CHAPTER-10

VECTORS

01 MARK TYPE QUESTIONS

Q. NO	QUESTION	MARK
1.	If points A (60 î+ 3 ĵ), (40 î– 8 ĵ) and C (aî- 52ĵ) are collinear, then 'a' is equal to a) 40 b) -40 c) 20 d) -20	1
2.	The value of î. (ĵx k̂) + ĵ. (îx k̂) + k̂. (îx ĵ) is a) 0 b) -1 c) 1 d) 3	1
3.	If $\|\vec{a}\| = 2$, $\|\vec{b}\| = 5$ and $\|\vec{a} \times \vec{b}\| = 8$, find $\vec{a} . \vec{b}$ a) 6 b)1 c)7 d)0	1
4.	Find the area of the ||gm whose adjacent sides are represented by the vectors $\vec{a} = 3\hat{i} + \hat{j} - 2\hat{k}$, $\vec{b} = \hat{i} - 3\hat{j} + 4\hat{k}$ a)10 b) 10√3 c)8 d)12	1
5.	$\vec{a}$ is a unit vector and $(\vec{x} - \vec{a})(\vec{x} + \vec{a}) = 8$, then find $\|\vec{x}\|$ a)2 b)5 c)3 d)1	1
6.	If $\|\vec{a} \times \vec{b}\| = 4$, $\|\vec{a} . \vec{b}\| = 2$, then $\|\vec{a}\|^2 \|\vec{b}\|^2$ is a) 6 b) 2 c) 20 d) 8	1
7.	If $\|\vec{a}\| = 2$, $\|\vec{b}\| = 7$ and $\vec{a} \times \vec{b} = 3\hat{i} + 2\hat{j} + 6\hat{k}$, find the angle between $\vec{a}$ and $\vec{b}$ a) π/6 b) π c) 0 d) none	1
8.	Find a vector of magnitude 3√2 units which makes an angle of π/4, π/2 with y and z-axes, respectively. a) ± 3î+ 3ĵ b) 3î- 3ĵ c) ± 5î+ 3ĵ d) none	1
9.	If points A (60 î+ 3 ĵ), (40 î– 8 ĵ) and C (aî- 52ĵ) are collinear, then 'a' is equal to a) 40 b) -40 c) 20 d) -20	1
10.	If $\vec{a} = 2\hat{i} + 2\hat{j} + 3\hat{k}$, $\vec{b} = -\hat{i} + 2\hat{j} + \hat{k}$, $\vec{c} = 3\hat{i} + \hat{j}$ are such that $\vec{a} + \lambda \vec{b}$ is perpendicular to $\vec{c}$, then find the value of λ. a)9 b)8 c)5 d)1	1
11.	Let $\vec{a} = 2\hat{i} + 3\hat{j} + c\hat{k}$. The value of c if $\|\vec{a}\| = 5$ is (a)0 (b)$2\sqrt{3}$ (c) 1 (d)12	1
12.	If $\vec{a} = (2\hat{i} - 4\hat{j} + 5\hat{k})$ then the value of h so that $h\vec{a}$ may be unit vector is (a)$\frac{1}{5}$ (b)$\frac{1}{\sqrt{3}}$ (c)$\frac{1}{3\sqrt{5}}$ (d)$\frac{1}{5\sqrt{3}}$	1
13.	If $\overrightarrow{AB} = (2\hat{i} + \hat{j} - 3\hat{k})$ and A(1,2,-1) is the given point, then the coordinates of B are (a) (3,-3,4) (b) (3,3,4) (c) (-3,-3,-4) (d) (3,3,-4)	1
14.	If $\left\|\vec{a} \times \vec{b}\right\| = 4$, $\vec{a}.\vec{b} = 2$, then $\|\vec{a}\|^2\left\|\vec{b}\right\|^2 =$ (a)6 (b)20 (c)8 (d)2	1
15.	If $\vec{a}$ is any vector, then $\vec{a}.\vec{a}$ is (a)0 (b)≠0 (c)$\vec{0}$ (d) $\|\vec{a}\|^2$	1
16.	If $\vec{a}$ and $\vec{b}$ are two vectors of magnitude 3 and $\frac{2}{3}$ respectively such that $\vec{a} \times \vec{b}$ is a unit vector, then the angle between $\vec{a}$ and $\vec{b}$ is (a) $\frac{\pi}{2}$ (b) $\frac{\pi}{4}$ (c) $\frac{\pi}{6}$ (d) $\frac{\pi}{8}$	1
17.	A vector of magnitude 9 units in the direction of the vector $(-2\hat{i}+\hat{j}+2\hat{k})$ is	1

