CBSE

MOTION IN A PLANE WS 2

Class 11 - Physics

Section A

1. The relation between the vectors A and -2A is that, **[1]**

   a) both have same magnitude

   b) they have opposite directions

   c) both have different magnitude

   d) both have same direction

2. If $A_x, A_y \ and \ A_z$ are x, y and z components of a vector then its magnitude is **[1]**

   a) $\sqrt{A_x^2 + 2A_y^2 + A_z^2}$

   b) $\sqrt{A_x^2 + A_y^2 + A_z^2}$

   c) $\sqrt{3A_x^2 + A_y^2 + A_z^2}$

   d) $\sqrt{A_x^2 + A_y^2 + A_z^3}$

3. **Assertion (A):** The sum of squares of cosines of angle made by a vector with X , Y and Z axes is equal to unity. **[1]**
   Reason (R): A vector makes 45° from X-axis have equal components along X and Y-axes.

   a) Both A and R are true and R is the correct explanation of A.

   b) Both A and R are true but R is not the correct explanation of A.

   c) A is true but R is false.

   d) A is false but R is true.

4. What is the magnitude and direction of $\hat{i} + \hat{j}$? **[1]**

5. When can the addition of two vectors be zero? **[1]**

Section B

6. Is $|\vec{a} + \vec{b}|$ greater than or less than $|\vec{a}| + |\vec{b}|$? Given reason. **[2]**

7. The magnitude of vector $\vec{A}$ is 2.5 metre and is directed towards east. What will be the magnitudes and directions of the following: **[2]**

   a. $-\vec{A}$

   b. $\frac{\vec{A}}{2}$

   c. $2.5\vec{A}$

   d. $4\vec{A}$?

8. A vector has both magnitude and direction. Does it mean that anything that has magnitude and direction is necessarily a vector? The rotation of a body can be specified by the direction of the axis of rotation, and the angle of rotation about the axis. Does that make any rotation a vector? **[2]**

Section C

9. **State True or False:** **[4]**

   (a) Force has a polar vector as it has a point of application. **[1]**

   (b) Each component of a vector is a scalar. **[1]**

   (c) Each component of a vector is always a scalar. **[1]**

   (d) The magnitude of a vector is always a scalar. **[1]**

10. **Fill in the blanks:** **[4]**

(a) The magnitude of a vector is often called its _____, indicated by |**v**| = v. **[1]**

(b) The physical quantities which have no specified direction and have different values in different directions are called _____. **[1]**

(c) Vectors which have a starting point or a point of application are called _____. **[1]**

(d) Vectors which represent the rotational effect and acts along the axis of rotation are called _____. **[1]**

Section D

11. Given $\vec{a} + \vec{b} + \vec{c} + \vec{d} = 0$, which of the following statements are correct: **[5]**

i. $\vec{a}$, $\vec{b}$, $\vec{c}$, and $\vec{d}$ must each be a null vector.

ii. The magnitude of ($\vec{a} + \vec{c}$) equals the magnitude of ($\vec{b} + \vec{d}$).

iii. The magnitude of '$\vec{a}$' can never be greater than the sum of the magnitudes of $\vec{b}$, $\vec{c}$, and $\vec{d}$.

iv. $\vec{b} + \vec{c}$ must lie in the plane of $\vec{a}$ and $\vec{d}$ if $\vec{a}$ and $\vec{d}$ are not collinear, and in the line of $\vec{a}$ and $\vec{d}$, if they are collinear?