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Class: XII
Subject: Math's
Topic: Vector Algebra
No. of Questions: 30

Q1. The magnitude of the resultant of vectors $\vec{a} = 2\hat{i} = \hat{j} + \hat{k}$ and $\vec{b} = \hat{i} + 2\hat{j} + 3\hat{k}$ is

A. $\sqrt{6}$
B. $\sqrt{34}$
C. $\sqrt{14}$
D. none of these

Q2. The magnitude of a vector can never be

A. negative
B. zero
C. positive
D. none of these

Q3. Let $\vec{a}$ be a non-zero vector then $\frac{\vec{a}}{|\vec{a}|}$ is a

A. null vector
B. scalar
C. unit vector parallel to $\vec{a}$
D. unit vector perpendicular to $\vec{a}$

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Q4. For any two vectors $\vec{a}$ and $\vec{b}$ which of the following is true?

A. $|\vec{a}+\vec{b}| \geq |\vec{a}|+|\vec{b}|$
B. $|\vec{a}+\vec{b}| = |\vec{a}|+|\vec{b}|$
C. $|\vec{a}+\vec{b}| < |\vec{a}|+|\vec{b}|$
D. $|\vec{a}+\vec{b}| \leq |\vec{a}|+|\vec{b}|$

Q5. A vector with magnitude zero is called a

A. free vector
B. localized vector
C. position vector
D. null vector

Q6. Which of the following is not a vector quantity?

A. force
B. mass
C. weight
D. velocity

Q7. If $|\vec{a}| = 3$, $|\vec{b}| = 4$ and $|\vec{a}+\vec{b}| = 5$, then $|\vec{a}-\vec{b}| =$

A. 6
B. 5
C. 4
D. 3

Q8. If $|\vec{a}+\vec{b}|^2 = |\vec{a}|^2 + |\vec{b}|^2$, then

A. $|\vec{a}+\vec{b}|^2 = |\vec{a}+\vec{b}|$
B. $\vec{a} = \vec{b}$
C. $\vec{a} \perp \vec{b}$
D. $\vec{a} \parallel \vec{b}$

Q9. If $\vec{a}$ and $\vec{b}$ are non-collinear proper vectors, then number of unit vectors at right angles to both $\vec{a}$ and $\vec{b}$ is

A. 1
B. 2
C. 4
D. infinitely many

Q10. The vectors $2\hat{i} + 3\hat{j} - 6\hat{k}$ and $a\hat{i}+b\hat{j}+c\hat{k}$ are perpendicular when

A. a = 1, b = 2, c = 3
B. a = 3, b = 2, c = 1
C. a = 6, b = 2, c = 3
D. None of these

Q11. What is the value of (a.i)i + (a.j) j + (a.k) k?

A. a
B. 2 a
C. 0
D. None of these

Q12. If $|\vec{a} \times \vec{b}| = |\vec{a} . \vec{b}|$, then the angle between $\vec{a}$ and $\vec{b}$ is

A. $\pi/3$
B. $\pi/6$
C. $\pi/2$
D. $\pi/4$

Q13. If the vectors $2\hat{i} + 3\hat{j} - 4\hat{k}$ and $a\hat{i} + b\hat{j} + c\hat{k}$ are at right angles, then a, b, c can have values

A. a = 2, b = 3, c = – 4
B. a = 4, b = 4, c = 5
C. a = 4, b = 4, c = – 5
D. a = 4, b = – 4, c = – 5

Q14. $[\vec{a} \times \vec{b}, \vec{b} \times \vec{c}, \vec{c} \times \vec{a}] =$

A. $[\vec{a}\,\vec{b}\,\vec{c}]$
B. $2[\vec{a}\,\vec{b}\,\vec{c}]$
C. $[\vec{a}\,\vec{b}\,\vec{c}]^2$
D. none of these

Q15. The distance of the point (x, y, z) from the XY-plane is

A. x
B. y
C. z
D. |z|

Q16. If I is the incentre of triangle ABC, then $|BC|\vec{IA} + |CA|\vec{IB} + |AB|\vec{IC}$ is equal to (Here $\underset{A}{\rightarrow}$ means magnitude.)

