CHAPTER 10

VECTORS

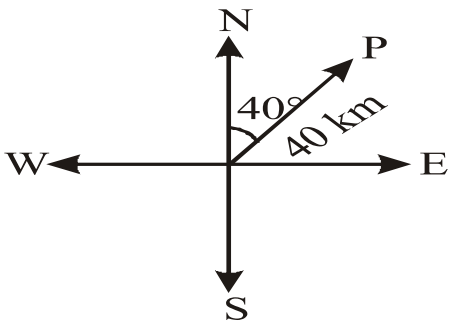
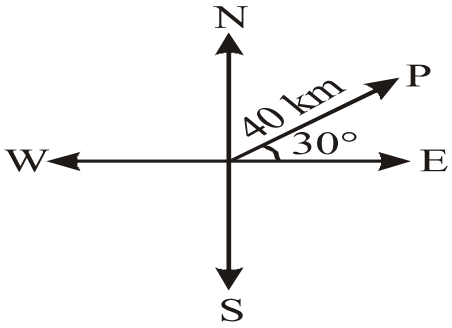
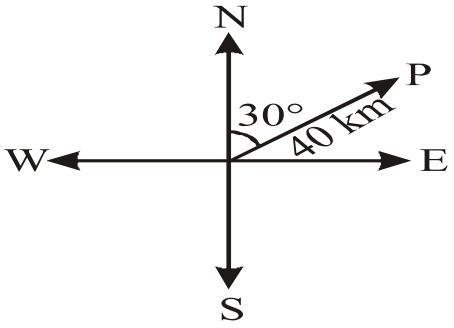
MULTIPLE CHOICE TYPE QUESTIONS

1	A vector equally inclined to axes is $(a)\ \hat{i}+\hat{j}+\hat{k}$ $(b)\ \hat{i}-\hat{j}+\hat{k}$ $(c)\ \hat{i}-\hat{j}-\hat{k}$ $(d)\ -\hat{i}+\hat{j}-\hat{k}$
2	If $\lvert\vec{a}\rvert = 4$ and $-3 \le \lambda \le 2$ then the range of $\lvert\lambda\vec{a}\rvert$ is (a) [0, 8] (b) [-12, 8] (c) [0, 12] (d) [8, 12]
3	For what value of 'a' the vectors $2\hat{i}-3\hat{j}+4\hat{k}$ and $a\hat{i}+6\hat{j}-8\hat{k}$ are collinear? (a) 2 (b) - 4 (c) 4 (d) - 2
4	ABCDEF is a regular hexagon, If $\overrightarrow{AB}=\vec{a}, \overrightarrow{BC}=\vec{b}$ and $\overrightarrow{CD}=\vec{c}$ then $\overrightarrow{AE}$ is (a) $\vec{a}+\vec{b}$ (b) $\vec{a}+\vec{b}+\vec{c}$ (c) $\vec{b}+\vec{c}$ (d) $\overrightarrow{2a}+\vec{b}+\vec{c}$
5	The value of α for which the vectors $2\hat{i}+\hat{j}+3\hat{k}$ and $\hat{i}-\alpha\hat{j}+4\hat{k}$ are orthogonal is (a) 12 (b) - 14 (c) 14 (d) - 12
6	The angle between the vectors $\hat{i}-\hat{j}+\hat{k}$ and $\hat{i}+\hat{j}-\hat{k}$ is (a) 0 (b) $\frac{\pi}{2}$ (c) $\cos^{-1}(\frac{1}{3})$ (d) $\cos^{-1}(-\frac{1}{3})$
7	If $\vec{p}$ is a unit vector and $(\vec{x}-\vec{p}).(\vec{x}+\vec{p})=80$, then $\lvert\vec{x}\rvert$ is (a) 9 (b) ± 9 (c) - 9 (d) $4\sqrt{5}$
8	If the vectors $2\hat{i}-\hat{j}+\hat{k}, \hat{i}+2\hat{j}-3\hat{k}$ and $3\hat{i}+\beta\hat{j}+5\hat{k}$ are coplanar then the value of β is (a) 2 (b) - 4 (c) 4 (d) - 2
9	The area of the parallelogram having diagonals $3\hat{i}+\hat{j}-2\hat{k}$ and $\hat{i}-3\hat{j}+4\hat{k}$ is (a) 12 $\sqrt{5}$ (b) 364 (c) $10\sqrt{3}$ (d) $5\sqrt{3}$
10	The unit vector perpendicular to both the vectors $\vec{a}=\hat{i}+\hat{j}+\hat{k}$ and $\vec{b}=\hat{i}+\hat{j}$. is (a) $\hat{i}+\hat{j}$ (b) $-\frac{1}{\sqrt{2}}\hat{i}+\frac{1}{\sqrt{2}}\hat{j}$ (c) $\frac{1}{\sqrt{2}}\hat{i}+\frac{1}{\sqrt{2}}\hat{j}$ (d) $\frac{1}{\sqrt{2}}\hat{i}-\frac{1}{\sqrt{2}}\hat{j}$
11	The value of $(\hat{i}\times\hat{j}).\hat{k}+\hat{i}.\hat{j}$ is (a) 1 (b) - 1 (c) 0 (d) - 2
12	The value of $(\hat{i}\times\hat{j}).\hat{k}+(\hat{j}\times\hat{k}).\hat{i}$ is (a) 2 (b) - 1 (c) 1 (d) - 2
13	If the vectors $3\hat{i}+2\hat{j}+9\hat{k}$ and $\hat{i}+p\hat{j}+3\hat{k}$ are parallel then the value of **p** is (a) 3/2 (b) – 3/2 (c) 2/3 (d) – 2 / 3
14	If $\lvert\vec{a}\times\vec{b}\rvert=\sqrt{3}, \lvert\vec{a}\rvert=1$ and $\lvert\vec{b}\rvert=2$ then the angle between $\vec{a}$ and $\vec{b}$ is (a) 30^0 (b) 60^0 (c) 45^0 (d) 90^0

