

## CLASS XI-PHYSICS

### VECTOR

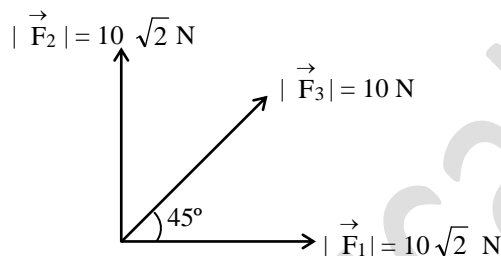
#### ASSIGNMENT-1

##### NUMERICAL QUESTIONS:

**Q.1** On a horizontal ground, rabbit is at origin and a cat is at position (46m, 28m). When the rabbit starts running with velocity  $(7.5\hat{i} + 10\hat{j})$  m/s cat also starts running. If cat can run with maximum speed of 5 m/s. What is the minimum time in which cat can catch the rabbit ? (in seconds)

**Q.2** Two forces of magnitude 6 N and 10 N are acting at a point. Resultant of these force is perpendicular to 6N. Then find the magnitude of the resultant force.

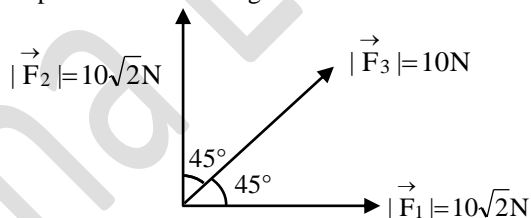
**Q.3** Three forces are acting at a point as shown in figure. All forces are acting in a plane. Find the magnitude of resultant of these forces.



**Q.4** On an open ground, a motorist follows a truck that runs to his left by an angle  $60^\circ$  after every 500 m. Starting from a given turn specify the displacement (in meter) of motorist at the third turn.

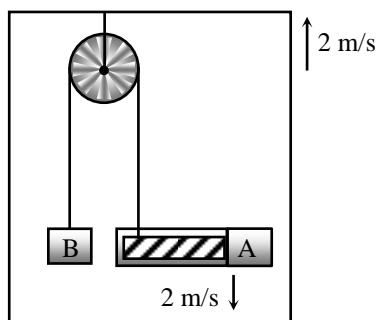
**Q.5** Two forces of magnitude 6N and 10N are acting at a point. Resultant of these force is perpendicular to 6 N. Then find the magnitude of the resultant force.

**Q.6** Three forces are acting at a point as shown in figure.

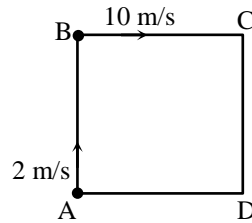


All forces are acting in a plane. Find the magnitude of resultant of these forces.

**Q.7** In the figure shown, the velocity of lift is 2m/s while string is winding on the motor shaft with velocity 2m/s and block A is moving downwards with a velocity of 2m/s, the velocity of block B in m/s is-



- Q.8** Two men P & Q are standing at corners A & B of square ABCD of side 8 m. They start moving along the tank with constant speed 2m/s and 10 m/s respectively. The time when they will meet for the first time, in second is -



- Q.9** Two motor vehicles run at constant speeds 5 m/s each along highways intersecting at an angle  $60^\circ$ . In what time after they meet at the intersection will the distance between the vehicles be  $10\sqrt{3}$  m.
- Q.10** Magnitude of resultant of two vector  $\vec{A}$  and  $\vec{B}$  is equal to 2. Angle between two vectors is  $180^\circ$ . If  $|\vec{A}| = 3$  then find  $|\vec{B}|$  ( $|\vec{B}|$  must be less than 2)
- Q.11** Magnitude of subtraction of two vector  $\vec{A}$  and  $\vec{B}$  is equal to 5. Angle between both is  $180^\circ$ . Find the magnitude of resultant of these two vectors. If  $|\vec{A}| = 2$ .
- Q.12** A swimmer jumps from a bridge over a canal and swims 1 km up stream. After that first km, he passes a floating cork. He continues swimming for half an hour and then turns around and swims back to the bridge. The swimmer and the cork reach the bridge at the same time. The swimmer has been swimming at a constant speed. How fast does the water in the canal flow in km/hr.
- Q.13** Two particles are moving with velocity  $\vec{v}_1 = \hat{i} - 2t\hat{j}$  m/s and  $\vec{v}_2 = 4\hat{i} + \hat{j}$  m/s respectively Time at which they are moving perpendicular to each other is.
- Q.14** Motion of a particle is defined by the position vector  $\vec{r} = A(\cos t + t \sin t)\hat{i} + A(\sin t - t \cos t)\hat{j}$ , where t is time in sec. Value of 't' for which position vector and acceleration are perpendicular to each other is -
- Q.15** Magnitude of resultant of two vector  $\vec{A}$  and  $\vec{B}$  is equal to 2. Angle between two vectors is  $180^\circ$ . If  $|\vec{A}| = 3$  then find  $|\vec{B}|$  ( $|\vec{B}|$  must be less than 2)
- Q.16** Magnitude of subtraction of two vector  $\vec{A}$  and  $\vec{B}$  is equal to 5. Angle between both is  $180^\circ$ . Find the magnitude of resultant of these two vectors. If  $|\vec{A}| = 2$ .