QB365 Question Bank Software Study Materials

Vector Algebra 50 Important 1 Marks Questions With Answers (Book Back and Creative)

11th Standard

Maths

Total Marks : 50

Multiple Choice Question

50 x 1 = 50

1) The value of $\overrightarrow{AB} + \overrightarrow{BC} + \overrightarrow{DA} + \overrightarrow{CD}$ is

(a) $\overrightarrow{AD}$ (b) $\overrightarrow{CA}$ **(c)** $\vec{0}$ (d) $-\overrightarrow{AD}$

2) If $\vec{a} + 2\vec{b}$ and $3\vec{a} + m\vec{b}$ are parallel, then the value of m is

(a) 3 (b) $\frac{1}{3}$ **(c) 6** (d) $\frac{1}{6}$

3) The unit vector parallel to the resultant of the vectors $\hat{i} + \hat{j} - \hat{k}$ and $\hat{i} - 2\hat{j} + \hat{k}$ is

(a) $\frac{\hat{i}-\hat{j}+\hat{k}}{\sqrt{5}}$ (b) $\frac{2\hat{i}+\hat{j}}{\sqrt{5}}$ (c) $\frac{2\hat{i}-\hat{j}+\hat{k}}{\sqrt{5}}$ **(d)** $\frac{2\hat{i}-\hat{j}}{\sqrt{5}}$

4) A vector $\overrightarrow{OP}$ makes 60° and 45° with the positive direction of the x and y axes respectively. Then the angle between $\overrightarrow{OP}$ and the z-axis is

(a) 45° **(b) 60°** (c) 90° (d) 30°

5) If $\overrightarrow{BA} = 3\hat{i} + 2\hat{j} + \hat{k}$ and the position vector of B is $\hat{i} + 3\hat{j} - \hat{k}$,then the position vector of A is

(a) $4\hat{i} + 2\hat{j} + \hat{k}$ **(b)** $4\hat{i} + 5\hat{j}$ (c) $4\hat{i}$ (d) $-4\hat{i}$

6) A vector makes equal angle with the positive direction of the coordinate axes. Then each angle is equal to

(a) $cos^{-1}(\frac{1}{3})$ (b) $cos^{-1}(\frac{2}{3})$ **(c)** $cos^{-1}(\frac{1}{\sqrt{3}})$ (d) $cos^{-1}(\frac{2}{\sqrt{3}})$

7) The vectors $\vec{a} - \vec{b}, \vec{b} - \vec{c}, \vec{c} - \vec{a}$ are

(a) parallel to each other (b) unit vectors (c) mutually perpendicular vectors **(d) coplanar vectors.**

8) If ABCD is a parallelogram, then $\overrightarrow{AB} + \overrightarrow{AD} + \overrightarrow{CB} + \overrightarrow{CD}$ is equal to

(a) $2(\overrightarrow{AB} + \overrightarrow{AD})$ (b) $4\overrightarrow{AC}$ (c) $4\overrightarrow{BD}$ **(d)** $\vec{0}$

9) One of the diagonals of parallelogram ABCD with $\vec{a}$ and $\vec{b}$ as adjacent sides is $\vec{a} + \vec{b}$ The other diagonal $\overrightarrow{BD}$ is

(a) $\vec{a} - \vec{b}$ **(b)** $\vec{b} - \vec{a}$ (c) $\vec{a} + \vec{b}$ (d) $\frac{\vec{a}+\vec{b}}{2}$

10) If $\vec{a}, \vec{b}$ are the position vectors A and B, then which one of the following points whose position vector lies on AB, is

(a) $\vec{a} + \vec{b}$ (b) $\frac{2\vec{a}-\vec{b}}{2}$ **(c)** $\frac{2\vec{a}+\vec{b}}{3}$ (d) $\frac{\vec{a}-\vec{b}}{3}$

11) If $\vec{a}, \vec{b}, \vec{c}$ are the position vectors of three collinear points, then which of the following is true?