15	If $\vec{a}$ and $\vec{b}$ are two unit vectors and θ is the angle between them then $\frac{1}{2}(\vec{a}-\vec{b})^2$ is (a) 1 + cosθ (b) 1 - sinθ (c) 1 + sinθ (d) 1 - cosθ
16	A vector in the direction of $\vec{a}$ = $\hat{i}$ −2 $\hat{j}$ whose magnitude is 7 (a) $\frac{7}{\sqrt{5}}\hat{i}-\frac{14}{\sqrt{5}}\hat{j}$ (b) $\frac{7}{\sqrt{5}}\hat{i}+\frac{14}{\sqrt{5}}\hat{j}$ (c) $\frac{7}{\sqrt{5}}(\hat{i}-\hat{j})$ (d) $\frac{7}{\sqrt{5}}\hat{i}-\frac{2}{\sqrt{5}}\hat{j}$
17	The position vector of a point which divides the join of points with position vectors $\vec{a}+\vec{b}$ and $2\vec{a}-\vec{b}$ in the ratio 1:2 internally is (a) $\frac{(3\vec{a}+2\vec{b})}{3}$ (b) $\vec{a}$ (c) $\frac{(5\vec{a}-\vec{b})}{3}$ (d) $\frac{(4\vec{a}+\vec{b})}{3}$
18	A vector in the direction of vector $\hat{i}-2\hat{j}+2\hat{k}$ that has magnitude 15 is (a) $\hat{i}-2\hat{j}+2\hat{k}$ (b) 5 ($\hat{i}-2\hat{j}+2\hat{k}$) (c) 5 $\hat{i}-2\hat{j}+2\hat{k}$ (d)$\hat{i}-5\hat{j}+2\hat{k}$
19	If $\vec{a}.\vec{b}=\vec{a}.\vec{c}$ and $\vec{a}\times\vec{b}=\vec{a}\times\vec{c}$, $\vec{a}\neq 0$, then (a) $\vec{b}=\vec{c}$ (b) $\vec{b}=\vec{0}$ (C) $\vec{b}+\vec{c}=\vec{0}$ (d)$\vec{c}=\vec{0}$
20	If $\vec{a}$ lies in the plane of vectors $\vec{b}$ and $\vec{c}$, then which of the following is correct? (a) $[\vec{a}\vec{b}\vec{c}]=0$ (b) $[\vec{a}\vec{b}\vec{c}]=1$ (C) $[\vec{a}\vec{b}\vec{c}]=3$ (d)$[\vec{b}\vec{c}\vec{a}]=1$
21	The vector cos X cos Y $\hat{i}$+ cos X sinY$\hat{j}$ + sinX $\hat{k}$ is a (a) Null vector (b) Unit vector(c) Constant vector (d)None of these
22	ABCD is a parallelogram with AC and BD as diagonals. Then, $\overrightarrow{AC}-\overrightarrow{BD}$ = (a) $4\overrightarrow{AB}$ (b) $3\overrightarrow{AB}$ (c) $2\overrightarrow{AB}$ (d)$\overrightarrow{AB}$
23	If $[2\vec{a}+4\vec{b}\vec{c}\vec{d}]$ = m $[\vec{a}\vec{c}\vec{d}]$ + n $[\vec{b}\vec{c}\vec{d}]$, then m + n = (a) 8(b) – 6 (c) 10 (d) 6
24	If the vectors $2\hat{i}-3\hat{j}+4\hat{k}$, $\hat{i}+2\hat{j}-\hat{k}$and $x\hat{i}-\hat{j}+2\hat{k}$ *are* coplanar, then x = (a) 0(b) 5/8 (c) 8/5(d)1
25	For every point P (x, y, z) on the xy – plane, (a) x = 0(b) y = 0 (c) z = 0(d)none of these
26	The position vector of the point (1, 0, 2) is (a) $\vec{i}+\vec{j}+2\vec{k}$ (b) $\vec{i}+2\vec{j}$ (c) $2\vec{}+3\vec{k}$ (d) $\vec{i}+2K$
27	The vector a and b satisfy the equation 2a+b=p and a+2b=q where p= i+j and q=i-j If θ is the

