Chapter 7

VECTORS

OBJECTIVE

(1) If $u = 2\underline{i} + \alpha\underline{j} + 5\underline{k}$ & $\underline{v} = 3\underline{i} + \underline{j} + \alpha\underline{k}$ are perpendicular α = ______

(a) 0 (b) 3

(c) -1 (d) $\frac{-1}{3}$

(2) Projection of $\underline{a} = u\underline{i} + v\underline{j} + w\underline{k}$ along $\underline{j}$ is ______

(a) u (b) v

(c) w (d) none

(3) $ab \sin\theta$ = __________

(a) $\underline{a} \times \underline{b}$ (b) $\underline{a} \cdot \underline{b}$

(c) $|\underline{a} \times \underline{b}|$ (d) $\frac{\underline{a} \times \underline{b}}{|\underline{a} \times \underline{b}|}$

(4) If $4\underline{i} + 0\underline{j} - 3\underline{k}$ be a vector then $\cos\gamma$ = _________

(a) $\frac{4}{5}$ (b) $\frac{1}{5}$

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

(5) The magnitude of a __________ can't be change.

(a) Null vector (b) Unit vector

(c) Negative of vector (d) none

(6) The vector [0, 0, 1] is along ___________

(a) x-axis (b) y-axis

(c) z-axis (d) all of these

(7) Volume of parallelepiped with edges $\underline{i} - 4\underline{j} - \underline{k}$, $\underline{i} - \underline{j} - 2\underline{k}$ & $2\underline{i} - 3\underline{j} + \underline{k}$ is _______

(a) 10 (b) 0

(c) 14 (d) 17

(8) If $\underline{a}$ & $\underline{b}$ are two non-zero vectors, then

$|\underline{a} . \underline{b}|$ & $|\underline{a} \times \underline{b}|$ are always _________

(a) $\geq |\underline{a}|\ |\underline{b}|$ (b) $\leq |\underline{a}|\ |\underline{b}|$

(c) $\neq |\underline{a}|\ |\underline{b}|$ (d) $= |\underline{a}|\ |\underline{b}|$

(9) The norm of a non zero vector $\underline{u}$ is ________

(a) $|\underline{u}| = 0$ (b) $|\underline{u}| < 0$

(c) $|\underline{u}| > 0$ (d) $|\underline{u}| \geq 0$

(10) If A, B, C, D are vertices of parallelepiped, its volume = _________

(a) $\left[\overrightarrow{AB}\ \overrightarrow{BC}\ \overrightarrow{CD}\right]$ (b) $\left[\overrightarrow{AB}\ \overrightarrow{AC}\ \overrightarrow{BD}\right]$

(c) $\left[\overrightarrow{AB}\ \overrightarrow{AC}\ \overrightarrow{AD}\right]$ (d) $\left[\overrightarrow{BC}\ \overrightarrow{BD}\ \overrightarrow{AD}\right]$

(11) $(\underline{i} - \underline{j}) . (\underline{j} - \underline{k}) \times (\underline{k} - \underline{i}) =$ _______

(a) 1 (b) 0

(c) -1 (d) 2

(12) Moment of foce $\overrightarrow{F}$ about A, applied at B is _______

(a) $\overrightarrow{F} . \overrightarrow{AB}$ (b) $\overrightarrow{AB} \times \overrightarrow{F}$

(c) $\overrightarrow{BA} . \overrightarrow{F}$ (d) $\overrightarrow{F} \times \overrightarrow{BA}$

(13) A vector parallel and perpendicular to every vector is __________

(a) position vector (b) negative vector

(c) zero vector (d) unit

(14) If $\overrightarrow{AB} = \lambda\ \overrightarrow{DC}$ in quadrilateral ABCD, then ABCD is parallelogram if

(a) $\lambda = 0$ (b) $\lambda \neq 0$

(c) $\lambda \neq 1$ (d) $\lambda = 1$

(15) A force $\vec{F}$ = __________

(a) $\vec{F}$ (b) $|\vec{F}|\ \vec{F}$

(c) $\dfrac{\vec{F}}{|\vec{F}|}$ (d) $\dfrac{\hat{F}}{|\vec{F}|}$

(16) $2\underline{i} \,.\, 5\underline{j} \times 3\underline{k}$ = ___________

(a) 1 (b) 30

(c) 0 (d) 12

(17) $\underline{u} = 2\underline{i} - 4\underline{j} + 5\underline{k}$ & $\underline{v} = 4\underline{i} - 3\underline{j} - 4\underline{k}$ are __________

