Boat And Stream

Q1   Distance constant

$$\frac{S_1}{S_2} = \frac{T_2}{T_1}$$

$$\frac{x+4}{x-4} = \frac{3}{2}$$

$$2x + 8 = 3x - 12$$

$$\boxed{x = 20 \ Km/hr}$$

(C)   Ans

Q2   D:U

$T \Rightarrow x : 3x$

$S \Rightarrow 3x : x$

$$\left[\begin{array}{l} \text{Time \& Speed} \\ \text{are inversely} \\ \text{proportional} \end{array}\right]$$

Speed of stream $= \left(\frac{3x-x}{2}\right)$

$$\frac{28}{3} = 2x$$

$$x = \frac{14}{3}$$

$$\boxed{x = 4\frac{2}{3} \ Km/hr}$$

Ans

Q3

$$A \underset{\xleftarrow{x}}{\xrightarrow{x}} B$$

$$T = \frac{D}{S} = \frac{x}{y+4}$$

$$T = \frac{D}{S} = \frac{x}{y-4}$$

(D) $\boxed{\text{Data Insufficient}}$

Ans

Q4

Upstream speed $(x-y) = \frac{16}{2} = 8 \ Km/hr$

Downstream speed $(x+y) = \frac{8}{20m} \times 60$

$$= 24 \ Km/hr$$

Speed in still water $= \frac{1}{2}(24+8)$

$$= \frac{1}{2} \times 32$$

$$= 16 \ Km/hr$$

Time $= \dfrac{\text{Distance}}{\text{Speed in still water}}$

$$= \frac{48}{16}$$

$$\boxed{Time = 3 hrs}$$

(B)   Ans

Q5   9 hr 48 min

$$9 + \frac{48}{60}$$

$$\frac{49}{5} = 9.8$$

Time $9.8 : 7$

Speed $7 : 9.8$

$$\left[\begin{array}{l} \text{Time \& Speed are inversely} \\ \text{proportional} \end{array}\right]$$

$$\frac{9.8+7}{9.8-7} = \frac{16.8}{2.8}$$

$$\boxed{6:1}$$

(C)   Ans

Speed Upstream = $9 - 1.5$

$= 7.5$

Speed Downstream = $9 + 1.5$

$= 10.5$

Total Time = $\dfrac{\text{Distance} \times \text{Sum of speed}}{\text{Product of speed}}$

$= \dfrac{105 \times (7.5 + 10.5)}{7.5 \times 10.5}$

$= \dfrac{105 \times 1800}{78.75}$

$= \boxed{24 \text{ hrs}}$

(A) Ans

Q7 Speed of Boat in still water $= \dfrac{1}{2}(11 + 5)$

$= \dfrac{16}{2}$

$= \boxed{8 \text{ Km/hrs}}$

(C) Ans

Q8 Upstream : Downstream

Distance $2 : 1$

Time $1 : 2$

Ratio $= \dfrac{\frac{1}{2}(2 + 1)}{\frac{1}{2}(2 - 1)}$

$= \dfrac{3}{1}$

(B) $\boxed{3 : 1}$

Ans

Q9 $x = 5$ Kmph

$5 - y = 3.5$

$y = 5 - 3.5$

$\boxed{y = 1.5}$

$5 + 1.5 = \boxed{6.5 \text{ Km/hr}}$

(C) Ans

Q10 U : D

$2 : 1$

$x - y \quad\quad x + y$

$2(x - y) = x + y$

$2x - 2y = x + y$

$\boxed{x = 3y}$

$42 = 3y$

$\boxed{y = 14 \text{ Km/hr}}$

(C)

Q11 Time $= \dfrac{\text{Distance}}{\text{speed}}$

$\dfrac{30}{a+b} + \dfrac{20}{a-b} = 4$ —①

$\dfrac{45}{a+b} + \dfrac{40}{a-b} = 7$ —②

Multiply eqn ① by 2 &
subtract eqn ② from ①

$\dfrac{60}{a+b} + \dfrac{40}{a-b} = 8$

$-\dfrac{45}{a+b} + \dfrac{40}{a-b} = 7$

_____

$\dfrac{15}{a+b} = 1$

$a + b = 15$ —③

Multiply eqn ① by ③ 1
eqn ② by 2 & subtract
eqn ② from ①

$$\frac{90}{a+b} + \frac{60}{a-b} = 12$$

$$\frac{90}{a+b} + \frac{80}{a-b} = 14$$

$$-\frac{20}{a-b} = -2$$

$$\boxed{a-b = 10} \quad ④$$

On solving eqn ③ & ④
we get

$$a = 12.5 \, km/hr$$
$$b = 2.5 \, km/hr$$

$$\boxed{a = 12.5 \, Km/hr}$$

ans