	angle between a and b , then (a) cosθ =4/5 (b)cos θ = -4/5 (c)cos θ =3/5 (d) cos θ =2/5
28	The modulus of $7\vec{i} - 2\vec{J} + \vec{K}$ (a) $\sqrt{15}$(b) $\sqrt{55}$(c)3 $\sqrt{6}$(d) 6
29	Let a and b be two unit vectors and α be the angle between them, then a+b is a unit vector, if (a)α=$\frac{\pi}{4}$ (b) α=$\frac{2\pi}{3}$(c). α=$\frac{\pi}{2}$(d) α=$\pi/6$
30	If $\vec{a} = 2\vec{i} - 3\vec{j} + 4\vec{k}$ and $\vec{b} = \vec{i} + 2\vec{j} + \vec{k}$ then $\vec{a} + \vec{b}$ = (a) $\vec{i} + \vec{j} + 3\vec{k}$ (b) $3\vec{i} - \vec{j} + 5\vec{k}$ (c) $\vec{i} - \vec{j} - 3\vec{k}$ (d) $2\vec{i} + \vec{j} + k$
31	The scalar product of 5i^ + j^ – 3k^ and 3i^ – 4j^ + 7k^ is (a) 10 (b) -10 (c) 15 (d) -15
32	If $\vec{a}.\vec{b} = 0$, then (a) a ⊥ b (b) $\vec{a}$ || $\vec{b}$ (c) $\vec{a} + \vec{b} = 0$ (d) $\vec{a} - \vec{b} = 0$
33	$\vec{k} \times \vec{j}$ = (a) 0 (b) 1 (c) $\vec{i}$ (d) $-\vec{i}$
34	$\vec{a}.\vec{a}$ = (a) 0 (b) 1 (c) $\|\vec{a}\|^2$ (d) $\|\vec{a}\|$
35	If $\vec{a} = \vec{i} - \vec{j} + 2\vec{k}$ and b = $3\vec{i} + 2\vec{j} - \vec{k}$ then the value of $(\vec{a} + 3\vec{b}).(2\vec{a} - \vec{b})$=. (a) 15 (b) -35 (c) 18 (d) -18
36	If $\vec{a} = \vec{i} + 2\vec{j} + 3\vec{k}$ and $\vec{b} = 3\vec{i} + 2\vec{j} + \vec{k}$, then cos θ = (a) 6/7 (b) 5/7 (c) 4/7 (d) ½
37	If $\|\vec{a} + \vec{b}\| = \|\vec{a} - \vec{b}\|$, then (a) $\vec{a}$ || $\vec{a}$ (b) $\vec{a}$ ⊥ $\vec{b}$ (c) $\|\vec{a}\| = \|\vec{b}\|$ (d) None of these
38	If for non-zero vectors $\vec{a}$and $\vec{b}$, $\vec{a}$X$\vec{b}$is a unit vector and $\|\vec{a}\|$= between$\|\vec{b}\| = \sqrt{2}$, then angle θ between vector $\vec{a}$ and $\vec{b}$ is a) $\frac{\pi}{2}$b)$\frac{\pi}{3}$ $c))\ \frac{\pi}{6}$ $d))\ -\frac{\pi}{2}$
39	The area of a parallelogram whose one diagonal is $2\hat{\imath}+\hat{\jmath} - 2\hat{k}$ and one side is $3\hat{\imath}+\hat{\jmath} - \hat{k}$ is a)$\hat{\imath}$- $4\hat{\jmath} - \hat{k}$ b) $3\sqrt{2}$ Sq. units c) $6\sqrt{2}$ Sq. units d)6 Sq. units
40	Position vector of point A and B are$\vec{a}\ X\ \vec{b}$ and $2\vec{a} - \vec{b}$. Then $\overrightarrow{AB}$ equal to a)$3\vec{a}$ b)-$\vec{a}$ +2$\vec{b}$ c) $\vec{a} - 2\vec{b}$ d) none of these

