1. $\left|\vec{a} \times \vec{b}\right| + \left(\vec{a} \,.\, \vec{b}\right)^2 =$

(A) $\left|\vec{a}\right|^2 + \left|\vec{b}\right|^2$ (B) $\left|\vec{a}\right|^2 - \left|\vec{b}\right|^2$

(C) $\left|\vec{a}\right|^2 \ \left|\vec{b}\right|^2$ (D) None of these

2. The area of a triangle whose vertices are, A (1, - 1, 2), B (2, 1, - 1) and C (3, - 1, 2) is :

(A) 13 (B) $\sqrt{13}$

(C) 6 (D) $\sqrt{6}$

3. If $\vec{a}$ & $\vec{b}$ are two non - zero vectors, then the component of $\vec{b}$ along is

(A) (B) $\dfrac{\left(\vec{a} \,.\, \vec{b}\right)\vec{b}}{\vec{a} \,.\, \vec{a}}$

(C) $\dfrac{\left(\vec{a} \,.\, \vec{b}\right)\vec{b}}{\vec{a} \,.\, \vec{b}}$ (D) $\dfrac{\left(\vec{a} \,.\, \vec{b}\right)\vec{a}}{\vec{a} \,.\, \vec{a}}$

4. If $\vec{a} + \vec{b} + \vec{c} = 0$, then which relation is correct .

(A) $\vec{a} = \vec{b} = \vec{c} = 0$

(B) $\vec{a} \,.\, \vec{b} = \vec{b} \,.\, \vec{c} = \vec{c} \,.\, \vec{a}$

(C) $\vec{a} \times \vec{b} = \vec{b} \times \vec{c} = \vec{c} \times \vec{a}$

(D) None of these

5. If ABCDEF is a regular hexagon and $\vec{AB} + \vec{AC} + \vec{AD} + \vec{AE} + \vec{AF} = \lambda\ \vec{AD}$, then λ =

(A) 2 (B) 3

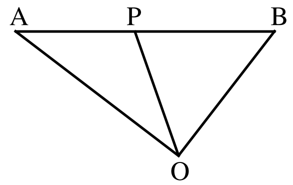
(C) 4 (D) 6

6. If O be the circumcentre and O′ be the orthocentre of a triangle ABC, then $\vec{OA} + \vec{OB} + \vec{OC} =$

(A) $2\ \vec{OO'}$ (B) $2\ \vec{O'O}$

(C) (D) $\vec{O'O}$

7. If in the given fig. $= \vec{a}$, $= \vec{b}$ and AP : PB = m : n, then =



(A) $\dfrac{m\vec{a} + n\vec{b}}{m + n}$ (B) $\dfrac{n\vec{a} + m\vec{b}}{m + n}$

(C) $m\,\vec{a} - n$ (D)

8. If $\vec{a} = 2\hat{i} + 2\hat{j} + 3\hat{k}$, [illegible] and $\vec{c} = 3\hat{i} + \hat{j}$, then + t is perpendicular to if t =

(A) 2 (B) 4

(C) 6 (D) 8

9. The area of the parallelogram whose diagonals are, and is :

(A) $10\sqrt{3}$ (B) $5\sqrt{3}$

(C) 8 (D) 4

10. $\vec{a}\ .\{(\ \ +\ \ )\times(\ \ +\ \ +\ \ )\} =$

(A) 0

(B) [ ] + [ ]

(C) [ ] (D) None of these

11. If the vectors , $\hat{i}+\hat{j}-\hat{k}$ and $3\hat{i}-\hat{k}$ form three concurrent edges of a parallelopiped, then the volume of the parallelopiped is :

(A) 8 (B) 10
(C) 4 (D) 14

12. $\left|(\vec{a}\times\vec{b})\,.\,\vec{c}\right| = |\vec{a}|\ |\ \ |\ |\ \ |$, if :

(A) . = . = 0

(B) . = . = 0

(C) . = . = 0

(D) . = . = . = 0

13. If , , are unit vectors such that + + = 0, then . + . + . =

(A) 1 (B) 3

(C) - (D)

14. If the position vectors of the points A, B, C be , , 3 – 2 respectively then the points A, B, C are :

(A) Collinear (B) Non – collinear
(C) Form a right angled triangle
(D) None of these

15. If & are the position vectors of A & B respectively, then the position vector of a point C on AB produced such that = 3 $\overrightarrow{AB}$ is :