	(a)$(-3\hat{\imath}+6\hat{\jmath}+6\hat{k})$ (b)$(-6\hat{\imath}+3\hat{\jmath}+3\hat{k})$ (c)$(-6\hat{\imath}+3\hat{\jmath}+6\hat{k})$ (d)$(6\hat{\imath}+6\hat{\jmath}-3\hat{k})$	
18.	The value of $\hat{\imath}.(\hat{\jmath}\times\hat{k})+\hat{\jmath}.(\hat{\imath}\times\hat{k})+\hat{k}.(\hat{\imath}\times\hat{\jmath})$ is (a)-1 (b) 1 (c) -2 (d) 2	1
19.	If $\left\|\vec{a}\times\vec{b}\right\|^2+\left\|\vec{a}.\vec{b}\right\|^2=144$ and $\left\|\vec{a}\right\|=4$, then $\left\|\vec{b}\right\|$ is equal to (a)1 (b)2 (c)3 (d)4	1
20.	If $\vec{a}$ and $\vec{b}$ are two collinear vectors, then which of the following is incorrect? (a) $\vec{b}$ = h$\vec{a}$, for som scalar h (b) $\vec{a}=\pm\vec{b}$ (c)the respective components of $\vec{a}$ and $\vec{b}$ are proportional (d)both the vector $\vec{a}$ and $\vec{b}$ have same direction, but different magnitudes.	1
21.	The vector in the direction of the vector $\vec{a}=\hat{\imath}-\hat{2}\hat{\jmath}+2\hat{k}$ that has a magnitude 9 is: (a) $\hat{\imath}-\hat{2}\hat{\jmath}+2\hat{k}$ (b)$\frac{1}{3}(\hat{\imath}-\hat{2}\hat{\jmath}+2\hat{k})$ (c) $3(\hat{\imath}-\hat{2}\hat{\jmath}+2\hat{k})$ (d)$9\,\hat{\imath}-\hat{2}\hat{\jmath}+2\hat{k}$	1
22.	The position vectors of the points *A, B, C* are $2\hat{\imath}+\hat{\jmath}-\hat{k}, 3\hat{\imath}-2\hat{\jmath}+\hat{k}$ *and* $\hat{\imath}+4\hat{\jmath}-3\hat{k}$ respectively. These points : (a) form an isosceles triangle (b) form a right triangle (c) are collinear (d) form a scalene triangle	1
23.	The projection of the vector $\vec{a}=2\hat{\imath}-\hat{\jmath}+\hat{k}$ on $\vec{b}=\hat{\imath}-2\hat{\jmath}+\hat{k}$ is: (a) $\frac{\sqrt{5}}{2}$ (b) $\frac{5}{\sqrt{2}}$ (c) $\frac{\sqrt{5}}{6}$ (d) $\frac{\sqrt{6}}{5}$	1
24.	If θ is the angle between any two vectors $\vec{a}$ *and* $\vec{b}$, then $\left\|\vec{a}\times\vec{b}\right\|=\left\|\vec{a}.\vec{b}\right\|$ when θ is: (a) $\frac{\pi}{3}$ (b)$\frac{\pi}{4}$ (c) $\frac{2\pi}{3}$ (d) none of these	1
25.	If $\hat{a},\hat{b},\hat{c}$ are mutually perpendicular unit vectors, then value of $\left\|\hat{a}+\hat{b}+\hat{c}\right\|$ is: (a) 1 (b) $\sqrt{2}$ (c) $\sqrt{3}$ (d) 2	1
26.	The vector $\vec{b}=3\hat{\imath}+4\hat{k}$ is to be written as the sum of a vector α parallel to $\vec{a}=\hat{\imath}+\hat{\jmath}$ and a vector $\vec{\beta}$ perpendicular to $\vec{a}$. Then $\vec{\alpha}$ is: (a) $\frac{3}{2}(\hat{\imath}+\hat{\jmath})$ (b)$\frac{2}{3}(\hat{\imath}+\hat{\jmath})$ (c)$\frac{1}{2}(\hat{\imath}+\hat{\jmath})$ (d) $\frac{1}{3}(\hat{\imath}+\hat{\jmath})$	1
27.	If the position vectors of *P* and *Q* are $\hat{\imath}+3\hat{\jmath}-7\hat{k}$ *and* $5\hat{\imath}-2\hat{\jmath}+4\hat{k}$ then cosine of the angle between $\overrightarrow{PQ}$ and y-axis is: (a)$\frac{5}{\sqrt{162}}$ (b) $\frac{4}{\sqrt{162}}$ (c) $\frac{11}{\sqrt{162}}$ (d) $-\frac{5}{\sqrt{162}}$	1
28.	$\vec{a}$ and $\vec{b}$ are two unit vectors and θ is the angle between them then $cos\frac{\theta}{2}=$ (a)$\frac{1}{2}\left\|\vec{a}+\vec{b}\right\|$ (b) $\left\|\vec{a}+\vec{b}\right\|$ c) $\left\|\vec{a}-\vec{b}\right\|$ (d) $\frac{1}{2}\left\|\vec{a}-\vec{b}\right\|$	1
29.	$\vec{a},\vec{b}$, and $\vec{c}$ are three unit vectors such that $\vec{a}+\vec{b}+\vec{c}=\vec{0}$, then $\vec{a}.\vec{b}+\vec{b}.\vec{c}+\vec{c}.\vec{a}=$ 3 (b) $-\frac{3}{2}$ (c) $\frac{3}{2}$ (d) 3	1
30.	**In the following questions, a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choice as follows:** **a) Assertion and reason both are correct statements and reason is correct explanation for assertion.** **b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.** **c) Assertion is correct statement but reason is wrong statement.** **d) Assertion is wrong statement but reason is correct statement.**	1