41	If $\|\vec{a}\|$=5,$\|\vec{b}\|$= 13 and $\|\vec{a}X\vec{b}\|$=25, then $\vec{a}.\vec{b}$ is equal to a) 12 b) 5 c) 13 d) 60
42	If $\|\vec{a}\|$=8,$\|\vec{b}\|$= 3 and $\|\vec{a}.\vec{b}\|$=$12\sqrt{3}$,then the value of $\|\vec{a}X\vec{b}\|$is a) 12 b) $12\sqrt{3}$ c)6 d) $4\sqrt{3}$
43	If $\hat{a}$ be a unit vector then, (a) direction of $\hat{a}$ is fixed b) magnitude of $\hat{a}$ is fixed (c) direction and magnitude is fixed (d) any one of direction is fixed.
44	The angle between the vectors $\vec{a}$= $\hat{\imath}$--$\hat{\jmath}+\hat{k}$ and $\vec{b}$= $\hat{\imath}$+$\hat{\jmath}-\hat{k}$ is a) $\cos^{-1}(\frac{1}{3})$ b)$\sin^{-1}(\frac{1}{3})$ c)$\cos^{-1}(\frac{-1}{3})$ d) $\sin^{-1}(\frac{-1}{3})$
45	A vector equally inclined to axes is a) $\hat{\imath}$+$\hat{\jmath}+\hat{k}$ b)$\hat{\imath}$-$\hat{\jmath}+\hat{k}$ c)$\hat{\imath}$-$\hat{\jmath}-\hat{k}$d)-$\hat{\imath}$+$\hat{\jmath}-\hat{k}$
46	$\vec{a},\vec{b},\vec{c}$ are 3 vectors, such that $\vec{a}+\vec{b}+\vec{c}=0$, $\|\vec{a}\|=1$, $\|\vec{b}\|=2,\|\vec{c}\|=3,$, then $\vec{a}.\vec{b}+\vec{b}.\vec{c}+\vec{c}.\vec{a}$ is equal to (a) 1 (b) 0 (c) -7 (d) 7
47	A zero vector has (a) any direction (b) no direction (c) many directions (d) None of these
48	Let $\vec{a}$, $\vec{b}$, $\vec{c}$ be three vectors of magnitudes 3, 4 and 5 respectively. If each one is perpendicular to the sum of the other two vectors, then $\|\vec{a}+\vec{b}+\vec{c}\|$= (a) 5 (b) $3\sqrt{2}$ (c) $5\sqrt{2}$ (d) 12

