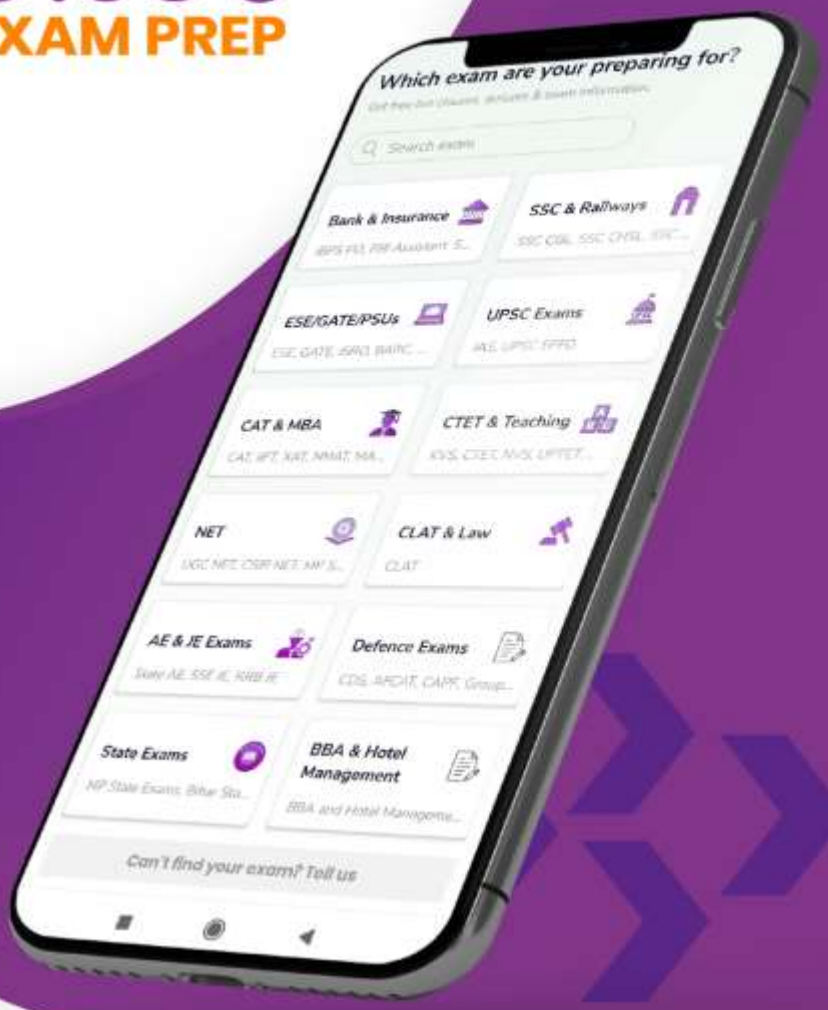
BYJU'S EXAM PREP



Important Boat and Stream Questions PDF (English)

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1. Speed of a duck in the direction of stream is 15 km/h. While the speed of the stream is 1.5 km/h. What is the speed of duck against the stream?
A. 12 km/h
B. 16.5 km/h
C. 13.5 km/h
D. 12.5 km/h

Ans. A
Sol.
Let the speed of duck in still water is D and speed of stream is C. Then according to question,
D + C = 15 km/h and C = 1.5 km/h
D = 15 – C = 15 – 1.5 = 13.5 km/h
Speed of duck against the stream = D – C = 13.5 – 1.5 = 12 km/h

2. The speed of a boat in still water is 10 km/h. If it can travel 26 km downstream and 14 km upstream in the same time then the speed of the stream is how much?
A. 2 km/h
B. 2.5 km/h
C. 3.2 km/h
D. None of these

Ans. D
Sol.
Let the speed of the stream $= x$ km/h
$\because$ Sped of boat in still water $= 10$ km/h
Speed of boat downstream $= (x+10)$ km/h
Speed of boat upstream $= (10-x)$ km/h
$\therefore$ Time taken to travel 26 km downstream $= \frac{26}{10+x}$ h
Time taken to travel 14 km upstream $= \frac{14}{10-x}$ h
By condition, $\frac{26}{10+x} = \frac{14}{10-x}$
$\Rightarrow 26(10-x) = 14(10+x)$

$\Rightarrow 260-26x=140+14x$

$\Rightarrow 40x=120$

$x=3$

Here, speed of stream $=3$ km/h

3. The speed of the current is 5 km/hour. A motorboat goes 10 km upstream and back again to the starting point in 50 minutes. The speed, in km/hour, of the motorboat in still water is

A. 20

B. 26

C. 25

D. 28

Ans. C

Sol.