(a) parallel (b) perpendicular

(c) neither // nor $\perp$ (d) none

(18) Two vectors $\underline{a}$ & $\underline{b}$ are coplanar if $P\underline{a} + q\underline{b} = 0$ implies

(a) $p = 0,\ q \neq 0$ (b) $p \neq 0,\ q = 0$

(c) $p = 0 = q$ (d) none

(19) Position vector of (–1, 2, 3) = ___________

(a) $\underline{i} + 2\underline{j} + 3\underline{k}$ (b) $\underline{i} - 2\underline{j} + 3\underline{k}$

(c) $\underline{i} - 2\underline{j} - 3\underline{k}$ (d) $-\underline{i} + 2\underline{j} + 3\underline{k}$

(20) Additive inverse of position vector is __________

(a) position vector (b) unit vector

(c) null vector (d) none

(21) $\left|\underline{v} . \dfrac{1}{|\underline{v}|}\right|$ = _________

(a) $|\underline{v}|$ (b) $\underline{v}$

(c) $\hat{\underline{v}}$ (d) 1

(22) A vector having norm 5 & lies on vertical line

(a) $5\underline{j}$ (b) $-5\underline{j}$

(c) both (d) none

(23) Angle between $\sqrt{3}\ \underline{i} + \underline{j}$ with x-axis is

(a) 30º (b) 60º

(c) 45° (d) 90°

(24) If $\underline{u} - \underline{v} = 0$, then $\underline{u} \times \underline{v} =$ _______

(a) 0 (b) $\underline{v} \times \underline{u}$

(c) v^2 (d) none

(25) If $\underline{u}$, $\underline{v}$ & $\underline{w}$ are coplanar, then $\underline{u} \cdot (\underline{v} \times \underline{w}) =$ _______

(a) 0 (b) 1

(c) -1 (d) none

(26) Vector making on angle α with y-axis is

(a) $\cos\alpha\, \underline{i} + \sin\alpha\, \underline{j}$ (b) $\sin\alpha\, \underline{i} + \cos\alpha\, \underline{j}$

(c) $\cos\alpha\, \underline{i} - \sin\alpha\, \underline{j}$ (d) all

(27) If $\underline{u} \cdot \underline{i} = -2$, $\underline{u} \cdot \underline{j} = 3$ then $\underline{u} =$ ________

(a) $3\underline{i} - 2\underline{j}$ (b) $2\underline{i} - 3\underline{j}$

(c) $3\underline{i} + 2\underline{j}$ (d) $-2\underline{i} + 3\underline{j}$

(28) If $\underline{u} = \underline{j} - 2\underline{k}$, $\underline{v} = 4\underline{j} + \underline{k}$, then $\underline{u} \times \underline{v}$ is // to

(a) x-axis (b) y-axis

(c) z-axis (d) none

(29) If $u = \frac{-1}{3}\underline{v}$ then $\underline{u} \times \underline{v} =$ ___________

(a) u^2 (b) $3\,uv\sin\theta$

(c) 0 (d) $3u^2$

(30) $\underline{u} \times (\underline{v} \cdot \underline{w}) =$ ________ ***(Lahore Board 2013)***

(a) $(\underline{u} \times \underline{v}) \cdot \underline{w}$ (b) $\underline{v} \cdot (\underline{w} \times \underline{u})$

(c) $\underline{w} \cdot (\underline{u} \times \underline{v})$ (d) none

(31) Vector making an angle α with x – axis is

(a) $\cos\alpha\, \underline{i} + \sin\alpha\, \underline{j}$ (b) $\sin\alpha\, \underline{i} + \cos\alpha\, \underline{j}$

(c) $\cos\alpha\, \underline{i} - \sin\alpha\, \underline{j}$ (d) all of these

(32) Cosine of the angle between any two non zero vectors $\underline{a}$ & $\underline{b}$.