49	Which of the following represents graphically the displacement of 40 km, 30° East of North? (a)  (b)  (c)  (d) None of these
50	Let $\vec{a},\vec{b},\vec{c}$ be unit vectors such that $\vec{a}+\vec{b}+\vec{c}=\vec{0}$. Which one of the following is correct ? (a) $\vec{a}\times\vec{b}=b\times\vec{c}=\vec{c}\times\vec{a}=\vec{0}$ (b) $\vec{a}\times\vec{b}=b\times\vec{c}=\vec{c}\times\vec{a}\neq\vec{0}$ (c) $\vec{a}\times\vec{b}=b\times\vec{c}=\vec{a}\times\vec{c}\neq\vec{0}$ (d) $\vec{a}\times\vec{b},b\times\vec{c},\vec{c}\times\vec{a}$ are muturally perpendicular
51	If the vectors $a\hat{i}+2\hat{j}+3\hat{k}$ and $-\hat{i}+5\hat{j}+a\hat{k}$ are perpendicular to each other then a is equal to: (a) 5 (b) -6 (c) -5 (d) 6

52	If $\vec{a}$ and $\vec{b}$ are the two vectors such that $\vec{a}\cdot\vec{b} = 0$ and $\vec{a}\times\vec{b} = 0$, then (a) $\vec{a}$ is parallel to $\vec{b}$. (b) $\vec{a}$ is perpendicular to $\vec{b}$. (c) either $\vec{a}$ or $\vec{b}$ is a null vector . (d) None of these.
53	If θ is the angle between any two vectors a and b, then $\lvert a.b\rvert = \lvert a\times b\rvert$, where θ is equal to (a) zero (b) $\frac{\pi}{4}$ (c) $\frac{\pi}{2}$ (d) π
54	For what value of m, are the points with position vector $10\hat{i}+3\hat{j}, 12\hat{i}-5\hat{j}$ and $m\hat{i}+11\hat{j}$ collinear ? (a) -8 (b) 8 (c) 4 (d) -4
55	If $\left(\vec{a}\times\vec{b}\right)^2+\left(\vec{a}.\vec{b}\right)^2 = 676$ and $\lvert\vec{b}\rvert = 2$, then $\lvert\vec{a}\rvert$ is equal to (a) 13 (b) 26 (c) 39 (d) None of these
56	A vector whose magnitude is the same as that of a given vector, but direction is opposite to that of it, is called (a) negative of the given vector (b) equal vector (c) null vector (d) collinear vector
57	Three points (2, –1, 3), (3, –5, 1) and (– 1, 11, 9) are (a) Non-collinear (b) Non-coplanar (c) Collinear (d) None of these