Let the speed of motorboat in still water be x kmph

$\therefore \frac{10}{x-5}+\frac{10}{x+5}=\frac{50}{60}$

$\Rightarrow 10\left(\frac{x+5+x-5}{(x+5)(x-5)}\right)=\frac{5}{6}$

$\Rightarrow$ 20x × 6 = (x^2 – 25) × 5

$\Rightarrow$ x^2 – 24x – 25 = 0

$\Rightarrow$ x^2 – 25x + x – 25 = 0

$\Rightarrow$ x(x - 25)+1 (x – 25) = 0

$\Rightarrow$ (x - 25)(x + 1) = 0

$\Rightarrow$ x = 25 because x ≠ -1

4. Speed of a boat is 10 km/h. Speed of boat in downstream is 2 times of speed of boat in upsteam. What is speed of current?

A. 5 km/h

B. 3 km/h

C. 2 km/h

D. none of these

Ans. D

Sol.

Let speed of current be x km/h

According to the question

10+x = (10-x)2
10+x = 20-2x
3x=10
x = $3\frac{1}{3} km/h$

5. A man can row 8 km/h in still water. When the river is running at 2 km/h, it takes him 3 h 12 min to row to a place and back. How far is the place?
A. 12 km
B. 15 km
C. 10 km
D. 20 km

Ans. A
Sol.
Speed downstream = (8 + 2) km/h = 10 km/h
Speed upstream = (8 – 2) km/h = 6 km/h
Let the required distance be *x* km. Then,

$$\frac{x}{10}+\frac{x}{6}=\frac{16}{5}$$
$$\Rightarrow \quad 3x+5x=96$$
$$\Rightarrow \quad 8x=96$$
$$\Rightarrow \quad x=12$$

Required distance = 12 km

6. A man can swim 3 km/hr. in still water. If the velocity of the stream is 2 km/hr., the time taken by him to swim to a place 10 km upstream and back is :

A. $9\frac{1}{3} hr.$
B. 10 hr.
C. 12 hr.
D. $8\frac{1}{3} hr.$

Ans. C
Sol.
Speed downstream = (3 + 2) km/hr = 5 km/hr;
Speed upstream = (3 – 2) km/hr = 1 km/hr;
Let the required time be x hrs. Then,

10/5 + 10/1 = x hrs
Therefore x = 12 hours.
Hence Option C is correct.

7. A boat takes quarter times in moving a certain distance downstream than upstream. The ratio of the boat in still water and that of the current is
A. 5 : 3
B. 3 : 2
C. 3 : 1
D. 4 : 5

Ans. A
Sol.
Let Speed of boat in still water = x kmph
Speed of current = y kmph
Rate downstream = (x + y) kmph
Rate upstream = (x – y) kmph
Distance = speed × time

$\therefore (x-y) \times 4t = (x+y) \times t$

$4x - 4y = x + y$

$3x = 5y$

$\frac{x}{y} = \frac{5}{3} = 5:3$

Option A is the correct response.

8. A swimmer swims from a point A against a current for 5 minutes and then swims backwards in favour of the current for next 5 minutes and comes to the point B. If AB = 100 meters, the speed of the current (in km per hour) is :
A. 0.4
B. 0.2
C. 1
D. 0.6

Ans. D
Sol.

The distance covered upstream = AC = d
AB = 100

BC = 100 + d
Rate upstream
= (x - y) m/minute
Rate downstream
= (x + y) m/minute

$\therefore \quad \frac{d}{x-y}=5$

$\Rightarrow$ d = 5 (x – y) …. (i)
Again,

$\frac{100+d}{x+y}=5$

$\Rightarrow \quad \frac{100+5(x-y)}{x+y}=5$

$\Rightarrow$ 100 + 5x – 5y = 5x + 5y
$\Rightarrow$ 10y = 100
$\Rightarrow$ y = 10 m/minute

$=\frac{10}{1000}\times 60 \text{ kpmh}$

$=0.6 \text{ kmph}$

9. A boat goes 24 km upstream and 28 km downstream in 6 hours. It goes 30 km upstream and 21 km downstream in 6 hours and 30 minutes. The speed of the boat in still water is
A. 8km/hr
B. 9 km/hr
C. 12km/hr
D. 10km/hr

Ans. D
Sol.
Let the speed of boat in still water and the speed of current be x km/hr and y km/hr respectively.
∴Rate upstream = (x – y) km/hr
Rate downstream = (x + y) km/hr
Case I:
24/x-y + 28/x+y = 6
24x+24y +28x -28y= 6(x-y)(x+y)
52x-4y=,6(x^2 - y^2)

Case II:

$$\frac{30}{x-y}+\frac{21}{x+y}=\frac{13}{2}$$

$$\Rightarrow \frac{30(x+y)+21(x-y)}{(x+y)(x-y)}=\frac{13}{2}$$

$$\Rightarrow 52x+9y=\frac{13}{2}(x^2-y^2) \ldots\ldots(ii)$$

On dividing equation (i) by (ii), we have

$$\frac{26x-2y}{51x+9y}=\frac{\frac{3}{13}}{2}=\frac{6}{13}$$

$$\Rightarrow 338x-26y=306x+54y$$

$$\Rightarrow 338x-306x=26y+54y$$

$$\Rightarrow 32x=80y \Leftrightarrow 2x=5y$$

$$\Rightarrow y=\frac{2x}{5} \ldots.(iii)$$

on putting value of y in equation 1
we get x= 10 km/hr
and y= 4 km/hr

10. A boat goes downstream in one third the time it takes to go upstream. Then, the ratio between the speed of boat in still water and that of the stream is
A. 3 : 1
B. 1 : 3
C. 1 : 2
D. 2 : 1