	Assertion(A): The area of parallelogram with diagonals $\vec{a}$ and $\vec{b}$ is $\left\|\vec{a} \times \vec{b}\right\|$. **Reason(R):** If $\vec{a}$ and $\vec{b}$ represent the adjacent sides of a triangle, then the area of a triangle, then the area of triangle can be obtained by evaluating $\left\|\vec{a} \times \vec{b}\right\|$.	
31.	Classify the following as scalar and vectors: (i) 20 kg weight (ii) $50m/s^2$.	1
32.	Find the position vector of the point which divides the join of the points $2\vec{a} - 3\vec{b}$ and $3\vec{a} - 2\vec{b}$ internally.	1
33.	Let $\vec{a} = \hat{\imath} + 2\hat{\jmath}$and $\vec{b} = 2\hat{\imath} + \hat{\jmath}$. Is $\|\vec{a}\| = \left\|\vec{b}\right\|$? Are the vectors equal ?	1
34.	Find the projection of the vector $7\hat{\imath} + \hat{\jmath} - 4\hat{k}$on $2\hat{\imath} + 6\hat{\jmath} + 3\hat{k}$.	1
35.	Find the value of p for which the vectors $\vec{a} = 3\hat{\imath} + 2\hat{\jmath} + 9\hat{k}$ and $\vec{b} = \hat{\imath} + p\hat{\jmath} + 3\hat{k}$ are (i) Perpendicular (ii) Parallel	1
36.	Find the angle between two vectors $\vec{a}\ and\ \vec{b}$ having the same length $\sqrt{2}$ and their scalar product is -1.	1
37.	If $\vec{r} = x\hat{\imath} + y\hat{\jmath} + z\hat{k}$, find the value of $(\vec{r} \times \hat{\imath}).(\vec{r} \times \hat{\jmath}) + xy$.	1
38.	Find a unit vector perpendicular to both the vectors $\hat{\imath} - 2\hat{\jmath} + 3\hat{k}$ and $\hat{\imath} + 2\hat{\jmath} - \hat{k}$.	1
39.	If $\vec{a} = \hat{\imath} + 3\hat{\jmath} - 2\hat{k}$ and $\vec{b} = -\hat{\imath} + 3\hat{k}$ then find $\left\|\vec{a} \times \vec{b}\right\|$.	1
40.	Find $\hat{\imath}.\hat{\imath}, \hat{\jmath}.\hat{\jmath}, and\ \hat{k}.\hat{k}$ also find $\hat{\imath} \times \hat{\imath}, \hat{\jmath} \times \hat{\jmath}\ and\ \hat{k} \times \hat{k}$	1
41.	The value of expression $\left\|\vec{a} \times \vec{b}\right\|^2 + (\vec{a} \cdot \vec{b})^2$ is $(a)\vec{a} \cdot \vec{b}$ (b) $\|\vec{a}\| \cdot \left\|\vec{b}\right\|$ (c) $\|\vec{a}\|^2 \left\|\vec{b}\right\|^2$ (d) $(\vec{a} \cdot \vec{b})$	1
42.	If is any non zero vector then $(\vec{a} \cdot \hat{\imath})\,\hat{\imath} + (\vec{a} \cdot \hat{\jmath})\,\hat{\jmath} + (\vec{a} \cdot \hat{k})\,\hat{k}$ is equal to (a) $\vec{a} \cdot \vec{b}$ (b) $\vec{a}$ (c) 0 (d) None of these	1
43.	The vector in the direction of the vector $(\hat{\imath} - 2\hat{\jmath} + 2\hat{k})$ has the magnitude 9 is (a) $(\hat{\imath} - 2\hat{\jmath} + 2\hat{k})$ (b) $\frac{\hat{\imath} - 2\hat{\jmath} + 2\hat{k}}{3}$ (c) $3(\hat{\imath} - 2\hat{\jmath} + 2\hat{k})$ (d) $9(\hat{\imath} - 2\hat{\jmath} + 2\hat{k})$	1
44.	The direction cosine of vector $\overrightarrow{BA}$,where the coordinates of A and B are (1,2,-1) and (3,4,0) respectively, are (a) -2,-2,-1 (b) $-\frac{2}{3}, -\frac{2}{3}, -\frac{1}{3}$ (c) 2,2,1 (d) $\frac{2}{3}, \frac{2}{3}, \frac{1}{3}$	1
45.	Angle between two vectors $\vec{a}$ and $\vec{b}$ with magnitude $\sqrt{3}$ and 4 respectively and $\vec{a} \cdot \vec{b} = 2\sqrt{3}$ is (a) $\frac{\pi}{6}$ (b) $\frac{\pi}{3}$ (c) $\frac{\pi}{2}$ (d) $\frac{5\pi}{2}$	1
46.	The value of p for which the vectors $2\hat{\imath} + p\hat{\jmath} + \hat{k}$ and $-4\hat{\imath} - 6\hat{\jmath} + 26\hat{k}$ are perpendicular to each other, is (a) 3 (b) -3 (c) $\frac{-17}{3}$ (d) $\frac{17}{3}$	1
47.	Two vectors $\vec{a}$ =A $\hat{\imath} + B\hat{\jmath} + C\hat{k}$ and $\vec{b}$=L$\hat{\imath} + M\hat{\jmath} + N\hat{k}$ are collinear if	1