(a) $\vec{a} = \vec{b} + \vec{c}$ **(b)** $2\vec{a} = \vec{b} + \vec{c}$ (c) $\vec{b} = \vec{c} + \vec{a}$ (d) $4\vec{a} + \vec{b} + \vec{c} = 0$

12) If $\vec{r} = \frac{9\vec{a}+7\vec{b}}{16}$, then the point P whose position vector $\vec{r}$ divides the line joining the points with position vectors $\vec{a}$ and $\vec{b}$ in the ratio

(a) 7: 9 internally (b) 9: 7 internally (c) 9: 7 externally (d) 7: 9 externally

13) If $\lambda\hat{i} + 2\lambda\hat{j} + 2\lambda\hat{k}$ is a unit vector, then the value of λ is

(a) $\frac{1}{3}$ (b) $\frac{1}{4}$ (c) $\frac{1}{9}$ (d) $\frac{1}{2}$

14) Two vertices of a triangle have position vectors $3\hat{i}+4\hat{j}-4\hat{k}$ and $2\hat{i}+3\hat{j}+4\hat{k}$. If the position vector of the centroid is $\hat{i}+2\hat{j}+3\hat{k}$, then the position vector of the third vertex is

(a) $-2\hat{i}-\hat{j}+9\hat{k}$ (b) $-2\hat{i}-\hat{j}-6\hat{k}$ (c) $2\hat{i}-\hat{j}+6\hat{k}$ (d) $-2\hat{i}+\hat{j}+6\hat{k}$

15) If $|\vec{a}+\vec{b}|=60, |\vec{a}-\vec{b}|=40$ and $|\vec{b}|=46$, then $|\vec{a}|$ is

(a) 42 (b) 12 **(c) 22** (d) 32

16) If $\vec{a}$ and $\vec{b}$ having same magnitude and angle between them is 60° and their scalar product is $\frac{1}{2}$ then $|\vec{a}|$ is

(a) 2 (b) 3 (c) 7 **(d) 1**

17) The value of $\theta \in (0, \frac{\pi}{2})$ for which the vectors $\vec{a}=(sin\theta)\hat{i}+(cos\theta)\hat{j}$ and $\vec{b}=\hat{i}-\sqrt{3}\hat{j}+2\hat{k}$ are perpendicular, is equal to

(a) $\frac{\pi}{3}$ (b) $\frac{\pi}{6}$ (c) $\frac{\pi}{4}$ (d) $\frac{\pi}{2}$

18) If $|\vec{a}|=13, |\vec{b}|=5$ and $\vec{a}.\vec{b}=60^o$ then $|\vec{a}\times\vec{b}|$ is

(a) 15 (b) 35 (c) 45 **(d) 25**

19) Vectors $\vec{a}$ and $\vec{b}$ are inclined at an angle $\theta=120^o$. If $|\vec{a}|=1, |\vec{b}|=2$, then $[(\vec{a}+3\vec{b})\times(3\vec{a}-\vec{b})]^2$ is equal to

(a) 225 (b) 275 (c) 325 **(d) 300**

20) If $\vec{a}$ and $\vec{b}$ are two vectors of magnitude 2 and inclined at an angle 60°, then the angle between $\vec{a}$ and $\vec{a}+\vec{b}$ is

(a) 30° (b) 60° (c) 45° (d) 90°

21) If the projection of $5\hat{i}-\hat{j}-3\hat{k}$ on the vector $\hat{i}+3\hat{j}+\lambda\hat{k}$ is same as the projection of $\hat{i}+3\hat{j}+\lambda\hat{k}$ on $5\hat{i}-\hat{j}-3\hat{k}$, then λ is equal to

(a) ±4 (b) ±3 **(c)** ±5 (d) ±1

22) If (1, 2, 4) and (2, -3λ, -3) are the initial and terminal points of the vector $\hat{i}+5\hat{j}-7\hat{k}$, then the value of λ is equal to