Ans. D
Sol.
let the speed of boat in still water is X and speed of stream is Y.
Speed of boat in downstream = X+ Y
Speed of boat in upstream = X-Y
if we suppose the distance covered by boat is P
then time taken for downstream = P/X+Y
time taken for upstream = P/X-Y
As it is given in question, boat goes downstream in 1/3 rd of time it goes upstream.
(P/X+Y) = 1/3 (P/X-Y)
3(X-Y) = (X+Y)
2X = 4Y
X= 2Y
X:Y = 2:1
hence, option D is the correct answer.

11. A man can swim at the rate of 4 km/hr in still water. If the speed of the water is 2 km/hr, then the time taken by him to swim 10 km upstream is

A. $2\frac{1}{2}$ hrs

B. $3\frac{1}{2}$ hrs

C. 5 hrs

D. 4 hrs

Ans. C

Sol.

Speed of man in upstream = 4-2 = 2km/hr

Time taken=10/2= 5 hrs

12. A man rows down a river 21 km in 3 hours with the stream and returns in 3.5 hours. The rate at which he rows in still water is:

A. 6.5 km/hr.

B. 3.5 km/hr.

C. 5.5 km/hr.

D. 4.5 km/hr.

Ans. A

Sol.

Let speed of a man in still water = x kmph and speed of current = y kmph.

$$\therefore x + y = \frac{21}{3} = 7\ kmph$$

$$(x - y) = \frac{21}{\frac{7}{2}} = 6\ kmph$$

On adding,

$$2x = 13\ kmph$$

$$x = \frac{13}{2} = 6.5\ kmph$$

Option A is correct.

13. A boat covers 18km downstream and 12km upstream in 3 hrs whereas it covers 24km downstream and 36km upstream in 6.5 hrs. Find the speed of boat.
A. 12.5km/h
B. 20km/h
C. 10km/h
D. 7.5km/h

Ans. C
Sol.
Instead of forming large equations, simply equate what is given in the question:

Downstream	Upstream	
18km × 3	12km ×3	3hr ×3
- 24km	- 36km	-6.5hr

= 30Km downstream in 2.5hr

Downstream speed = 12km/hr

14. A boat goes 12 km downstream and comes back to the starting point in 3 hours. If the speed of the current is 3 km/hr, then the speed (in km/hr) of the boat in still water is
A. 12
B. 9
C. 8
D. 6

Ans. B
Sol.
Tricky Approach
If the speed of boat in still water be x kmph, then

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

$$\Rightarrow 12\left(\frac{x-3+x+3}{(x+3)(x-3)}\right)=3$$

$\Rightarrow$ $4 \times 2x = x^2 - 9$
$\Rightarrow$ $x^2 - 8x - 9 = 0$
$\Rightarrow$ $x^2 - 9x + x - 9 = 0$
$\Rightarrow$ $x(x - 9) + 1(x - 9) = 0$
$\Rightarrow$ $(x - 9)(x + 1) = 0$
$\Rightarrow$ $x = 9$ because $x \neq -1$

15. A man takes 3 times as long to cover a distance against the stream as to cover the same distance downstream. What is the ratio of speed of stream to the speed of the man?
A. 0.5
B. 2
C. 0.33
D. 3

Ans. A
Sol.
Let the speed of the stream be x km/h
Let the speed of the man be y km/h
Let the distance being covered be d km
Time taken to cover d km upstream = d/(y – x)
Time taken to cover d km downstream = d/(y + x)
It is given that time taken to go upstream is three times the time taken to go downstream.
So, d/(y – x) = 3d/(y + x)
y + x = 3y – 3x
x/y = 2/4 = 0.5

16. A person can row a distance of 4 km upstream in one hour 20 minutes and can row back to the starting point in just 24 minutes. How much time (in hours) will he take to row 13 km in still water?
A. $2\frac{1}{2}$
B. $3\frac{1}{2}$
C. 2
D. 3

Ans. C
Sol.
Speed of boat upstream = 4/(4/3) = 3 km/hr
Speed of boat downstream = 4/(2/5) = 10 km/hr
Speed of boat in still water = (3+10)/2 = 6.5km/hr
Time taken by boat to travel 13 km in still water = 13/(6.5) = 2hours

17. A boatman goes 6 km upstream and back again to the starting point in 2 hrs. If the speed of water 4 km/h, find the speed of boat.
A. 8 km/h
B. 6.5 km/h
C. 12 km/h
D. 24 km/h

Ans. A
Sol.
Let the speed of the boat is B. Then,

$$\frac{6}{B+4}+\frac{6}{B-4}=2$$

$$\frac{3(B-4+B+4)}{B^2-16}=1$$

$$B^2-6B-16=0$$

B = 8 km/h

18. If the speed of a boat in still water is 26km/hr. and the speed of current is 8km/hr., then time taken by the boat to travel 136km with the current is –
A. 8 hours
B. 5 hours
C. 4 hours
D. 3 hours

Ans. C
Sol.
Downstream rate of the boat = 26 + 8 = 34 km/hr.

$$Required\ time=\frac{136}{34}=4\ hours$$

Option C is correct.