	(a) AL + BM + CN= 0 (b) $\frac{A}{L}=\frac{B}{M}=\frac{C}{N}$ (c) A=L ,B=M , C=N (d) None of these	
48.	The value of $(\hat{\imath}\times\hat{\jmath})\cdot\hat{\jmath}+(\hat{\jmath}\times\hat{\imath})\cdot\hat{k}$ is (a) 2 (b) 0 (c) 1 (d) -1	1
49.	If $\lvert\vec{a}\rvert = 4$ and $-3\leq\delta\leq 2$ then the range of $\lvert\delta\vec{a}\rvert$ is (a) [0 , 8] (b) $[-12, 8]$ (c) [0 , 12] (d) [8 , 12]	1
50.	In ΔABC, $\overrightarrow{AB}=\hat{\imath}+\hat{\jmath}+2\hat{k}$ and $\overrightarrow{AC}=3\hat{\imath}-\hat{\jmath}+4\hat{k}$ .If D is mid- point of BC ,then , $\overrightarrow{AD}$ is equal to (a) $4\hat{\imath}+6\hat{k}$ (b) $2\hat{\imath}-2\hat{\jmath}+2\hat{k}$ (c) $\hat{\imath}-\hat{\jmath}+\hat{k}$ (d) $2\hat{\imath}+3\hat{k}$	1

ANSWERS:

Q. NO	ANSWER	MARKS
1.	b	**1**
2.	d	**1**
3.	a	**1**
4.	b	**1**
5.	c	**1**
6.	c	**1**
7.	a	**1**
8.	a	**1**
9.	b	**1**
10.	b	**1**
11.	b	1
12.	c	1
13.	d	1
14.	b	1
15.	d	1
16.	c	1
17.	c	1
18.	b	1
19.	c	1
20.	d	1
21.	C. $3(\hat{\imath}-\hat{2}\jmath+2\hat{k})$	1
22.	A. form an isosceles triangle	1
23.	C. $\frac{\sqrt{5}}{6}$	1
24.	B. $\frac{\pi}{4}$	1
25.	C. $\sqrt{3}$	1
26.	A. $\frac{3}{2}(\hat{\imath}+\hat{\jmath})$	1
27.	D. $-\frac{5}{\sqrt{162}}$	1
28.	A. $\frac{1}{2}\lvert\vec{a}+\vec{b}\rvert$	1

29.	B. $-\frac{3}{2}$	1
30.	C. **Assertion is correct statement but reason is wrong statement.**	1
31.	(i) Scalar (ii) Vector	1
32.	$\frac{12}{5}\vec{a}-\frac{13}{5}\vec{b}$	1
33.	Magnitude is equal ($\sqrt{5}$) of both vectors but since components if the vectors are not equal both vectors are not same.	1
34.	8/7	1
35.	(i) P=-15 (ii) P=2/3	1
36.	$\frac{2\pi}{3}$	1
37.	0	1
38.	$4\sqrt{3}$	1
39.	$\sqrt{91}$	1
40.	1,1,1 AND 0,0,0	1
41.	(c)	1
42.	(b)	1
43.	(c)	1
44.	(b)	1
45.	(b)	1
46.	(a)	1
47.	(b)	1
48.	(d)	1
49.	(c)	1
50.	(d)	1