Chapter: 2 Vectors: [Exam Model Questions]

MCQs: [1 marks each]

1. Which of the sets give below may represent the magnitudes of three vectors adding to be zero?
   a. 2, 4, 8 b. 4, 8, 16 c. 1, 2, 1 d. 0.5, 1, 2
2. A vector is not changed if:
   a. It is rotated through an arbitrary angle.
   b. It is multiplied by an arbitrary scalar
   c. It is cross multiplied by a unit vector
   d. It is shifted parallel to itself
3. If $\vec{P}.\vec{Q} = |\vec{P}X\vec{Q}|$, the angle between $\vec{P}$ *and* $\vec{Q}$ is,
   a. 0 b. π/2 c. π/4 d. π
4. The resultant of $\vec{A}$ and $\vec{B}$ makes an angle α with $\vec{A}$ and β with $\vec{B}$.
   a. $\alpha < \beta$ b. $\alpha < \beta$ if A<B c. $\alpha < \beta$ if A>B d. $\alpha < \beta$ if A=B
5. If $\vec{P}.\vec{Q} = 0$, the angle between $\vec{P}$ *and* $\vec{Q}$ is
   a. 0 b. π/2 c. π/4 d. π
6. The resultant magnitude of two vector will be maximum, if angle between them is,
   a. 0 b. π/2 c. π/4 d. π
7. What is the angle between $\vec{P}X\vec{Q}$ and $\vec{Q}X\vec{P}$
   a. 0 b. π/2 c. π/4 d. π
8. What is the angle between $\vec{P}X\vec{Q}$ and $\vec{P} + \vec{Q}$
   a. 0 b. π/2 c. π/4 d. π
9. If $\vec{A}$, $\vec{B}$ *and* $\vec{C}$ have magnitude 6, 8 and 10 respectively, and $\vec{A} + \vec{B} = \vec{C}$, angle between A and B is,
   a. 0 b. 45 c. 90 d. 180
10. A force of $(3\hat{\imath} + 4\hat{\jmath})N$ acts on a body and displaces it by$(3\hat{\imath} + 4\hat{\jmath})m$. The work done by the forces is,
    a. 10 J b. 12 J c. 16 J d. 25 J
11. A force$\left(3\hat{\imath} + c\hat{\jmath} + 2\hat{k}\right)N$ acting on a particle causes displacement of $\left(-4\hat{\imath} + 2\hat{\jmath} + 3\hat{k}\right)m$ in its own direction. If work done is 6 J, then value of 'c' is,
    a. 0 b. 1 c. 6 d. 12
12. Three vectors satisfy the relation $\vec{A}.\vec{B}$=0 and $\vec{A}.\vec{C}$=0, then A is parallel to,
    a. $\vec{B}X\vec{C}$ b. $\vec{B}.\vec{C}$ c. $\vec{C}$ d. $\vec{B}$
13. The value of $\hat{\imath}.(\hat{\jmath}x\hat{k})$ is,
    a. 1 b. 0 c. $\hat{\jmath}$ d. $\hat{k}$
14. Two vectors $\vec{A} = 5\hat{\imath} + 7\hat{\jmath} - 3\hat{k}$ and $\vec{B} = 2\hat{\imath} + 2\hat{\jmath} - a\hat{k}$ are perpendicular to each other, then the value of a is,
    a. 12 b. -12 c. 8 d. -8
15. If $\vec{P}.\vec{Q} = |\vec{P}X\vec{Q}|$, then $|\vec{P} + \vec{Q}|$,
    a. $A + B$ b. $A - B$ c. $\sqrt{A^2 + B^2 + \sqrt{2}AB}$ d. zero
16. Two forces of magnitude F have resultant of same magnitude F. Angle between two forces is,
    a. 45^0 b. 120^0 c. 150^0 d. 180^0

SAQs {5 marks type questions}

1. a. A vector has both magnitude and direction does it mean that anything that has magnitude and direction is necessarily a vector? Explain with example.

   b. If $\vec{A} = 4\hat{\imath} - \hat{\jmath} + 3\hat{k}$ and $\vec{B} = 7\hat{\imath} + 5\hat{\jmath} + \hat{k}$:
   i. Find the unit vector of vector $\vec{A}$.
   ii. Find scalar product (Dot product) of $\vec{A}$ and $\vec{B}$
   iii. Find the angle between vector $\vec{A}$ and $\vec{B}$.
   iv. Find vector product (Cross Product) of $\vec{A}$ and $\vec{B}$
   v. Find the magnitude of $2\vec{A} + 3\vec{B}$