19. A man can row 30 km upstream and 44 km downstream in 10 hrs. Also he can row 40km upstream and 55 km downstream in 13 hrs. Find speed of man in still water?
A. 8km/hr
B. 9km/hr
C. 10km/hr
D. 7km/hr

Ans. A

Sol.

Concept **: If a man rows d_1 km upstream and e_1 km downstream in t_1 hrs . Also he can row d_2 km upstream and e_2 km downstream in t_2 hrs .**

Then the upstream speed of man = $\frac{d1e2-d2e1}{e2t1-e1t2}$ km/hr

Downstream speed of man = $\frac{d1e2-d2e1}{d1t2-d2t1}$ **km/hr**

Here Upstream speed of man will be :

$\frac{30\times55-40\times44}{55\times10-44\times13}=-\frac{110}{-22}=5km/hr$

Downstream speed of man :

$\frac{(30\times55-40\times44)}{30\times13-40\times10}=11\,km/hr$

Speed of man : = $\frac{5+11}{2}=8km/hr$

And speed of stream : = $\frac{11-5}{2}=3\,km/hr$

20. Speed of a boat in still water is 55 km/h. If the boat travels 90 km along the stream in 1 hour 15 minutes, then the time taken by it to cover the same distance against the flow of the stream will be:

A. 1 hour 55 minutes

B. 2 hours 12 minutes

C. 2 hours 22 minutes

D. 2 hours 36 minutes

Ans. C

Sol.

Let the speed of the stream b x km/h

Time taken by boat to cover 90 km along the stream = 1.25 hours = 90/(55 + x)

x = 17 km/h

Time taken to travel 90 km against the flow = 90/(55 – 17) = 2.36 hours or 2 hours 22 minutes (approximately)

Since 0.36 hour = 0.36×60 = 21.6 mins

21. A man can row at 5 km/h in still water. If the river is flowing at 1 km/h, it takes him 75 min to row to a place and back. How far is the place?

A. 2.5km

B. 3km

C. 4 km

D. 5 km

Ans. B
Sol.
Speed downstream = (5+1) km/h = 6km/h
Speed upstream = (5-1) km/h = 4km/h
time given = 75 minutes = 5/4 hours
Let the required distance be x km. Then,
(x/6)+(x/4)= 5/4
$\Rightarrow$ 5x = 15
x = 3 km
Required distance = 3 km

22. A boat goes 12 km downstream and comes back to the starting point in 3 hours. If the speed of the current is 3 km/hr. then the speed (in km/hr) of the boat in still water is
A. 12
B. 9
C. 8
D. 6

Ans. B
Sol.
Let the speed of boat in still water be x km/hr
Therefore;

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

$$12\left(\frac{x-3+x+3}{(x+3)(x-3)}\right)=3$$

$$4\times 2x=x^2-9$$

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

Solving the above equation ; we get;
x = 9 km/hr

23. The speed of a boat in still water is 13 km/hr and the speed of stream is 6 km/hr. If takes 6 hours more to sail in upstream than in the downstream. Find the distance travelled.
A. 68.5 km
B. 66.5 km
C. 65 km
D. 67.5 km

Ans. B

Sol.

Here, Upstream speed = 13 – 6 = 7 km/hr

And Downstream speed = 13 + 6 = 19 km/hr

Let the distance be D,

Then, as per the question,

Time (Upstream) – Time (Downstream) = 6 hours

$\Rightarrow \frac{D}{7} - \frac{D}{19} = 6$

$\Rightarrow \frac{19D - 7D}{133} = 6$

$\Rightarrow 12D = 133 \times 6$

$\Rightarrow D = \frac{133 \times 6}{12}$

= 66.5 km

24. A person can cover a distance of 60 km in upstream in 5 hrs. Speed of boat in still water is 7 times of that of current. What is total time required for boat to cover 20 km in up stream and come back on starting point?

A. 2 hrs 45 min

B. 4 hrs 30 min

C. 2 hrs 35 min

D. 2 hrs 55 min

Ans. D

Sol.