(a) $\frac{7}{3}$ **(b)** $-\frac{7}{3}$ (c) $-\frac{5}{3}$ (d) $\frac{5}{3}$

23) If the points whose position vectors $10\hat{i}+3\hat{j}, 12\hat{i}-5\hat{j}$ and $a\hat{i}+11\hat{j}$ are collinear then a is equal to

(a) 6 (b) 3 (c) 5 **(d) 8**

24) If $\vec{a}=\hat{i}+\hat{j}+\hat{k}, \vec{b}=2\hat{i}+x\hat{j}+\hat{k}, \vec{c}=\hat{i}-\hat{j}+4\hat{k}$ and $\vec{a}.(\vec{b}\times\vec{c})=70$, then x is equal to

(a) 5 (b) 7 **(c) 26** (d) 10

25) If $\vec{a}=\hat{i}+2\hat{j}+2\hat{k}, |\vec{b}|=5$ and the angle between $\vec{a}$ and $\vec{b}$ is $\frac{\pi}{6}$, then the area of the triangle formed by these two vectors as two sides, is

(a) $\frac{7}{4}$ **(b)** $\frac{15}{4}$ (c) $\frac{3}{4}$ (d) $\frac{17}{4}$

26) The value of m for which the vectors $3\hat{i}-6\hat{j}+\hat{k}$ and $2\hat{i}-4\hat{j}+\lambda\hat{k}$ are parallel is _____ .

(a) $\frac{2}{3}$ (b) $\frac{3}{2}$ (c) $\frac{5}{2}$ (d) $\frac{2}{5}$

27) The vectors from origin to the points A and B are $2\hat{i}-3\hat{j}+2\hat{k}$ and $2\hat{i}+3\hat{j}+\hat{k}$ respectively, then the area of ΔOAB is equal to

(a) 340 (b) 5 (c) $\sqrt{229}$ **(d)** $\frac{1}{2}\sqrt{229}$

28) The projection of $\vec{b}$ on $\vec{a}$ is _____ .

(a) $\left(\frac{\vec{a}.\vec{b}}{|\vec{b}|}\right)\vec{b}$ (b) $\frac{\vec{a}.\vec{b}}{|\vec{b}|}$ (c) $\frac{\vec{a}.\vec{b}}{|\vec{a}|}$ **(d)** $\left(\frac{\vec{a}.\vec{b}}{|\vec{a}|}\right)$

29) The number of vectors of unit length perpendicular to the vectors $\vec{a}=\hat{i}+\hat{j}+\hat{k}$ and $\vec{b}=2\hat{i}+\hat{j}+6\hat{k}$ is _____ .

(a) 1 **(b) 2** (c) 3 (d) infinite

30) If $|\vec{a}| = |\vec{b}|$ then

(a) $\vec{a} = \vec{b}$ (b) $\vec{a} = \overrightarrow{-b}$ **(c)** $\vec{a} = \pm\vec{b}$ (d) both are null vectors

31) If $|\vec{a}|$=4 and $-3 \leq \lambda \leq 2$ then the range of $|\lambda\vec{a}|$ is _____ .

(a) [0, 8] (b) [-12, 8] **(c) [0, 12]** (d) [8, 12]

32) The vector in the direction of the vector $\hat{i} - 2\hat{j} + 2\hat{k}$ that has magnitude 9 is _____ .

(a) $\hat{i} - 2\hat{j} + 2\hat{k}$ (b) $\frac{\hat{i}-2\hat{j}+2\hat{k}}{3}$ **(c)** $3(\hat{i} - 2\hat{j} + 2\hat{k})$ (d) $9(\hat{i} - 2\hat{j} + 2\hat{k})$

33) If the direction cosines of a line are k, k and k, then

(a) k > 0 (b) 0 (c) k=1 **(d)** $k = \frac{1}{\sqrt{3}} or -\frac{1}{\sqrt{3}}$

34) The direction cosines of the vector $2\hat{i} + 2\hat{j} - \hat{k}$ are _____ .

