BHARAT SCHOOL OF BANKING

BOAT AND STREAM

Q1. A swimmer covers a distance of 28 Km against the current and 40 Km in the direction of the current. If in each case he takes 4 hours, then the speed of the current is:
(a) 3.5 Km/h
(b) 1.5 Km/h
(c) 2.5 Km/h
(d) 4.5 Km/h
(e) None of these

S1. Ans.(b)
Sol. Speed of the swimmer upstream
$= \frac{28}{4} = 7$ Km/h.
Speed of the swimmer downstream
$= \frac{40}{4} = 10$ Km/h.
$\therefore$ Speed of the stream
$= \frac{1}{2}$ (Downstream Speed – Upstream Speed)
$= \frac{1}{2}\ (10 - 7) = \frac{3}{2} = 1.5$ Km/h.

Q2. If a man's rate with the current is 12 Km/h and the rate of the current is 1 (1/2) Km/h, then his rate against the current is:
(a) 13 Km/h
(b) 7 Km/h
(c) 9 Km/h
(d) 10 Km/h
(e) None of these

S2. Ans.(c)
Sol. Speed of the man downstream = 12 Km/h.
Speed of the Stream $= \frac{3}{2}$ Km/h.
Let, the speed of the man upstream = x Km/h.
We have,
Speed of the stream
$= \frac{1}{2}$ (Downstream Speed – Upstream Speed)
$\Rightarrow \frac{3}{2} = \frac{1}{2}\ (12 - x)$.
$\therefore x = 12 - 3 = 9$ Km/h.

Q3. A boatman can row 2 Km against the stream in 20 minutes and return in 18 minutes. Find the rate of current.
(a) 1/2 Km/h
(b) 2/3 Km/h
(c) 1/3 Km/h
(d) 1/4 Km/h
(e) None of these

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S3. Ans.(c)
Sol. Speed of the boatman upstream
$= \frac{2}{20} \times 60 = 6$ Km/h.
Speed of the boatman downstream
$= \frac{2}{18} \times 60 = \frac{20}{3}$ Km/h.
∴ Rate of the current
$= \frac{1}{2}$ (Downstream Speed – Upstream Speed)
$= \frac{1}{2}\left(\frac{20}{3} - 6\right) = \frac{1}{3}$ Km/h.

Q4. A boat travels 2 Km upstream in a stream flowing at 3 Km/h and, then returns downstream to the starting point in 30 minutes. The speed of the boat in still water is:
(a) 17 Km/h
(b) 9 Km/h
(c) 13 Km/h
(d) 15 Km/h
(e) None of these

S4. Ans.(b)
Sol. Let, the speed of the boat be x Km/h.
We have,
$\frac{2}{x-3} + \frac{2}{x+2} = \frac{1}{2}$
$\Rightarrow 2 = \frac{\frac{1}{2}(x^2-9)}{2x}$, $i.e., 2 = \frac{x^2-9}{4x}$
or, $x^2 - 8x - 9 = 0$
or, $(x-9)(x+1) = 0$
or, $x = -1$ or 9.
Since the speed cannot be negative, we neglect –1.
Therefore, speed of the boat in still water = 9 Km/h.

Q5. Twice the speed downstream is equal to the thrice the speed upstream, the ratio of speed in still water to the speed of the current is:
(a) 1 : 5
(b) 5 : 1
(c) 1 : 3
(d) 2 : 3
(e) None of these

S5. Ans.(b)
Sol. Let, speed in still water = x Km/h.
Speed of current = y Km/h.
Speed downstream = (x + y) Km/h.
Speed upstream = (x – y) Km/h.
∴ $2(x + y) = 3(x - y)$
∴ $x = 5y$
or, $\frac{x}{y} = \frac{5}{1}$ or 5 : 1.

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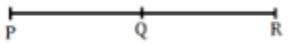
Q6. A boatman goes 2 Km against the current of the stream in 1 h and goes 1 Km along the current in 10 min. How long will he take to go 5 Km in stationary water?
(a) 1 hour
(b) 1 hour 15 minutes
(c) 1 1/2 hours
(d) 40 minutes
(e) None of these

S6. Ans.(b)
Sol. Upstream speed = 2 Km/h
Downstream speed = 6 Km/h
$\therefore$ Speed in still water $= \frac{2+6}{2} = 4$ Km/h
$\therefore$ Time required to go 5 Km in still water
$= \frac{5}{4}$ hours = 1 hours 15 minutes.