Let speed of boat in still water be 7x and speed current be x km/h

According to the question,

⇒ 7x - x = 60/5 ⇒ 6x = 12 ⇒ x = 2 km/h

Speed in downstream = 7x2 +2 = 16 km/h

Required time = $\frac{20}{16} + \frac{20}{12} = \frac{60+80}{48} = \frac{140}{48} = \frac{35}{12} = 2hrs\ \ 55\,\text{min}$

25.A boat moves down stream at the rate of 8km/hr. and upstream at 4Km/hr. The speed of the boat in still waters is:

A. 4.5 km/hr.

B. 5 km/hr.

C. 6 km/hr.

D. 6.4 km/hr.

Ans. C
Sol.
Let speed of boat be x km/hr and current be y km/hr
A boat moves down stream at the rate of 8 km/hr. and upstream at 4 Km/hr.
Therefore,
x + y = 8-------(1)
x – y = 4 -------(2)
By adding both equations
2x = 12
x = 6 km/hr

26. A man rows 40 km upstream in 8 hours and a distance of 36 km downstream in 6 hour Then speed of stream is
A. 0.5 km/hr
B. 1.5 km/hr
C. 1 km/hr
D. 3 km/hr

Ans. A
Sol.
Let the speed of boat in still water = X km/hr
Speed of water = Y km/hr
Formula: speed = distance / time
Relative speed of boat in upstream = X – Y = 40/8 = 5 km/hr …… (1)
Relative speed of boat in downstream = X+ Y = 36/6 = 6 km/hr …… (2)
After solving these two equations :
X = 5.5 km/hr and Y = 0.5 km/hr
Hence speed of stream = 0.5 km/ hr

27. A motorboat goes 24 km in 2 hours along the stream and 10 km in 1 hour against the stream. The speed of the motorboat in still water in kilometre per hour is:
A. 12
B. 10
C. 11
D. 14

Ans. C
Sol.
Let speed of motorboat = x km/hr
Let speed of stream = y km/hr

Upstream speed of motorboat
(x−y) = 10/1 = 10 km/hr …… (1)
Downstream speed of motorboat
= (x+y) = 24/2 = 12 km/hr …… (2)
Adding equation (1) and (2):
2x = 22
x = 11 km/hr
Hence, Speed of Motorboat = x = 11 km/hr

28. A sailor goes 12 km downstream in 48 minutes and returns in 1 hour 20 minutes. The speed of the sailor in still water is:
A. 12 km/hr
B. 12.5 km/hr
C. 13 km/hr
D. 15 km/hr

Ans. A
Sol.
Let the speed of sailor in still water be x kmph.
Speed of current = y kmph

$$\therefore \quad x+y=\frac{12}{\frac{48}{60}}$$

$$=\frac{12}{48}\times 60=15 \text{ kmph}$$

and, $x-y=\frac{12}{\frac{80}{60}}$

$$=\frac{12}{80}\times 60=9 \text{ kmph}$$

Adding these equations,

$$2x=15+9=24$$

$$x=\frac{24}{2}=12 \text{ kmph}$$

29. A boy can swim in still water at a speed of 10 km/hr. If the speed of the current would have been 5 kmph then the boy could swim 60 km _____.
A. upstream in 4 hours
B. downstream in 12 hours
C. upstream in 6 hours
D. downstream in 4 hours

Ans. D
Sol.
Speed downstream = 10+5 = 15 kmph
Speed Upstream = 10 – 5 = 5 kmph
Time taken to swim 60km downstream = 60/15 = 4 hours

30. A boat covered a distance of 15 km upstream in 5 hours and a distance of 42 km downstream in 6 hours. The speed of the stream in km/h is:
A. 2
B. 3
C. 1.5
D. 2.5

Ans. A
Sol.
Speed of boat upstream = 15/5 = 3 km/hr
Speed of boat downstream = 42/6 = 7 km/hr
Speed of stream = (speed of boat downstream – speed of boat upstream)/2 = (7 – 3)/2 = 2 km/hr

31. A man can row 30 km downstream and return to the starting point in 8 hours. If the speed of the boat in still water is four times the speed of the current, then the of the speed current is
A. 1 km/hour
B. 2 km/hour
C. 4 km/hour
D. 3 km/hour

Ans. B
Sol.
If the speed of stream = x kmph,
then speed of boat in still water = 4 x kmph

Rate downstream = $4x + x = 5x$ kmph

Rate upstream = $4x - x = 3x$ kmph

$\therefore \frac{30}{3x} + \frac{30}{5x} = 8$

$\frac{10}{x} + \frac{6}{x} = 8$

$\frac{16}{x} = 8$

$x = \frac{16}{8} = 2$ kmph

32. Ravi can row a boat in still water at the speed of 14 km/h If a river is flowing at the speed of 2 km/h and Ravi takes 3 hours to cover a certain distance upstream, then how much time will he take to cover the same distance downstream?

A. 2 h

B. 2 h 15 m

C. 2 h 20 m

D. 2 h 30 m

Ans. B

Sol.

Given:

Speed of boat in still water = 14 km/h

Speed of river = 2 km/h

Speed of a boat in upstream = 14- 2 = 12 km/h

Distance = speed × time

Distance = 12 × 3 = 36 km

Speed of a boat in downstream = 14 + 2 = 16 km/h

Therefore, required time taken by boat in downstream = $\frac{36}{16} = \frac{9}{4} = 2\frac{1}{4}$ hours = 2 h 15 min.