(a) $\underline{a} \cdot \underline{b}$ (b) $\frac{|\underline{a}|\,|\underline{b}|}{\underline{a}.\underline{b}}$

(c) $\dfrac{\underline{a} \cdot \underline{b}}{|\underline{a}||\underline{b}|}$ (d) $\dfrac{\underline{a} \times \underline{b}}{|\underline{a}||\underline{b}|}$

(33) Angle between vectors $2\underline{i} + 3\underline{j} + \underline{k}$ and $2\underline{i} - \underline{j} - \underline{k}$ is __________

(a) $\dfrac{\pi}{6}$ (b) $\dfrac{\pi}{4}$

(c) $\dfrac{\pi}{2}$ (d) π

(34) A unit vector perpendicular to $\vec{a}$ & $\vec{b}$ is

(a) $\dfrac{\vec{a} \times \vec{b}}{|\vec{a}||\vec{b}|}$ (b) $\dfrac{\vec{a} \times \vec{b}}{|\vec{a} \times \vec{b}|}$

(c) $\vec{a} \times \vec{b}$ (d) $\dfrac{|\vec{a} \times \vec{b}|}{|\vec{a}||\vec{b}|}$

(35) The projection of $\vec{a}$ along $\vec{b}$ is

(a) $\vec{a} \cdot \hat{\underline{b}}$ (b) $\hat{\underline{a}} \cdot \vec{b}$

(c) $\hat{\underline{a}} \cdot \hat{\underline{b}}$ (d) $\vec{a} \cdot \vec{b}$

(36) If $\underline{u}$ & $\underline{v}$ are adjacent vectors of parallelogram, then area of parallelogram is

(a) $|\underline{u} \times \underline{v}|$ (b) $\dfrac{1}{2}|\underline{u} \times \underline{v}|$

(c) $\dfrac{1}{6}|\underline{u} \times \underline{v}|$ (d) $|\underline{u} \times \underline{v}|$

(37) Two vectors are $\vec{a} \cdot \vec{b}$ // if

(a) $\vec{a} \cdot \vec{b} = 0$ (b) $\vec{a} = \lambda \vec{b}$

(c) $\vec{a} \times \vec{b} = 0$ (d) both b & c

(38) The dot product of two vectors is minimum if

(a) $\theta = 0^{o}$ (b) $\theta = \pi$

(c) $\theta = \frac{\pi}{2}$ (d) $\theta = \frac{\pi}{4}$

(39) $[\underline{a} \cdot \underline{a} \cdot \underline{b}] =$ ________

(a) $a^2 b$ (b) $\underline{a} \cdot \underline{a} \cdot \underline{c}$

(c) 0 (d) none

(40) If 1 & $\sqrt{3}$ are i & j components respectively of a vector then its angle with x-axis is _____ ***(Lahore Board 2009)***

(a) 30º (b) 45º

(c) 60º (d) 90º

(41) The magnitude of dot & cross product of two vectors are 6 & $6\sqrt{3}$ respectively, then angle b/w the vectors is ***(Lahore Board 2009)***

(a) 90º (b) 60º

(c) 30º (d) 45º

(42) For vector $3\underline{i} - \underline{j} + 2\underline{k}$, $\cos\alpha =$ ________

(a) $\frac{3}{\sqrt{14}}$ (b) $\frac{1}{\sqrt{14}}$

(c) $\frac{-1}{\sqrt{14}}$ (d) $\frac{4}{\sqrt{14}}$

(43) _______ is parallel to every vector.

(a) position vector (b) null vector

(c) unit vector (d) none

(44) If α, β, γ are directional angles then $\sin^2\alpha + \sin^2\beta + \sin^2\gamma =$ ________

(a) 0 (b) 1

(c) 2 (d) -2

(45) The vector $\underline{u}$ & $\underline{v}$ are collinear if angle between is _________

(a) 1 (b) 0

(c) 45º (d) 90º

(46) If $\underline{u}$, $\underline{v}$ & $\underline{w}$ are edges of tetrahedron then volume = ______

(a) $\frac{1}{2}[\underline{u}\ \underline{v}\ \underline{w}]$ (b) $\frac{1}{3}[\underline{u}\ \underline{v}\ \underline{w}]$

