St. Lawrence High School

A Jesuit Christian Minority Institution

Term : 1st

Work Sheet – 12

Class – XI | Subject – Physics | Date – 27.06.20

Chapter – Vector | Topic – Cross product

Choose the correct option for the following questions. $1 \times 15 = 15$

1. If $\vec{A} = 2\hat{\imath} + 3\hat{\jmath}$ *and* $\vec{B} = \hat{\imath} + \hat{\jmath}$, then what is the component of $\vec{A}$ along the direction of $\vec{B}$?
   a. $\frac{1}{\sqrt{2}}$
   b. $\frac{3}{\sqrt{2}}$
   c. $\frac{5}{\sqrt{2}}$
   d. $\frac{7}{\sqrt{2}}$

2. If we multiply a non zero vector by -2, then –
   a. The magnitude will be doubled but direction will be same.
   b. The magnitude will be same but direction will be reversed.
   c. The magnitude will be doubled and direction will be reversed.
   d. Both will remain unchanged

3. Choose the incorrect option –
   a. $\vec{A} \times \vec{A} = \vec{0}$
   b. $\vec{A} \cdot \vec{A} = A^2$
   c. $\vec{A} \times \vec{B} = \vec{B} \times \vec{A}$
   d. $\vec{A} \cdot \vec{B} = \vec{B} \cdot \vec{A}$

4. The vector perpendicular to both $3\hat{\imath} + \hat{\jmath} + 2\hat{k}$ and $2\hat{\imath} - 2\hat{\jmath} + 4\hat{k}$ is –
   a. $\frac{1}{\sqrt{3}}(\hat{\imath} - \hat{\jmath} - \hat{k})$
   b. $\hat{\imath} - \hat{\jmath} - \hat{k}$
   c. $\frac{1}{\sqrt{3}}(\hat{\imath} + \hat{\jmath} + \hat{k})$
   d. $(\sqrt{3}\,\hat{\imath} - \hat{\jmath} - \hat{k})$

5. For which values of a *and* b $a\,\hat{\imath} + b\,\hat{\jmath}$ will be perpendicular to $\hat{\imath} + \hat{\jmath}$?
   a. 1, 0
   b. -2, 0
   c. 3, 0
   d. $\frac{1}{\sqrt{2}}, -\frac{1}{\sqrt{2}}$

6. The velocities of two particles are given as $\hat{\imath} + \sqrt{3}\hat{\jmath}$ and $2\hat{\imath} + 2\hat{\jmath}$ respectively. If they start from the same point, then what is the angle between their directions of motion?
   a. 60°
   b. 30°
   c. 45°
   d. 15°

7. The initial velocity of a particle is $3\hat{\imath} + 4\hat{\jmath}$ m/s . If it moves with an acceleration $0.3\hat{\imath} + 0.4\hat{\jmath}$ m/s^2, then after 10sec its velocity will be
   a. 10m/s
   b. 8.5m/s
   c. 7m/s
   d. 7.5m/s

8. If $\vec{A} \cdot \vec{B} = 0$ and $\vec{A} \cdot \vec{C} = 0$, then $\vec{A}$ will be parallel to –
   a. $\vec{C}$
   b. $\vec{B}$
   c. $\vec{B} \times \vec{C}$
   d. $\vec{B} \cdot \vec{C}$

9. A thin lamina of area 24m^2 is placed in YZ plane. Its area vector can be represented by –
   a. $24\hat{\imath}$
   b. $24\hat{\jmath}$
   c. $24\,\hat{k}$
   d. $24\hat{\imath} + 24\hat{\jmath}$

10. Two sides of a parallelogram are given as $3\hat{\imath} + 4\hat{\jmath}$ and $4\hat{\imath}$. The area of the parallelogram is –
   a. $16\,\hat{k}$ or $-16\,\hat{k}$
   b. $16\hat{\jmath}$ or $-16\hat{\jmath}$
   c. $12\hat{\jmath} + 16\,\hat{k}$
   d. None of these

11. The unit vector perpendicular to the plane contained by two vectors $\hat{\imath} + \hat{\jmath} - \hat{k}$ and $2\hat{\imath} - 3\hat{\jmath} + \hat{k}$ is –
   a. $2\hat{\imath} + 3\hat{\jmath} + 5\hat{k}$
   b. $-(2\hat{\imath} + 3\hat{\jmath} + 5\hat{k})$
   c. $-\frac{2\hat{\imath}+3\hat{\jmath}+5\hat{k}}{\sqrt{38}}$
   d. $none\ of\ these$

12. For two non zero vectors $\vec{A}$ and $\vec{B}$ $|\vec{A} \times \vec{B}| = \vec{A} \cdot \vec{B}$. then the angle between them will be –
   a. 30°
   b. 45°
   c. 60°
   d. 90°

13. If , $\left|\vec{A} \times \vec{B}\right| : \vec{A} . \vec{B} = 1 : \sqrt{3}$, then the angle between two vectors will be –
    a. $30°$
    b. $45°$
    c. $60°$
    d. $120°$

14. The magnitude of the area of the triangle whose two sides are given as two vectors as $\hat{\imath} - 2\hat{\jmath} - 2\hat{k}$ and $2\hat{\imath} + \hat{\jmath} + \hat{k}$ is –
    a. 0
    b. 5 unit
    c. $5\sqrt{2}\ unit$
    d. 50 unit

15. The three vertices of triangle are given as (1,1,1), (3,1,3) and (1,5,5). What will be the magnitude of the area of the triangle?
    a. 4 unit
    b. $4\sqrt{3}\ unit$
    c. 8 unit
    d. $8\sqrt{3}\ unit$

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