33. The speed of a boat in still water is 10km/hr. It covers upstream a distance of 45 km in 6 hours. The speed (in km/hr) of the stream is

A. 2.5

B. 3

C. 3.5

D. 4

Ans. A

Sol.

$Let\ the\ speed\ of\ the\ stream\ be\ x km/hr$

$$\frac{45}{6} = 10 - x$$

$$60 - 6x = 45$$

$$x = \frac{15}{6} = 2.5 km/hr$$

34. A boat travels 24 km upstream in 6 hours and 20 km downstream in 4 hours Then the speed of boat in still water and the speed of current water are respectively

A. 4 kmph and 3 kmph

B. 4.5 kmph and 0.5 kmph

C. 4 kmph and 2 kmph

D. 5 kmph and 2 kmph

Ans. B

Sol.

Let the speed of boat in still water = X kmph

Speed of water = Y kmph

Formula: speed = distance / time

Relative speed of boat in upstream = X – Y = 24/6 = 4 kmph …… (1)

Relative speed of boat in downstream = X+ Y = 20/4 = 5 kmph …… (2)

After solving these two equations :

X = 4.5 kmph and Y = 0.5 kmph

35. A man swims downstream a distance of 15 km in 1 hour. If the speed of the current is 5 km/hour, the time taken by the man to swim the same distance upstream is

A. 1 hour 30 minutes

B. 45 minutes

C. 2 hours 30 minutes

D. 3 hours

Ans. D

Sol.

Let the speed of a man in the still water is x km/hr

Therefore, (x + 5) = 15

x = 10 km/hr

The speed of a man against current = (10 – 5) = 5 km/hr

The required time to swim of the 15 km distance against current $=\frac{15}{5}$

= 3 hours

Hence, option D is correct.

36. The speed of a boat in still water in 6 km/h. Time taken by the boat to cover a certain distance upstream is 3 hours more than the time taken to cover the same distance downstream. If the speed of the stream is 2 km/h, then what is the total distance, upstream and downstream, covered by the boat?

A. 72 km

B. 24 km

C. 48 km

D. 36 km

Ans. C

Sol.

Let, the distance covered (upstream) = distance covered (downstream) = x km

Time = Distance/Speed

According to the question,

⇒ x/(6-2) - x/(6+2) = 3

⇒ x = 24 km.

∴ Required distance = 2 × 24 = 48 km

37. A boat covers 64 km upstream in 8 hours and 120 km downstream in 12 hours. What is the speed (in m/s) of the boat in still water?

A. 2.5

B. 2

C. 3.5

D. 3

Ans. A

Sol.

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

Speed of current = y km/h

Speed of boat during upstream = (x-y) km/h

Speed of boat during downstream = (x+y) km/h

boat covers 64 km upstream in 8 hours

Speed of boat during upstream = $\frac{64}{8} = 8\ km/h$

Speed of boat during downstream = $\frac{120}{12} = 10 \text{ km/h}$

⇒ x – y = 8 ……(1)
⇒ x +y = 10 ……(2)
Adding (1) and (2)
⇒ 2x = 18
⇒ x = 9

Speed of the boat in still water = 9 km/h = $9 \times \frac{5}{18} = 2.5 \text{ m/sec}$

38. If speed of stream is 20% of the speed of boat in still water and it covers 120 km upstream in 150 minutes, then what is the downstream speed of the boat?
A. 75 km/h
B. 72 km/h
C. 80 km/h
D. 64 km/h

Ans. B
Sol.
Given that speed of stream is 20% of the speed of boat in still water

⇒ $20\% = \frac{1}{5}$

Let speed of boat in still water (x)= 5 unit
Speed of stream(y) = 1
Speed of boat during downstream = (x +y) = (5+1) = 6 unit
Speed of boat during upstream =(x-y) = (5 -1) = 4 unit
Also, Boat covers 120 km upstream in 150 minutes.

Speed of boat during upstream = $\frac{\text{Distance}}{\text{Time}} = \frac{120 \text{ km}}{2\frac{1}{2} \text{ hr}} = \frac{120}{\frac{5}{2}} = 48 \text{ km/hr}$

⇒ 4 unit = 48 km/h
⇒ 1 unit = 12 km/h
⇒ 6 unit = 72 km/h
Hence, Speed of boat during downstream = 72 km/h

39. Downstream speed of a boat is 14 km/h. Upstream speed of the boat is 10 km/h. In how much time, can it cover 72 km in still water?
A. 8 hours
B. 6 hours
C. 12 hours
D. 4 hours

Ans. B

Sol.