(c) $\frac{1}{4}[\underline{u}\ \underline{v}\ \underline{w}]$ (d) $\frac{1}{6}[\underline{u}\ \underline{v}\ \underline{w}]$

(47) Magnitude of the vector $\underline{v} = 2\underline{i} + 3\underline{j} + 4\underline{k}$ is ___________ ***(Lahore Board 2014)***

(a) 29 (b) $\sqrt{29}$
(c) 28 (d) $\sqrt{28}$

(48) Two vectors $\underline{u}$ & $\underline{v}$, written as $p\underline{u} + q\underline{v} = 0$ are collinear if
(a) $p \neq 0$, $q \neq 0$ (b) $p = 0 = q$
(c) $p \neq 0$, $q = 0$ (d) $p = 0$, $q \neq 0$

(49) If two vectors $\underline{u}$ & $\underline{v}$ are orthogonal, then
(a) $\underline{u} \times \underline{v} = 0$ (b) $\underset{\rightarrow}{u} = \lambda \underline{v}$
(c) $\underline{u} \cdot \underline{v} = 0$ (d) $\vec{r} = \underline{u} + \lambda\underline{v}$

(50) The direction cosines of a vector are
(a) real numbers (b) – ve real numbers
(c) + ve real numbers (d) non zero real numbers

(51) Projection of $3\underline{i} + \underline{j} - \underline{k}$ along $-2\underline{i} - \underline{j} + \underline{k}$ is
(a) $\frac{-1}{\sqrt{2}}(-2\underline{i} - \underline{j} + \underline{k})$ (b) $\frac{-1}{2}$
(c) $\frac{1}{\sqrt{2}}\underline{i}$ (d) none of these

(52) A vector having norm 2 and lies on horizontal line is
(a) $2\underline{i}$ (b) $-2\underline{i}$
(c) both (a, b) (d) none of these

(53) Diagonals of ________ bisect each other.
(a) square (b) rectangle
(c) parallelogram (d) all of above

(54) If $\underline{a} = 4\underline{i} + 3\underline{j} + \underline{k}$, $\underline{b} = 2\underline{i} - \underline{j} + 2\underline{k}$ then vector perpendicular to both $\underline{a}$ & $\underline{b}$ is ___
(a) $\sqrt{185}\,\underline{i}$ (b) $\frac{1}{\sqrt{185}}(7\underline{i} - 6\underline{j} - 10\underline{k})$
(c) $\frac{1}{\sqrt{185}}(7\underline{i} + 6\underline{j} + 10\underline{k})$ (d) none

(55) Cosine of the angle between two collinear vectors is
(a) 0 (b) 0 and 1
(c) 1 and – 1 (d) none of these

(56) Let $\vec{OA} = \underline{a}$, $\vec{OB} = \underline{b}$ then $\vec{AB} =$ _______

(a) $\underline{a} - \underline{b}$ (b) $\underline{a} + \underline{b}$
(c) $\underline{b} - \underline{a}$ (d) $\underline{b} + \underline{a}$

(57) Work done = _______ *(Lahore Board 2014)*

(a) $\vec{r} \times \vec{F}$ (b) $\vec{F} \times \vec{r}$
(c) $\vec{F} \cdot \vec{d}$ (d) $\vec{d} \cdot \vec{F}$

(58) $|\vec{a} \times \vec{b}| =$ _________

(a) ab cos θ (b) ab sin θ
(c) $|\underline{a}||\underline{b}| \sin\theta\, \hat{n}$ (d) none

(59) If the angle between two vectors with magnitudes 16 and 2 is 60º. Find their scalar product.

