

Take option (b) $x = 9$

$$\frac{12}{9+3} + \frac{12}{9-3} = \frac{12}{12} + \frac{12}{6} = 1 + 2 = 3$$

$\therefore$ Option (b) is the answer

Alternate :

$$T = \frac{2xD}{x^2 - y^2}$$

$$3 = \frac{2 \times x \times 12}{x^2 - 3^2}$$

$$3(x^2 - 9) = 24x$$

$$x^2 - 9 = 8x$$

$$x^2 - 8x - 9 = 0$$

$$x = 9, -1$$

$$x = 9 \text{ km/hr.}$$