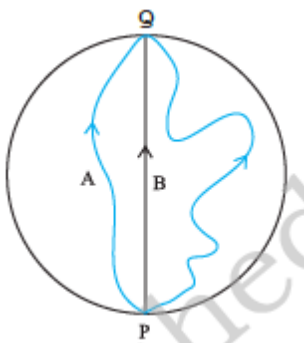
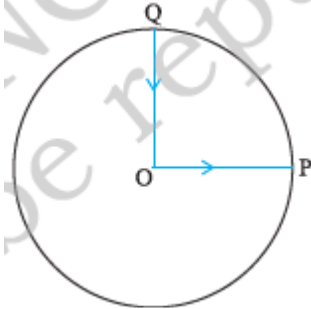


Class XI Subject-physics
Chapter–4: Motion in a Plane Work Sheet-1

1. Rain is falling vertically with a speed of 35 m/s. Winds starts blowing after sometime with a speed of 12 m s.⁻¹ in east to west direction. In which direction should a boy waiting at a bus stop hold his umbrella ? [2]
2. A motorboat is racing towards north at 25 km/h and the water current in that region is 10 km/h in the direction of 60° east of south. Find the resultant velocity of the boat [2]
3. State, for each of the following physical quantities, if it is a scalar or a vector volume, mass, speed, acceleration, density, number of moles, velocity, angular frequency, displacement, angular velocity. [3]
4. Pick out the two scalar quantities in the following list : force, angular momentum, work, current, linear momentum, electric field, average velocity, magnetic moment, relative velocity. [2]
5. Pick out the only vector quantity in the following list : Temperature, pressure, impulse, time, power, total path length, energy, gravitational potential, coefficient of friction, charge. [1]
6. Read each statement below carefully and state with reasons, if it is true or false : (a) The magnitude of a vector is always a scalar, (b) each component of a vector is always a scalar, (c) the total path length is always equal to the magnitude of the displacement vector of a particle. (d) the average speed of a particle (defined as total path length divided by the time taken to cover the path) is either greater or equal to the magnitude of average velocity of the particle over the same interval of time, (e) Three vectors not lying in a plane can never add up to give a null vector. [5]
- 7 Three girls skating on a circular ice ground of radius 200 m start from a point P on the edge of the ground and reach a point Q diametrically opposite to P following different paths as shown in Fig. . What is the magnitude of the displacement vector for each ? For which girl is this equal to the actual length of path skate ? [2]



8. A cyclist starts from the centre O of a circular park of radius 1 km, reaches the edge P of the park, then cycles along the circumference, and returns to the centre along QO as shown in Fig. . If the round trip takes 10 min, what is the (a) net displacement, (b) average velocity, and (c) average speed of the cyclist? [3]



9. On an open ground, a motorist follows a track that turns to his left by an angle of 60° after every 500 m. Starting from a given turn, specify the displacement of the motorist at the third, sixth and eighth turn. Compare the magnitude of the displacement with the total path length covered by the motorist in each case. [3]

10. A passenger arriving in a new town wishes to go from the station to a hotel located 10 km away on a straight road from the station. A dishonest cabman takes him along a circuitous path 23 km long and reaches the hotel in 28 min. What is (a) the average speed of the taxi, (b) the magnitude of average velocity? Are the two equal? [2]

11. Rain is falling vertically with a speed of 30 m/s. A woman rides a bicycle with a speed of 10 m/s in the north to south direction. What is the direction in which she should hold her umbrella? [2]

12. A man can swim with a speed of 4.0 km/h in still water. How long does he take to cross a river 1.0 km wide if the river flows steadily at 3.0 km/h and he makes his strokes normal to the river current? How far down the river does he go when he reaches the other bank? [3]

13. In a harbour, wind is blowing at the speed of 72 km/h and the flag on the mast of a boat anchored in the harbor flutters along the N-E direction. If the boat starts moving at a speed of 51 km/h to the north, what is the direction of the flag on the mast of the boat? [3]

14. If $\mathbf{A} = -2\mathbf{i} + 3\mathbf{j} - 4\mathbf{k}$ and $\mathbf{B} = 3\mathbf{i} - 4\mathbf{j} + 5\mathbf{k}$. Find $\mathbf{A} \times \mathbf{B}$ AND $\mathbf{A} \cdot \mathbf{B}$ [2]

15. Determine λ such that : $\mathbf{A} = 2\mathbf{i} + \lambda\mathbf{j} + \mathbf{k}$; $\mathbf{B} = 4\mathbf{i} - 2\mathbf{j} - 2\mathbf{k}$ are perpendicular to each other. [2]

Acknowledgement

The questions in this work sheet have been taken from NCERT text book and based on previous years Exam question papers