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# NEET MOTION IN A PLANE — RELATIVE VELOCITY IN TWO DIMENSIONS (RAIN–MAN, RIVER–BOAT) — PYQS

**Max. Marks:** 20 **Questions:** 5

## Section A (MCQ) — 5 questions

**Q.1** The speed of a swimmer in still water is 20 m/s. The speed of river water is 10 m/s and is flowing due east. If he is standing on the south bank and wishes to cross the river along the shortest path, the angle at which he should make his strokes w.r.t. north is given by : [NEET (UG) 2019]

(1) 0° (2) 60° (3) 45° west (4) 30° west

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**Q.2** Two particles A and B, move with constant velocities $\vec{v_1}$ and $\vec{v_2}$. At the initial moment their position vectors are $\vec{r_1}$ and $\vec{r_2}$ respectively. The condition for particles A and B for their collision is [AIPMT 2015]

(1) $\vec{r_1} \times \vec{v_1} = \vec{r_2} \times \vec{v_2}$ (2) $\vec{r_1} - \vec{r_2} = \vec{v_1} - \vec{v_2}$

(3) $\frac{\vec{r_1} - \vec{r_2}}{|\vec{r_1} - \vec{r_2}|} = \frac{\vec{v_2} - \vec{v_1}}{|\vec{v_2} - \vec{v_1}|}$ (4) $\vec{r_1} \cdot \vec{v_1} = \vec{r_2} \cdot \vec{v_2}$

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**Q.3** A ship A is moving Westwards with a speed of 10 km $h^{-1}$ and a ship B 100 km South of A, is moving Northwards with a speed of 10 km $h^{-1}$. The time after which the distance between them becomes shortest, is [AIPMT 2015 (Cancelled)]

(1) $5\sqrt{2}$ h (2) $10\sqrt{2}$ h (3) 0 h (4) 5 h

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**Q.4** Two boys are standing at the ends A and B of a ground where AB = a. The boy at B starts running in a direction perpendicular to AB with velocity $v_1$. The boy at A starts running simultaneously with velocity v and catches the other in a time t, where t is [AIPMT 2005]

(1) $\frac{a}{\sqrt{v^2 + v_1^2}}$ (2) $\frac{a}{v + v_1}$

(3) $\frac{a}{v - v_1}$ (4) $\sqrt{\frac{a^2}{v^2 - v_1^2}}$

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**Q.5** The width of river is 1 km. The velocity of boat is 5 km/hr. The boat covered the width of river along the shortest path in 15 min. Then the velocity of river stream is [AIPMT 2000]

(1) 3 km/hr (2) 4 km/hr

(3) $\sqrt{29}$ km/hr (4) $\sqrt{41}$ km/hr

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## ANSWER KEY

| Ques. | 1 | 2 | 3 | 4 | 5 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Ans. | 4 | 3 | 4 | 4 | 1 | | | | | | |