Let speed of boat in still water = x km/hr

Speed of current = y km/hr

Downstream speed of boat (x + y) =14 km/h .....(1)

Upstream speed of boat (x - y) =10 km/h .....(2)

Adding (1) and (2)

$\Rightarrow 2x = 24$

$\Rightarrow x = 12$ km/hr

Hence, Speed of boat in still water = 12 km/hr

Time taken by boat to cover 72 km in still water = $\frac{72}{12} = 6$ hr

40. The speed of a boat in the still water 30 km/h. If the boat covers 60 km downstream in 1 hour 30 minutes, then what is the time taken by the boat to cover 60 km upstream?

A. 3 hours

B. 5 hours

C. 4 hours

D. 1 hour

Ans. A

Sol.

Let Speed of a boat in the still water = x km/h

Speed of current = y km/h

Speed of boat during Upstream =(x-y) km/h

Speed of boat during Downstream = (x+y) km/h

From questions:

x = 30 km/h

Speed of boat during Downstream = $\frac{60}{\frac{3}{2}}$ km/h = 40 km/h

$\Rightarrow x + y = 40$

$\Rightarrow 30 + y = 40$

$\Rightarrow y = 10$

Speed of current = 10 km/h

Speed of boat during Upstream =(x-y) km/h = (30 – 10) = 20 km/h

Time taken by the boat to cover 60 km upstream = $\frac{60}{20} = 3$ hour

41. If a boat goes 100 km down stream in 10 hours and 75 km upstream in 15 hours, then the speed of the stream is
A. 2 km/hour
B. 2.5 km/hour
C. 3 km/hour
D. 3.5 km/hour

Ans. B
Sol.
Rate downstream = 100/10 = 10 kmph
Rate upstream = 75/15 = 5 kmph

$\therefore$ Speed of current = (speed in downstream - speed in upstream)/2 = $\frac{1}{2}(10-5)$ kmph

$=\frac{1}{2}\times 5=2.5$ kmph

42. A person can row $7\frac{1}{2}$ km an hour in still water and he finds that it takes him twice as long to row up as to row down the river. The speed of the stream is:
A. 2 km/hr
B. 3 km/hr
C. $2\frac{1}{2}km/hr$
D. $3\frac{1}{2}km/hr$

Ans. C
Sol.
Short Trick:
Ratio of time along and against the current = 1:2
Ratio of speed = 2:1
$\frac{7.5+v}{7.5-v}=\frac{2}{1}$
using componendo and dividendo
$\frac{7.5}{v}=\frac{2+1}{2-1}=\frac{3}{1}$
v=2.5

Basic Method:

The speed of a person man of rowing in still water = $7\frac{1}{2} km/hr.$

Let speed of stream = x Km/ Hr

The speed of person down the river = speed of rowing + speed of stream = $(7\frac{1}{2}+x) km/hr.$

The speed of person up in the river = speed of rowing - speed of stream = $(7\frac{1}{2}-x) km/hr.$

Given: Time to row against stream = 2 Time to row along stream

$$2\frac{dis\tan ce}{\left(\frac{15}{2}+x\right)}=\frac{dis\tan ce}{\left(\frac{15}{2}-x\right)}$$

$$\Rightarrow\left(\frac{15}{2}+x\right)=2\left(\frac{15}{2}-x\right)$$

$$\Rightarrow 3x=\frac{15}{2}\Rightarrow x=\frac{5}{2}=2\frac{1}{2} km/hr.$$

43. A boat can go 20 km downstream and 30 km up steam in 2 hours 20 minutes. Also, it can go 10 km downstream and 8 km upstream in 49 minutes. What is the speed of boat downstream in km/h?

A. 18

B. 20

C. 16

D. 24

Ans. D

Sol.

Let the speed of boat downstream=D km/h,

And speed of boat upstream= U km/h,

$Distance = Speed \times Time$

$\frac{20}{D}+\frac{30}{U}=\frac{7}{3}$ ..... (1)

$\frac{10}{D}+\frac{8}{U}=\frac{49}{60}$ ..... (2)

On multiplying equation (2) by 2 and then subtracting it from equation (1), we have

$\frac{14}{u}=\frac{21}{30}$

$u = 20\ km/hr$

Now putting u=2o in equation (1)

We have,

Downstream speed D = 24 km/hr.

44. The speed of a boat in still water is 6 km/h. If the time taken to travel a distance opposite the stream is four times the boat takes travelling the same distance along the stream, then find the speed of stream:

A. 2.5 km/h

B. 5 km/h

C. 4.2 km/h

D. 3.6 km/h

Ans. D

Sol.

Let the speed of boat in still water $= u$

Speed of stream $= v$

A.T.Q.

$$\frac{u+v}{u-v} = \frac{4}{1}$$

Apply C & D rule –

$$\frac{u}{v} = \frac{5}{3}$$

$$\frac{6}{v} = \frac{5}{3}$$

$$v = \frac{18}{5} = 3.6\ \text{km/h}$$

45. A train of length 600 metre crosses a platform of length 1000 metre in 80 seconds. What is the speed (in m/s) of the train?