Q7. P, Q, R are three towns on a river which flows uniformly. Q is equidistant from P and R. A man rows from P to Q and returns in 10 h. He can row from P to R in 4 h. The ratio of speed of the man in still water to the speed of the current is :
(a) 5 : 3
(b) 3 : 5
(c) 2 : 5
(d) 1 : 2
(e) None of these

S7. Ans.(a)
Sol. Let, the speed of man in still water = x Km/h
Speed of the current = y Km/h
Speed downstream = (x + y) Km/h
Speed upstream = (x – y) Km/h
Let, the river be flowing from P to R and PQ = Q R = α.
Then, PR = 2α



$\therefore \frac{a}{x+y} + \frac{a}{x-y} = 10.$
and, $\frac{2a}{x+y} = 4$
$\therefore \frac{a}{x+y} = 2$
And, $\frac{a}{x-y} = 8$
By dividing both Eqs, we get $\frac{x-y}{x+y} = \frac{1}{4}$
$\therefore 4x - 4y = x + y$
or, 3x = 5y
or, $\frac{x}{y} = \frac{5}{3}$ or 5 : 3.

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Q8. A man can row 30 Km upstream and 44 Km downstream in 10 hours. Also, he can row 40 Km upstream and 55 Km downstream in 13 hours. Find the rate of the current and the speed of the man in still water.
(a) 3 Km/h, 8 Km/h
(b) 3.5 Km/h, 7.5 Km/h
(c) 4.5 Km/h, 6.5 Km/h
(d) 4.5 Km/h, 6.5 Km/h
(e) None of these

S8. Ans.(a)
Sol. Let, upstream speed = x Km/h and downstream speed = y Km/h
Then, $\frac{30}{x}+\frac{44}{y}=10$, and $\frac{40}{x}+\frac{55}{y}=13$
or, $30u + 44v = 10$, and $40u + 55v = 13$,
where $u=\frac{1}{x}$ and $v=\frac{1}{y}$
Solving, we get $u=\frac{1}{5}$ and $v=\frac{1}{11} \therefore x = 5$ *and* $y = 11$
$\therefore$ Rate in still water $=\frac{5+11}{2}=8$ Km/h
Rate of current $=\frac{11-5}{2}=3$ km/h.

Q9. A boat takes 6 hours to travel from place M to N downstream and back from N to M upstream. If the speed of the boat in still water is 4 Km/h, what is the distance between the two places?
(a) 8 Km
(b) 12 Km
(c) 6 Km
(d) Date inadequate
(e) None of these

S9. Ans.(d)
Sol. Total time = 6 hours
Speed of the boat in still water = 4 km/h
Let, the distance between M and N be D kms.
Let, speed of the stream be x Km/h
$D\left[\frac{1}{4+x}+\frac{1}{4-x}\right]=6$
or, $D\left[\frac{4-x+4+x}{4^2-x^2}\right]=6$ *or*, $\frac{8D}{16-x^2}=6$
or, $D=\frac{6}{8}(16-x^2)=\frac{3}{4}(16-x^2)$
Since, the speed of the stream (x) is not given,
the distance D cannot be determined.

Q10. A person can swim at 7 (1/2) Km/h in stagnant water. In a river with 1.5 Km/h current, the person swims to a certain distance and comes back within 50 min. What is the distance between the two points?
(a) 3 Km
(b) 4 Km
(c) 1 Km
(d) 2 Km
(e) None of these

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S10. Ans.(a)

Sol. Speed in still water, S = 7.5 Km/h

Speed of current, Z = 1.5 Km/h

Upstream speed = S – Z = 6 Km/h

Downstream speed = S + Z = 9 Km/h

Let, the distance between the two points be x Km

$\therefore$ Total journey time $= \frac{x}{6} + \frac{x}{9} = \frac{50}{60}$

or, $x\left(\frac{3+2}{18}\right) = \frac{5}{6}$ or $x = \frac{5}{6} \times \frac{18}{5} = 3\ km.$

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