SOLUTIONS

1. (a) Speed of boat in still water (x) = 17 km/hr

Speed of stream (y) = 5 km/hr

Downstream speed (x + y) = 17 + 5 = 22 km/h

$\therefore$ Required time = $\frac{110}{22}$ = 5 hrs

2. (a) Let, the required distance be 'D' kms

Speed of boat in still water (x) = 20 km/hr

Speed of stream (y) = 8 kmph

ATQ,

$$\frac{D}{x-y}-\frac{D}{x+y}=6$$

$$\Rightarrow \frac{D}{12}-\frac{D}{28}=6$$

$\Rightarrow$ D(16) = 6 × 12 × 28

$\therefore$ D = 126 km

3. (d) Speed of boat in still water (x) = 6 kmph

Speed of stream (y) = 2.5 kmph

ATQ,

$$\frac{59.5}{6+2.5}+\frac{59.5}{6-2.5}=\text{time}$$

$$\Rightarrow 59.5\left[\frac{1}{8.5}+\frac{1}{3.5}\right]=t$$

$$\Rightarrow \frac{59.5\times 12}{8.5\times 3.5}=t$$

$\Rightarrow$ t = 24 hrs

4. (b)

Let, x = speed of boat in still water

y = speed of stream

then,

ATQ,

Downstream speed $(x+y)=\frac{72}{6}=12$

and Upstream speed $(x-y)=\frac{72}{12}=6$

$$\therefore x=\frac{12+6}{2}=9 \text{ km/hr}$$

5. (a) v = 8 km/hr, u = 15 kmph

$\therefore$ speed of boat in still water

$$=\frac{v+u}{2}=\frac{23}{2}=11.5 \text{ km/h}$$

and speed of stream

$$=\frac{u-v}{2}=\frac{15-8}{2}=\frac{7}{2}=3.5 \text{ km/h}$$

6. (d) ATQ,

Upstream speed $(x-y)=\frac{4}{1}=4$ km/h

and Downstream speed (x + y)

$$=\frac{2}{1/4}=8 \text{ km/h}$$

$$\therefore x=\frac{8+4}{2}=6 \text{ km/hr}$$

Hence, required time = $\frac{7}{6}=1\frac{1}{6}$

= 1 hr 10 mins

7. (b) Let the speed of boat in still water = x km/h

Downstream speed of boat

$$=x+2=\frac{104}{8}$$

$\Rightarrow x + 2 = 13$ km/h

$\Rightarrow \quad x = 11$ km/h

Speed of boat in upstream

= (11 – 2) = 9 km/h

Time take by the boat to cover the distance of 13 km in upstream

$$=\frac{13}{9}\text{km/h}=1\frac{4}{9}\text{ km/h}$$

8. (c) Let the speed of the boat in still water = x km/h

Speed of stream = y km/h

CASE-I:

Boat can go 40 km downstream and 25 km upstream in 7 hours 30 minutes.

$$\Rightarrow \frac{40}{x+y}+\frac{25}{x-y}=7.5 \quad \text{.....(1)}$$

CASE- II:

Boat can go 48 km downstream and 36 km upstream in 10 h.

$$\Rightarrow \frac{48}{x+y}+\frac{36}{x-y}=10 \quad \text{.....(2)}$$

On solving (1) and (2) we get,

$x = 9$, y = 3

Hence, Speed of boat = 9 km/h

9. (a) Let the speed of stream be x m/s and speed of boat be $3x$ m/s.

Speed of boat in downstream = $x + 3x = 4x$ m/s

Distance covered = $4x \times 15.5$

$= 62x$ m

Speed of boat in upstream

$= 3x - x = 2x$ m/s

Time taken to cover $62x$ m in upstream $=\frac{62x}{2x}=31$sec

Additional time required to travel upstream = 31 – 15.5 = 15.5 sec.

10. (b) Speed of boat in still water (x)

= 15 km/h

Speed of current still water (y)

= 5 km/h

Total time = $\frac{60}{15+5}+\frac{60}{15-5}$

= 3 + 6

= 9 hours

11. (a) Upstream Speed= $(x - y)$ km/h

Downstream Speed= $(x + y)$ km/h

$$\Rightarrow \frac{\frac{15}{4}}{x-y}=\frac{3}{2}$$

$$\Rightarrow \frac{15}{4(x-y)}=\frac{3}{2}$$

$\Rightarrow 12x - 12y = 30 \quad$ ...(1)

Again, $\frac{13}{(x+y)} = 2$

$\Rightarrow 2x + 2y = 13 \quad$ ...(2)

Now, Adding (1) & (2) × 6,

$$12x - 12y = 30$$
$$\underline{12x + 12y = 78}$$
$$24x = 108$$

$$\Rightarrow x = \frac{9}{2} \text{ km/h}$$

Time to row a distance of 90 km in still water $= 90 \times \frac{2}{9} = 20$ Hours.

12. (a) $\frac{14}{B+S} + \frac{14}{B-S} = \frac{56}{15}$

Speed of current = 2 km/h (given)

By option

put speed of boat = 8 km/h

So, $\frac{14}{8+2} + \frac{14}{8-2} = \frac{56}{15}$

$= \frac{14}{10} + \frac{14}{6} = \frac{56}{15}$

$= \frac{56}{15} = \frac{56}{15}$ (Satisfied)

Hence the speed of boat is 8 km/h

13. (c) Let speed of boat be x km/h.

Speed of current = 9 km/h

Distance between X and Y = 10.5 km

Upstream speed = $(x - 9)$ km/h

Downstream speed = $(x + 9)$ km/h

ATQ,

$$\frac{10.5}{x-9} + \frac{10.5}{x+9} = 4$$

Put $x = 12$ from the option.

(Satisfied the equations)

So, Speed of boat = 12 km/h.

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