(a) $\frac{2}{3}, \frac{2}{3}, -\frac{1}{3}$ (b) $\frac{2}{3}, \frac{2}{3}, \frac{1}{3}$ (c) $-\frac{2}{3}, -\frac{2}{3}, \frac{1}{3}$ (d) $-\frac{2}{3}, -\frac{2}{3}, -\frac{1}{3}$

35) The angle between two vectors $\vec{a}$ and $\vec{b}$ with magnitudes $\sqrt{3}$ and 4 respectively and $\vec{a}.\vec{b} = 2\sqrt{3}$ is _____ .

(a) $\frac{\pi}{6}$ **(b)** $\frac{\pi}{3}$ (c) $\frac{\pi}{2}$ (d) $\frac{5\pi}{2}$

36) The value of λ when the vectors $\vec{a} = 2\vec{i} + \lambda\vec{j} + \vec{k}$ and $\vec{b} = \vec{i} + 2\vec{j} + 3\vec{k}$ are orthogonal is _____ .

(a) 0 (b) 1 (c) $\frac{3}{2}$ **(d)** $-\frac{5}{2}$

37) If m $\left(\vec{2} + \vec{j} + \vec{k}\right)$ is a unit vector then the value of m is _____ .

(a) $\pm\frac{1}{\sqrt{3}}$ (b) $\pm\frac{1}{\sqrt{5}}$ **(c)** $\pm\frac{1}{\sqrt{6}}$ (d) $\pm\frac{1}{2}$

38) Match List - I with List II

	LIST I		**LIST II**
1	$\hat{i}.\hat{i}$	a	0
2	$\hat{i}.\hat{j}$	b	$\hat{k}$
3	$\hat{i} \times \hat{i}$	c	1
4	$\hat{i} \times \hat{j}$	d	0

The Correct match is

(a)

i	ii	iii	iv
b	c	d	a

(b)

i	**ii**	**iii**	**iv**
c	**a**	**d**	**b**

(c)

i	ii	iii	iv
d	b	a	c

(d)

i	ii	iii	iv
d	c	b	a

39) Assertion (A): If ABCD is a parallelogram, $\overrightarrow{AB} + \overrightarrow{AD} + \overrightarrow{CB} + \overrightarrow{CD}$ then is equal zero.

Reason (R): $\overrightarrow{AB}$ and $\overrightarrow{CD}$ are equal in magnitude and opposite in direction. Also $\overrightarrow{AD}$ and $\overrightarrow{CB}$ are equal in magnitude and opposite in direction

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

(b) Both A and R are true and R is not a correct explantion of A (c) A is true but R is false (d) A is false but R is true

40) Let $\vec{a}\vec{b}$ and $\vec{c}$ be the three vectors having magnitudes $1, 5$ and 3 respectively, such that the angle between $\vec{a}$ and $\vec{b}$ is 0 and $\vec{a}$ _____

(a) 0 (b) $\frac{2}{3}$ (c) $\frac{3}{5}$ **(d)** $\frac{3}{4}$

41) If $\vec{a}$ and $\vec{b}$ are two vectors, such that $\vec{a} \cdot \vec{b} < 0$ and $|\vec{a} \cdot \vec{b}| = |\vec{a} \times \vec{b}|$, then the angle between vectors $\vec{a}$ and $\vec{b}$ is _____ .

(a) π (b) $7\pi/4$ (c) $\pi/4$ (d) $3\pi/4$

42) If $\vec{a}, \vec{b}, \vec{c}$ are unit vectors such that $\vec{a} \cdot \vec{b} = 0 = \vec{a} \cdot \vec{c}$ and the angle between $\vec{b}$ and $\vec{c}$ is $\frac{\pi}{3}$. Then the value of $|\vec{a} \times \vec{b} - \vec{a} \times \vec{c}|$ is _____ .

(a) 1/2 **(b) 1** (c) 2 (d) None of these

43) Trmentinnent sides of a parallelogram $ABCD$ are $2\hat{i}+4\hat{j}-5\hat{k}$ and $\hat{i}+2\hat{j}+3\hat{k}$. Then the value of $|\overrightarrow{AC}\times\overrightarrow{BD}|$ is _____ .