(A) 3 $\vec{a}$ - (B) 3 -

(C) 3 - 2 (D) 3 - 2

16. The position vectors of the points A, B & C are , $\hat{j}+\hat{k}$ and $\hat{k}+\hat{i}$ respectively . The vector area of the Δ ABC = $\pm\frac{1}{2}$, where =

(A) (B) $\hat{i}-\hat{j}+\hat{k}$

(C) $\hat{i}+\hat{j}-\hat{k}$ (D) $\hat{i}+\hat{j}+\hat{k}$

17. If $\vec{a}$ = (1, – 1, 1) & = (– 1, – 1, 0), then the vector satisfying, $\vec{a}\times$ = $\vec{c}$ & . = 1, is :

(A) (1, 0, 0) (B) (0, 0, 1)
(C) (0, – 1, 0) (D) None of these

18. If $\vec{a}\times$ = $\vec{b}\times\vec{c}\neq 0$, then for some scalar k :

(A) + = k (B) $\vec{a}$ + = k $\vec{c}$

(C) + $\vec{c}$ = k (D) None of these

19. P is the point of intersection of the diagonals of the parallelogram ABCD. If O is any point, then $\overrightarrow{OA}+\overrightarrow{OB}+\overrightarrow{OC}+\overrightarrow{OD}$ is :

(A) $\overrightarrow{OP}$ (B) 2 $\overrightarrow{OP}$

(C) 3 $\overrightarrow{OP}$ (D) 4 $\overrightarrow{OP}$

20. A unit vector in the xy – plane which is perpendicular to $4\hat{i}-3\hat{j}+\hat{k}$ is :

(A) $\frac{\hat{i}+\hat{j}}{\sqrt{2}}$ (B) $\frac{1}{5}(3\hat{i}+4\hat{j})$

(C) $\frac{1}{5}(3\hat{i}-4\hat{j})$ (D) None of these

21. If the position vectors of the points

A, B, C, D be $2\hat{i}+3\hat{j}+5\hat{k}$, $\hat{i}+2\hat{j}+3\hat{k}$, $-5\hat{i}+4\hat{j}-2\hat{k}$ and $\hat{i}+10\hat{j}+10\hat{k}$ respectively, then :

(A) $\vec{AB} = \vec{CD}$ (B) $\vec{AB} \,||\, \vec{CD}$

(C) $\vec{AB} \perp$ (D) None of these

22. Let $\vec{a} =$ be a vector which makes an angle of 120° with a unit vector . Then the unit vector (+) is :

(A) (B) $-\frac{\sqrt{3}}{2}\hat{i}+\frac{1}{2}\hat{j}$

(C) $\frac{1}{2}\hat{i}+\frac{\sqrt{3}}{2}\hat{j}$ (D) $\frac{\sqrt{3}}{2}\hat{i}-\frac{1}{2}\hat{j}$

23. The points with position vectors, $60\hat{i}+3\hat{j}$, $40\hat{i}-8\hat{j}$, $a\hat{i}-52\hat{j}$ are collinear, if a =

(A) - 40 (B) 40

(C) 20 (D) None of these

24. If the scalar product of the vector, $\hat{i}+\hat{j}+\hat{k}$ with a unit vector parallel to the sum of the vectors, $2\hat{i}+4\hat{j}-5\hat{k}$ & $\lambda\hat{i}+2\hat{j}+3\hat{k}$ be 1, then λ =

(A) 1 (B) - 1

(C) 2 (D) - 2

25. If $\vec{a}$, , are three non-coplanar vectors and are defined by the relations ,

$$\vec{p}=\frac{\vec{b}\times\vec{c}}{[\vec{a}\ \vec{b}\ \vec{c}]},\ \vec{q}=\frac{\vec{c}\times\vec{a}}{[\vec{a}\ \vec{b}\ \vec{c}]},\ \vec{r}=\frac{\vec{a}\times\vec{b}}{[\vec{a}\ \vec{b}\ \vec{c}]}$$

then, $\left(\vec{a}+\vec{b}\right).\vec{p}+\left(\vec{b}+\vec{c}\right).\vec{q}+\left(\vec{c}+\vec{a}\right).\vec{r}$ is equal to :

(A) 0 (B) 1

(C) 2 (D) 3

26. The unit normal vector to the line joining $\hat{i}-\hat{j}$ & $2\hat{i}+3\hat{j}$ and pointing towards the origin is :

