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VECTORS

Class :- XII **Subject :- MATH**

QNo.	Questions
1	If $\vec{a} = \hat{i} + \hat{j} + \hat{k}$, $\vec{b} = 4\hat{i} + 3\hat{j} + 4\hat{k}$ and $\vec{c} = \hat{i} + \alpha\hat{j} + \beta\hat{k}$ are linearly dependent vectors and $\lvert\vec{c}\rvert = \sqrt{3}$ then
2	Consider the following statements (i) vectors are collinear if their supports are same and parallel (ii) if a and b are non-collinear vectors and $l a + m b = 0 \Rightarrow l = 0, m = 0$ (iii) 0, a = 0 (iv) k (a . b) = (k a). b where k is any scalar The correct statements are
3	If a and b are unit vectors and if θ is the angle between them, then its value is given by
4	If **a** + **b** + **c** = 0, |**a**| = 3, |**b**| = 5, |**c**| = 7, the angle between the vectors **a** and **b** will be
5	[**a + b b + c c + a**] is equal to
6	To a man walking at the rate of 4 km/hr, rain appears to fall vertically. If its actual velocity is 8 km/hr, the actual direction makes an angle with apparent direction is
7	[(**a** × **b**) × (**b** × **c**) (**b** × **c**) × (**c** × **a**) (**c** × **a**) × (**a** × **b**)] is equal to
8	**i** × (**a** × **i**) + **j** (**a** × **j**) + **k** × (**a** × **k**) is equal to
9	Consider the following statements (i) **a** × (**b** × **c**) + **b** × (**c** × **a**) = 0, then a is parallel to **b** (ii) $\frac{(a.b)(a.b)}{\lvert a\rvert^2 \lvert b\rvert^2}$ is equal to one (iii) If the vectors a and b are mutually perpendicular, then **a** × [**a** × {**a** × (**a** × **b**)}] = $\lvert \mathbf{a}\rvert^4 \mathbf{b}$ (iv) **a** × (**b** × **c**) + **b** × (**c** × **a**) + **c** × (**a** × **b**) = 0 select the correct codes given below
10	The position vectors of the point P and Q are p and q respectively. If O is the origin and R is a point in the interior of ∠POQ such that OR bisects the ∠POQ then what is the unit vector along OR?
11	The position vectors of three points A, B and C are 3 **i** – **j** + 2 **k**, **i** + λ**j** – 3 **k** and 4 **i** – 3 **j** –λ**k** respectively. The value of λ ∈R for which ΔABC is equilateral, is
12	If **a** + **b** + **c** = 0 then **a** × **b** is equal to (i) **c** × **a** (ii) **c**

	(iii) **b** × **c** (iv) **a** × **c**
13	Let a = 2**i** – **j** + **k**, **b** = **i** + 2**j** – **k** and **c** = **i** + 2**j** – **k** be three vectors. A vector in the plane of **b** and **c** whose projection on a is of the magnitude $\sqrt{\frac{2}{3}}$, is
14	The value of **i** × **(i** × **j)** + **j** × **(j** × **k)** + **k** × **(k** × **i**) in the simple form is
15	For nonzero vectors **a, b, c** the equality |(**.a** × **b). c| = |a|| b || c**| holds if and only if
16	If |**a| = |b| = |c**| = 1and **a. b** = 0 **a . c = b . c** where **c = λa + μ b + v a × b** then (i) $v^2 + 2\lambda^2 = 1$ (ii) λ= μ (iii) λ = μ = v (iv) λ = 2μ
17	Let **a, b** and **c** be three vectors having magnitudes 1, 1 and 2 respectively. If **a × (a × c) + b** = 0 then the acute angle between a and c is
18	If **a, b** are nonzero vectors and **a** is perpendicular to **b** then a nonzero vector **r** satisfying **r .a = a**, for some scalar **α, a × r = b** is
19	The distance of the point B with position vector **i** + 2 **j** + 3 **k** from the line passing through the point **A** whose position vector is 4 **i** + 2 **j** + 2 **k** and parallel to the vector 2 **i** + 3 **j** + 6 **k** is
20	Let **a = i – k, b = x i + j** + (I – x) **k** and **c** = y **i** + x **j** + (1 + x – y)**k**. Then [**a b c**] depends on
21	If **a, b** and **c** are unit vectors, then $\|a – b\|^2 + \|b – c\|^2 + \|c – a\|^2$ does not exceed
22	Let **a, b** and **c** be three non-coplanar vectors, and let **p, q** and **r** be the vectors defined by the relations $P = \frac{b \times c}{[abc]}, q = \frac{c \times a}{[abc]}$ and $r = \frac{a \times b}{[abc]}$ Then the value of the expression (**a + b). p + (b + c). q + (c + a). r** is equal to
23	Let $\vec{a}, \vec{b}, \vec{c}$ be three unit vectors such that $\vec{a} \times (\vec{b} \times \vec{c}) = \frac{\vec{b} \times \vec{c}}{\sqrt{2}}$ and the angles between $\vec{a}, \vec{b}$ be α and β respectively, $(\vec{b} \neq \vec{a})$ then :
24	If **a = i + j – k**, **b = i – j + k**, and **c** are unit vectors perpendicular to the vector **a** and coplanar with **a** and **b**, then a unit vector d perpendicular to both **a** and **c** is
25	A vector **c**, directed along the internal bisector of the angle between the vectors **a** = 7 **i** – 4**j** – 4**k** and **b** = – 2 **i** – **j** + 2**k** , with | **c** | = $5\sqrt{6}$, is
26	The vectors **a, b** and **c** are of the same length and, taken pairwise, they form equal angles. If **a** = **i** + **j** and **b** = **j** + **k**, the coordinates of C are (i) (1, 0, 1) (ii) (1, 2, 3) (iii) (–1, 1, 2) (iv) (–1/3, 4/3, –1/3)
27	Let **b** = 4**i** + 3**j** and **c** be two vectors perpendicular to each other in the xy-plane. All