A. 20

B. 72

C. 16

D. 36

Ans. A
Sol.
Length of train =600m
Length of platform =1000
Time taken =80 sec
Total distance covered =1000+600=1600m
So time taken=1600/80 = 20m/s

46. A boat can row 35 km upstream in 7 hours and the same distance downstream in 5 hours. What is the speed (in km/hr) of the boat in still water?
A. 5
B. 7
C. 9
D. 6

Ans. D
Sol.
Upstream speed =35/7 =5km/hr
Downstream speed =35/5=7km/hr
Speed of boat in still water = $\frac{7+5}{2} = 6km/hr$

47. A boat can go 30 km downstream and 24 km upstream in 2 hours 27 minutes. Also, it can go 20 km downstream and 8 km upstream in 74 minutes. What is the speed of the boat in still water in km/h?
A. 18
B. 20
C. 24
D. 22

Ans. D
Sol.
Let speed of boat in still water is x km/h and speed of stream is y km/h. Then speed of boat in downstream, x+y and in upstream, x-y .

$Time = \frac{Distance}{Speed}$

$2\ hours\ and\ 27\ mins = \frac{49}{20}\ hours\ 74mins = \frac{74}{60}\ Hours$

$\frac{30}{x+y} + \frac{24}{x-y} = \frac{49}{20}$ .....(1

$\frac{20}{x+y} + \frac{8}{x-y} = \frac{74}{60}$ .....(2

Solve equations 1 and 2 and calculate the value of x and y.

$x = 22km/h \ and \ y = 20km/h$

48. A boat can go 10 km downstream and 8 km upstream in 49 minutes. Also it can go 12 km downstream and 4 km upstream in 42 minutes. What is the speed of stream in km/h?

A. 2

B. 1

C. 1.5

D. 2.5

Ans. A

Sol.

Let the speed of boat downstream=D km/h,

And speed of boat upstream= U km/h,

$Distance = Speed \times Time$

$\frac{10}{D} + \frac{8}{U} = \frac{49}{60}$..... (1)

$\frac{12}{D} + \frac{4}{U} = \frac{42}{60}$..... (2)

On multiplying equation (2) by 2 and then subtracting it from equation (1)

$\frac{14}{D} = \frac{35}{60}$

$D = 24$

Now putting D=24 in equation (2)

$\frac{12}{24} + \frac{4}{U} = \frac{42}{60}$

$U = 20$

Speed of stream,

$= \frac{D-U}{2} = \frac{24-20}{2} = 2$ km/hr

49. Speed of a boat in downstream is 20% more than its speed in upstream. If speed of boat is 11km/h then what is speed of current?

A. 4 km/h

B. 3 km/h

C. 2 km/h

D. 1 km/h

Ans. D
Sol.
Let speed of current be x
According to the question
$(11-x)\frac{120}{100}=11+x$
66-6x=55+5x
11x = 11
X = 1km/h

50. A boat can go 30 km downstream and 24 km upstream in 2 hours 27 minutes. Also, it can go 10 km downstream and 4 km upstream in 37 minutes. What is the speed of the boat upstream (in km/h)?
A. 24
B. 18
C. 22
D. 20

Ans. D
Sol.
time taken by boat to travel 30km downstream and 24 km upstream = 2 hours 27 minutes….(i)
time taken by boat to travel 10km downstream and 4 km upstream = 37 minutes….(ii)
if we multiply (ii) the above by 3
time taken by boat to travel 30km downstream and 12 km upstream = 1 hour 51 minutes…(iii)
Subtracting (i) from (iii); we get;
therefore time taken by boat to travel 12km upstream = 2 hours 27 minutes – 1 hour 51 minutes = 36minutes
speed of boat upstream = 12/36 x 60 = 20km/hr

51. A boat goes 2 km upstream and 3 km downstream in 20 minutes. It goes 7 km upstream and 2 km downstream in 53 minutes. What is speed (in km/h) of the boat in still water?
A. 75/7
B. 120/7
C. 135/7
D. 150/7

Ans. C

Sol.

Let the speed of boat and still water be 'x km/hr' & 'y km/hr' respectively.

Upstream speed (U) = x - y and Downstream speed (D) = x + y

Therefore,

$$\frac{2}{U}+\frac{3}{D}=\frac{20}{60} \quad .....Eq(1)$$

$$\frac{7}{U}+\frac{2}{D}=\frac{53}{60} \quad .....Eq(2)$$

Multiplying eq(1) by 2 and eq(2) by 3, we get,

$$\frac{4}{U}+\frac{6}{D}=\frac{40}{60} \quad ....eq(3)$$

$$\frac{21}{U}+\frac{6}{D}=\frac{159}{60} \quad ....eq(4)$$

Now, subtracting eq(3) from eq(4)

17/U = 119/60

U = 60/7

Substituting the value of U in Eq(1).

7/30 + 3/D = 1/3

D = 30

So,

x - y = 60/7

x + y = 30

2x = 270/7

x = 135/7

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