(a) 6 (b) 48
(c) 16 (d) 24

(60) The work done by a force $2\underline{i} - \underline{j} - \underline{k}$ in moving on object through a displacement $3\underline{i} + 2\underline{j} - 5\underline{k}$ is ________

(a) 3 (b) 5
(c) 7 (d) 9

(61) The angle between vectors $\vec{A}$ & $\vec{B}$ is

(a) $\sin^{-1}\left(\dfrac{\vec{A}\cdot\vec{B}}{AB}\right)$ (b) $\sin^{-1}\left(\dfrac{|\vec{A}\times\vec{B}|}{AB}\right)$
(c) $\cos^{-1}\left(\dfrac{|\vec{A}\times\vec{B}|}{AB}\right)$ (d) $\cos^{-1}|\vec{A} \times \vec{B}|$

(62) A vector whose initial point is at origin and whose terminal point is P is called __

(a) displacement of P (b) magnitude of P
(c) position vector of point P (d) none of these

(63) If P = (2 , 3) Q = (6, – 2) $\vec{PQ}$ = __________

(a) $4\underline{i} + 5\underline{j}$ (b) $-4\underline{i} + 5\underline{j}$
(c) $4\underline{i} - 5\underline{j}$ (d) $5\underline{i} - 4\underline{j}$

(64) If $\underline{a} = -4\underline{i} + \underline{j} - 2\underline{k}$, $\underline{b} = 2\underline{i} + \underline{j} + \underline{k}$ then $\underline{b} \times \underline{a}$ = ________

(a) $3\underline{i} - 6\underline{k}$ (b) $-3\underline{i} + 6\underline{k}$

(c) $3\underline{i} + 6\underline{k}$ (d) $-3\underline{i} - 6\underline{k}$

(65) $(2\underline{a} + 3\underline{b}) \times (5\underline{a} + 7\underline{b}) =$ ________

(a) $\underline{b} - \underline{a}$ (b) $\underline{b} + \underline{a}$

(c) $\underline{a} \times \underline{b}$ (d) $\underline{b} \times \underline{a}$

(66) $\underline{u} \cdot (\underline{v} \times \underline{w}) =$ ___________

(a) $\underline{u} \times \underline{v}$ (b) $\underline{w} \cdot (\underline{v} \times \underline{u})$

(c) $\underline{v} \cdot (\underline{w} \times \underline{u})$ (d) none

(67) Commutative law hold in ___________

(a) vector product (b) cross product

(c) scalar product (d) none of these

(68) For any vectors $\underline{u} = [x, y]$, $\underline{v} = [x', y']$ are said to be equal iff

(a) $x = y$, $x' = y'$ (b) $x = -x'$, $y = -y'$

(c) $x = x'$, $y = y'$ (d) none

(69) $R^2 = \{(x, y) : x, y \in \Re\}$ is called _________

(a) vector (b) curve

(c) cartesian plane (d) none of these

(70) Geometrically $\vec{a} \cdot \vec{b} \times \vec{c}$ represents _________ having $\vec{a}$. $\vec{b}$ and $\vec{c}$ as its adjacent sides.

(a) Area of triangle (b) volume of parallelepiped

(c) volume of tetrahedron (d) area of parallelogram

(71) If $\underline{a} = 2\underline{i} + 4\underline{j} - \underline{k}$, $\underline{b} = \underline{i} - \underline{j} + 7\underline{k}$ & $\underline{c} = 5\underline{i} + 2\underline{j} + 3\underline{k}$ then $(3\underline{c} + \underline{b}) . (2\underline{a} - \underline{c}) =$ ________

(a) 32 (b) – 66

(c) – 19 (d) – 27

(72) If $\underline{a} \times \underline{b} = \underline{b} \times \underline{c} = \underline{c} \times \underline{a}$ then

(a) $\underline{a} = \underline{b} + \underline{c}$ (b) $\underline{b} = \underline{c} + \underline{a}$

(c) $\underline{a} = \underline{b} \neq \underline{c}$ (d) $\underline{a} + \underline{b} + \underline{c} = 0$

(73) If u = [4, 5] , 4, 5 called ________

(a) coordinates (b) vectors

(c) components (d) ordinates

(74) If $\overrightarrow{PQ} = 2\underline{i} + 7\underline{j}$ then P point is ________

(a) (2, 7) (b) (7, 2)

(c) (– 2 – 7) (d) (– 2, 7)

(75) If $\underline{a} = [2, 3, 1]$, $\underline{b} = [1, 0, 2]$ then $\underline{a} \times \underline{b}$ = __________

(a) $6\underline{i} - 3\underline{j} - 3\underline{k}$ (b) $6\underline{i} + 3\underline{j} + 3\underline{k}$