58	For any vector $\vec{a}$, the value of $\left(\vec{a}\times\hat{i}\right)^2+\left(\vec{a}\times\hat{j}\right)^2+\left(\vec{a}\times\hat{k}\right)^2$ is equal to (a) $\vec{a}^2$ (b) $3\vec{a}^2$ (c) $4\vec{a}^2$ (d) $2\vec{a}^2$
59	The Position vector $\vec{a}$ of a point (12,n) is such that $\lvert\vec{a}\rvert$ = 13 then n = (a) ±4 (b) ±3 (c) ±5 (d) ±6
60	If a, b, c and d are the position vectors of the points A, B, C and D such that a + c = b + d, then ABCD is a (a) Trapezium (b) Rectangle (c) Square (d) Parallelogram
61	A point from a vector starts is called ____ and where it ends is called its ____ (a) Terminal point, end point. (b) initial point, terminal point (c) Origin, end point (d) initial point, end point
62	If $\vec{a}$ and $\vec{b}$ are position vectors of the points (- 1, 1) and (m, – 2). then for what value of m, the vectors $\vec{a}$ and $\vec{b}$ are collinear. (a) 1 (b) 2 (c) -1 (d) -2
63	Vectors that may be subject to its parallel displacement without changing its magnitude and direction are called _____. (a) Free vectors (b) Coinitial vectors (c) Collinear vectors. (d) Parallel vectors
64	Find the value of λ so that the vectors $2\hat{i}-4\hat{j}+\hat{k}$ and $4\hat{i}-8\hat{j}+\lambda\hat{k}$ are parallel. (a) -1(b) 3 (c) -4(d) 2
65	The vectors AB = $3\hat{i}+4\hat{k}$ and BC = AC=$5\hat{i}-2\hat{j}+4\hat{k}$are the side of a ΔABC. The length of the median through A is

	(a) √18(b) √72(c) √33(d) √288
66	The vectors $\lambda\hat{i}+\hat{j}+2\hat{k}, \hat{i}+\lambda\hat{j}-\hat{k}$ and $2\hat{i}-\hat{j}+\lambda\hat{k}$ are coplanar if (a) λ = -2(b) λ = 0(c) λ = 1(d) λ = -1
67	If |a – b| = |a| = |b| = 1, then the angle between a and b is (a) π/3(b) 3π/4(c) π/2(d) 0
68	If the angle between $\hat{i}+\hat{k}$ and $\hat{i}+\hat{j}+a\hat{k}$ is π/3, then the value of a is (a) 0 or 2(b) -4 or 0(c) 0 or -3(d) 2 or -2
69	The projection of (1, 2, – 1) on $\hat{i}$ is ..... (a) $\frac{1}{\sqrt{6}}$ (b) $\frac{-1}{\sqrt{6}}$ (c) 1 (d) – 1
70	The projection of the vector (–4, –2, 4) on (2, 1, 1) is ..... (a) (–2, 1, 1) (b) (–2, –1, –1) (c) (1, –1, –2) (d) (–1, 1, 2)
71	Find the magnitude of vector $3\hat{i}+2\hat{j}+12\hat{k}$ (a) √157(b) 4√11(c) √213(d) 9√3

ANSWERS

MultpleChoice question	
Q.No.1	Answer
1	a
2	c
3	b
4	c
5	c
6	d
7	a
8	b
9	d
10	b
11	a
12	a
13	c
14	b
15	d
16	(a) $\frac{7}{\sqrt{5}}\hat{i} - \frac{14}{\sqrt{5}}\hat{j}$
17	(d) $\frac{(4\vec{a}+\vec{b})}{3}$
18	(b) 5 ($\hat{i}$– 2 $\hat{j}$ + 2 $\hat{k}$)
19	$(a)\ \vec{b} = \vec{c}$
20	(a) [$\vec{a}\vec{b}\vec{c}$] = 0
21	(b) unit vector
22	**(c) 2 $\overrightarrow{AB}$**
23	**(d) 6**
24	(c) 8/5
25	**(c) z = 0**
26	D
27	B
28	C
29	B
30	B
31	B
32	A

33	D
34	C
35	B
36	B
37	B
38	C
39	B
40	C
41	D
42	A
43	B
44	C
45	A
46	C
47	B
48	C
49	C
50	C
51	C
52	C
53	B
54	B
55	A
56	A
57	C
58	D
59	(c)
60	(d)
61	(b)
62	(b)
63	(a)
64	(d)
65	(c)
66	(a)
67	(a)
68	(b)
69	(c)
70	(b)
71	(a)

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