(a) $20\sqrt{5}$ **(b)** $22\sqrt{5}$ (c) $24\sqrt{5}$ (d) $26\sqrt{5}$

44) $\vec{r}\times\vec{a}=\vec{b}\times\vec{a};\vec{r}\times\vec{b}=\vec{a}\times\vec{b};\vec{a}\neq 0;\vec{b}\neq 0;\vec{a}\neq\lambda b;\vec{a}$ is not perpendicular to $\vec{b}$ Then $\vec{r}$ is equal to

(a) $\vec{a}+\vec{b}$ **(b)** $\vec{a}-\vec{b}$ (c) $\vec{a}\times\vec{b}+\vec{a}$ (d) $\vec{a}\times\vec{b}+\vec{b}$

45) If $\vec{r}\cdot\vec{a}=\vec{r}\cdot\bar{b}=\vec{r}\cdot\vec{c}=0$ where $\vec{a},\vec{b}$ and $\vec{c}$ are non-coplanar, then

(a) $\vec{r}$ Perpendicular $(\vec{c}\times\vec{a})$ (b) $\vec{r}$ Perpendicular $(\vec{a}\times\vec{b})$ (c) $\vec{r}$ Perpendicular $(\vec{b}\times\vec{c})$ **(d)** $\vec{r}=\vec{0}$

46) If vectors $\vec{a}$ and $\vec{b}$ are two adjacent sides of a parallelogram, then the vectors representing the altitude of the parallelogram

(a) $\vec{b}+\frac{\vec{b}\times\vec{a}}{|\vec{a}|^2}$ (b) $\frac{\vec{a}\cdot\vec{b}}{|\vec{b}|^2}$ **(c)** $\vec{b}-\frac{\vec{b}\cdot\vec{a}}{|\vec{a}|^2}\vec{a}$ (d) $\frac{\vec{a}\times(\vec{b}\times\vec{a})}{|\vec{b}|^2}$

47) A parallelogram is constructed on $3\vec{a}+\vec{b}$. and $\vec{a}-4\vec{b}$, where $|\vec{a}|=6$ and $|\vec{b}|=8$ and $\vec{a}$ and $\vec{b}$ are anti-parallel. Then the lengtl

(a) 40 (b) 64 (c) 32 **(d) 48**

48) If $\vec{a}\cdot\vec{b}=0$ where $\vec{a}$ and $\vec{b}$ are unit vectors and the unit vector $\vec{c}$ is inclined at the angle θ to both $\vec{a}$ and $\vec{b}$. If $\vec{c}=m\dot{a}+n\vec{b}+I$

(a) $\frac{-\pi}{4}\leq\theta\leq\frac{\pi}{4}$ **(b)** $\frac{\pi}{4}\leq\theta\leq\frac{3\pi}{4}$ (c) $0\leq\theta\leq\frac{\pi}{4}$ (d) $0\leq\theta\leq\frac{3\pi}{4}$

49) If $\vec{a}$ satisfies $\vec{a}\times(\hat{i}+2\hat{j}+\hat{k})=\hat{i}-\hat{k}$ then $\vec{a}$ is equal to

(a) $\lambda\hat{i}+(2\lambda-1)\hat{j}+\lambda\hat{k},\lambda\in R$ (b) $\lambda\hat{i}+(1-2\lambda)\hat{j}+\lambda\hat{k},\lambda\in R$ **(c)** $\lambda\hat{i}+(2\lambda+1)\hat{j}+\lambda\hat{k},\lambda\in\mathbf{R}$

(d) $\lambda\hat{i}+(2+2\lambda)\hat{j}+\lambda\hat{k},\lambda\in R$

50) $\vec{a},\vec{b}$ and $\vec{c}$ are the three vectors of equal magnitude. The angle between each pair of vectors is $\frac{\pi}{3}$ such that $|\vec{a}+\vec{b}+\vec{c}|=\sqrt{6}$.

_____

(a) 2 (b) -1 **(c) 1** (d) $\frac{\sqrt{6}}{3}$