(c) $-6\underline{i} + 3\underline{j} + 3\underline{k}$ (d) Null vector

(76) $[\ \underline{i}\ .\ \underline{i}\ .\ \underline{j}]$ = _______ ***(Lahore Board 2012)***

(a) 1 (b) 3

(c) 0 (d) 2

(77) $|\cos\alpha\ \underline{i} + \sin\alpha\ \underline{j} + 0\underline{k}\ |$ = _______ ***(Lahore Board 2012)***

(a) 0 (b) 1

(c) – 1 (d) 2

(78) Magnitude of the vector $\underline{\mathbf{v}} = -\underline{\boldsymbol{i}} + \underline{\boldsymbol{j}}$ is ***(Lahore Board 2012)***

(a) $\sqrt{1}$ (b) $\sqrt{2}$

(c) $\sqrt{3}$ (d) $\sqrt{4}$

(79) The value of $\underline{\boldsymbol{k}}\ .\ \underline{\boldsymbol{i}} \times \underline{\boldsymbol{j}}$ is ***(Lahore Board 2012)***

(a) 0 (b) 1

(c) 2 (d) – 1

(80) Magnitude of $2\dot{i} + 3\dot{j} + 4\dot{k}$ is ***(Lahore Board 2011)***

(a) 2a (b) $\sqrt{29}$

(c) 28 (d) $\sqrt{28}$

(81) Commutative law holds in ***(Lahore Board 2013)***

(a) Vector product (b) cross product in three vectors

(c) Inner product (d) None of these

(82) The norm of $\underline{u} = [x, y]$ in R^2 is ***(Lahore Board 2013)***

(a) $x^2 + y^2$ (b) $\sqrt{x^2 + y^2}$

(c) $x^2 - y^2$ (d) $\sqrt{x^2 - y^2}$

(83) If $\underline{a}$ & $\underline{b}$ are non zero vectors, then $\underline{a} \times \underline{b}$ = ________ ***(Lahore Board 2013)***

(a) $\underline{b} \times \underline{a}$ (b) $\underline{a}\,\underline{b}$

(c) $\underline{a} \cdot \underline{b}$ (d) $-\underline{b} \times \underline{a}$

(84) $2\underline{i} \cdot (2\underline{j} \times \underline{k})$ equals

(a) 0 (b) 2

(c) 4 (d) 6

(85) $\hat{i} \times \hat{i}$ = ________

(a) 1 (b) 2

(c) 0 (d) −1

1.	*c*	***2.***	*b*	***3.***	*c*	***4.***	*c*	***5.***	*c*	***6.***	*c*
7.	*c*	***8.***	*b*	***9.***	*c*	***10.***	*c*	***11.***	*b*	***12.***	*b*
13.	*c*	***14.***	*d*	***15.***	*b*	***16.***	*b*	***17.***	*b*	***18.***	*d*
19.	*d*	***20.***	*d*	***21.***	*d*	***22.***	*c*	***23.***	*a*	***24.***	*a*
25.	*a*	***26.***	*b*	***27.***	*d*	***28.***	*a*	***29.***	*c*	***30.***	*d*
31.	*a*	***32.***	*c*	***33.***	*d*	***34.***	*b*	***35.***	*a*	***36.***	*d*
37.	*d*	***38.***	*b*	***39.***	*c*	***40.***	*c*	***41.***	*b*	***42.***	*a*
43.	*b*	***44.***	*c*	***45.***	*b*	***46.***	*d*	***47.***	*b*	***48.***	*a*
49.	*c*	***50.***	*a*	***51.***	*d*	***52.***	*c*	***53.***	*c*	***54.***	*b*
55.	*c*	***56.***	*c*	***57.***	*c*	***58.***	*b*	***59.***	*c*	***60.***	*d*
61.	*b*	***62.***	*c*	***63.***	*c*	***64.***	*b*	***65.***	*d*	***66.***	*c*
67.	*c*	***68.***	*c*	***69.***	*c*	***70.***	*b*	***71.***	*b*	***72.***	*d*
73.	*c*	***74.***	*c*	***75.***	*a*	***76.***	*c*	***77.***	*b*	***78.***	*b*
79.	*b*	***80.***	*b*	***81.***	*c*	***82.***	*b*	***83.***	*d*	***84.***	*c*
85.	*c*										