A. $\dfrac{\vec{IA} + \vec{IB} + \vec{IC}}{3}$
B. $\vec{IA} + \vec{IB} + \vec{IC}$
C. $\vec{0}$
D. None of these

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Q17. If ABCDEF is a regular hexagon and $\vec{AB} = \vec{a}, \vec{BC} = \vec{b}$, $\vec{AD}$ is equal to

A. $\vec{a} + \vec{b}$
B. $\vec{b} - \vec{a}$
C. $2\vec{b}$
D. None of these

Q18. If $\vec{a} \bullet \vec{a} = 0$, then $\vec{a}$ is a

A. free vector
B. localized vector
C. null vector
D. none of these

Q19. In a triangle ABC, D is the mid-point of side [BC] ; $\vec{AD}$ is equal to

A. $\vec{AB} + \vec{AC}$
B. $\frac{1}{2}(\vec{AB} + \vec{AC})$
C. $\vec{AB} - \vec{AC}$
D. None of these

Q20. The medians of a triangle are concurrent at the point called

A. Circumcentre
B. Orthocentre
C. Centroid
D. Incentre

Q21. P and Q are two points with position vectors $3\vec{a} - 2\vec{b}$ and $\vec{a} + \vec{b}$,Respectively. Write the position vector of a point R divides the line segment PQ in the ratio 2 : 1 externally.
[All India 2013]

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Q22. Write the position vector of mid-point of the vector joining points P (2, 3, 4) and Q (4, 1 – 2).
[Foreign 2011]

Q23. Find the position vector of a point R, which divides the line joining two points P and Q whose position vectors are $2\vec{a}+\vec{b}$ and $\vec{a}-3\vec{b}$ respectively, externally in the ratio 1 : 2. Also, show that P is the mid-point of line segment RQ.
[Hots; Delhi 2010]

Q24. Find $|\vec{x}|$, if for a unit vector â, $(\vec{x}-\vec{a}).(\vec{x}+\vec{a})=15$.
[Hots; All India 2013]

Q25. Write the value of $(\hat{k}\times\hat{j}).\hat{i}+\hat{j}.\hat{k}$. [Hots; All India 2012]

Q26. If $\hat{P}$ is a unit vector and $(\vec{X}-\hat{P}).\vec{X}+\hat{P}=80$, then find $|\vec{X}|$
[Hots; All India 2009]

Q27. If $\vec{a}+\vec{b}+\vec{c}$ are three vectors, such that $|\vec{a}|=5, |\vec{b}|=12, |\vec{c}|=13$ and $\vec{a}+\vec{b}+\vec{c}=0$, then, find the value of $\vec{a}.\vec{b}+\vec{b}.\vec{c}+\vec{c}.\vec{a}$
[Delhi 2012]

Q28. If vectors $\vec{a}=2\hat{i}+2\hat{j}+3\hat{k}, \vec{b}=-\hat{i}+2\hat{j}+\hat{k}$ and $\vec{c}=3\hat{i}+\hat{j}$ are such that $\vec{a}+\lambda\vec{b}$ is Perpendicular to $\vec{c}$, then find the value of λ.

Q29. If $\vec{a}, \vec{b}$ and $\vec{c}$ are three vectors, such that $|\vec{a}|=3, |\vec{b}|=4$ and $|\vec{c}|=5$ and each one of these is perpendicular to the sum of other two, then find $|\vec{a}+\vec{b}+\vec{c}|$.
[All India 2011C, 2010C]

Q30. If $\vec{a}, \vec{b}, \vec{c}$ are such that $\vec{a}+\vec{b}+\vec{c}=0$ and $|\vec{a}|=3, |\vec{b}|=5$ and $|\vec{c}|=7$, then find angle between $\vec{a}$ and $\vec{b}$ [All India 2008; Delhi 2008]

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