



VECTOR-MECHANICS

The magnitude of two vectors acting at a point are 10ms^{-1} and 6ms^{-1} . The angle between them is 60° . Calculate the magnitude and direction of the resultant. [Ans. 14ms^{-1} ; $21^\circ 45'$ with 10ms^{-1}]

2. Two vector quantities each of magnitude 6 unit are acting at a point making an angle 120° with each other. Determine the magnitude and direction of the resultant.



3. The wind is blowing from the middle of north-east. If the component of velocity in the north is 3 km h^{-1} and that in the east is 4 km h^{-1} . Find the magnitude and direction of the resultant velocity.

[Ans. 5 km h^{-1} ; $53^\circ 8'$]

4. A boat starts rowing with velocity 20 ms^{-1} along the width of a river. The velocity of the current of the river is 15 ms^{-1} . Determine the resultant velocity of the boat. If the river is of width 3 km , what will be the time required by the boat to reach the other side of the river?

5. The maximum and minimum resultant of two vectors are 10 unit and 2 unit calculate their magnitude.

[Ans. 6 unit and 4 unit]



6. The maximum resultant of two vector quantities is 7 units and minimum resultant is 1 unit. What is the resultant when they act at a point perpendicular to each other? [R.B. 2000, 2004; Ch. B. 2001]

7. The resultant is equal to each of the two equal forces. Find the angle between the forces

[Ans: 120°]

8. If two vectors acting simultaneously at a point are equal, show that their resultant bisects the angle between those vectors.



9. Velocity of the current in the river is 5 km/hr. The velocity of an engine boat is 10km/hr. To cross the width of the river what should be its direction? [Ans. 120° with the current]

10. A man while running at velocity 3ms^{-1} comes across rain falling vertically of velocity 6ms^{-1} . At what angle he will have to hold an umbrella to protect himself from rain?

11. A car is running at 40 km/hr towards east. The driver of the car sees a truck running at $40\sqrt{3}$ km/hr towards north. (a) In which direction really the truck is running? And (ii) What is the actual velocity of the truck.