	vectors in the same plane having projections 1 and 2 along **b** and **c** respectively, are given by
28	If the vectors a **i + j + k, i + bj + k** and **i** + **j** + c**k** (a ≠ b ≠ c ≠ 1) are coplanar, then $\frac{1}{1-a}+\frac{1}{1-b}+\frac{1}{1-c}=$
29	If $p=\frac{b\times c}{[abc]},\ q=\frac{b\times c}{[abc]},\ r=\frac{a\times b}{[abc]}$, where a, b, c are three non-coplanar vectors then the value of the expression (a + b), p + (b + c), q + (c + a) r is equal to
30	Let a = **i + j** and b = 2**i – k**, then point of intersection of the lines r × a = b × a and r × b = a × b is
31	Let a, b, c be distinct non-negative numbers. If the vectors a **i** + a**j** + c **k, i + k** and c**i** + c**j** + b**k** lie in a plane, then c is
32	Let α, β, λ be distinct real numbers. The points with position vectors αi – βj + λk, + βi + λj + αk, λi + αj + βk
33	If a = **i + j + k**, b = 4**i** + 3**j** + 4**k** and c = **i** + αj + β**k** are linearly dependent vectors and | c | = $\sqrt{3}$, then
34	For three vector **u, v, w** which of the following expressions is not equal to any of the remaining three?
35	Let $\vec{a}=2\hat{i}+\hat{j}-2\hat{k}$ and $\vec{b}=\hat{i}+\hat{j}$. If $\vec{c}$ is a vector such that $\vec{a}\cdot\vec{c}=\|\vec{c}\|,\ \|\vec{c}-\vec{a}\|=\sqrt{2}$ and the angle between $\vec{a}\times\vec{b}$ and $\vec{c}$ is 30° then $\|(\vec{a}\times\vec{b})\times\vec{c}\|$ is equal to
36	Given the points A (–2, 3, –4), B(3, 2, 5), C(1. –1, 2) and D(3, 2, -4). The projection of vector **AB** on the vector **CD** is
37	$\vec{a},\vec{b},\vec{c}$ are three non-coplanar, non zero vectors and $\vec{r}$ is any vector in space then $(\vec{a}\times\vec{b})\times(\vec{r}\times\vec{c})+(\vec{b}\times\vec{c})\times(\vec{r}\times\vec{a})+(\vec{c}\times\vec{a})\times(\vec{r}\times\vec{b})$ is equal to :
38	Let **a**, **b** and **c** be non-coplanar unit vectors equally inclined to one another at an acute angle θ. Then [**abc**] in terms of θ is equal to
39	If **b** and **c** are any two non-collinear unit vectors and **a** is any vector, then $(a, b)b + (a.c)c + \frac{a(b\times c)}{\|b\times c\|^2}\times(b\times c)$
40	If the difference of two unit vectors is also a unit vector, then angle between them is
41	If ABCDEF is a regular hexagon and **AB + AC + AD + AE + AF** = k **AD** then, k sequals
42	If u = a – b, v = a + b and |a| = |b| = 2, then |u × v| is
43	Position vectors of points A and B are $\vec{a}+\vec{b}$ and $2\vec{a}-\vec{b}$. Then $\vec{AB}$ equal to
44	Unit vectors along vector $\hat{i}+2\hat{j}-2\hat{k}$ are
45	Given vector $\vec{a}$ then $-2\vec{a}$ is a vector whose

46	The position vectors of opposite vertices of a parallelogram are $2\vec{a}+3\vec{b}$ and $\vec{a}-2\vec{b}$. Then position vector of the point of intersection of diagonals is
47	If $\vec{a}$ and $\vec{b}$ are non-zero vectors, such that $\vec{a}\,.\,\vec{b}$ = 0 , then
48	If for non-zero vectors $\vec{a}, \vec{b}, \vec{c}$, and $\vec{b}\times\vec{c}=\vec{a}$, then $\vec{a}\times\vec{b}=\vec{c}$
49	If $\left\lvert\vec{a}+\vec{b}\right\rvert=\left\lvert\vec{a}-\vec{b}\right\rvert$, then
50	If $\left\lvert\vec{a}\right\rvert=5, \left\lvert\vec{b}\right\rvert=13$ and $\left\lvert\vec{a}\times\vec{b}\right\rvert=25$ then $\vec{a}\,.\,\vec{b}$ is equal to
51	Area of parallelogram, whose diagonals are along vectors $\hat{i}+2\hat{k}$ and $2\hat{j}-3\hat{k}$ is