(A) $\frac{4\hat{i}-\hat{j}}{\sqrt{17}}$ (B) $\frac{-4\hat{i}+\hat{j}}{\sqrt{17}}$

(C) $\frac{2\hat{i}-3\hat{j}}{\sqrt{13}}$ (D) $\frac{-2\hat{i}+3\hat{j}}{\sqrt{13}}$

27. The position vector of a point C w.r.t. B is $\hat{i}+\hat{j}$ & that of B w.r.t. A is $\hat{i}-\hat{j}$. The position vector of C w.r.t. A is :

(A) $2\hat{i}$ (B) $2\hat{j}$

(C) $-2\hat{j}$ (D) $2\hat{i}$

28. A unit vector perpendicular to the plane determined by the points, (1, - 1, 2) , (2, 0, - 1) & (0, 2, 1) is :

(A) $\pm\frac{1}{\sqrt{6}}\left(2\hat{i}+\hat{j}+\hat{k}\right)$

(B) $\frac{1}{\sqrt{6}}\left(\hat{i}+2\hat{j}+\hat{k}\right)$

(C) $\frac{1}{\sqrt{6}}\left(\hat{i}+\hat{j}+\hat{k}\right)$

(D) $\frac{1}{\sqrt{6}}\left(2\hat{i}-\hat{j}-\hat{k}\right)$

29. If ABCD is a parallelogram, $\vec{AB}=2\hat{i}+4\hat{j}-5\hat{k}$ and $\vec{AD}=\hat{i}+2\hat{j}+3\hat{k}$, then the unit vector in the direction of BD is :

(A) $\frac{1}{\sqrt{69}}\left(\hat{i}+2\hat{j}-8\hat{k}\right)$

(B) $\frac{1}{69}\left(\hat{i}+2\hat{j}-8\hat{k}\right)$

(C) $\frac{1}{\sqrt{69}}\left(-\hat{i}-2\hat{j}+8\hat{k}\right)$

(D) $\frac{1}{69}\left(-\hat{i}-2\hat{j}+8\hat{k}\right)$

30. Let $\vec{b} = 3\hat{j} + 4\hat{k}$, and let be component vectors of $\vec{b}$ parallel and perpendicular to . If $= \frac{3}{2}\hat{i} + \frac{3}{2}\hat{j}$, then $\vec{b}_2 =$

(A) $\frac{3}{2}\hat{i} + \frac{3}{2}\hat{j} + 4\hat{k}$

(B) $-\frac{3}{2}\hat{i} + \frac{3}{2}\hat{j} + 4\hat{k}$

(C) $-\frac{3}{2}\hat{i} + \frac{3}{2}\hat{j}$ (D) None of these

31. If the points whose position vectors are $3\hat{i} - 2\hat{j} - \hat{k}$, $2\hat{i} + 3\hat{j} - 4\hat{k}$, $-\hat{i} + \hat{j} + 2\hat{k}$ and $4\hat{i} + 5\hat{j} + \lambda\hat{k}$ lie on a plane, then $\lambda =$

(A) - $\frac{146}{17}$ (B)

(C) - (D)

32. A and B are two points . The position vector of A is 6b − 2a . A point P divides the line AB in the ratio 1 : 2 . If is the position vector of P, then the position vector of B is given by :

(A) $7\hat{a} - 15\hat{b}$ (B) $7\hat{a} + 15\hat{b}$

(C) $15\hat{a} - 7\hat{b}$ (D) $15\hat{a} + 7\hat{b}$

33. If $\vec{a}$ & $\vec{b}$ are unit vectors making an angle θ with each other then $|\vec{a} - \vec{b}|$ is :

(A) 1 (B) 0

(C) $\cos\frac{\theta}{2}$ (D) 2 sin

34. If the vectors, , $\hat{i} + b\hat{j} + \hat{k}$ and $\hat{i} + \hat{j} + c\hat{k}$ $(a \neq b \neq c \neq 1)$ are coplanar, then the value of, $\frac{1}{1-a} + \frac{1}{1-b} + \frac{1}{1-c} =$

(A) - 1 (B) - $\frac{1}{2}$

(C) (D) 1

35. If C is the middle point of AB and P is any point outside AB, then :

$\vec{PA} + \vec{PB} = \vec{PC}$

(A)

(B) $\vec{PA} + \vec{PB} = 2\vec{PC}$

(C) $\vec{PA} + \vec{PB} + \vec{PC} = 0$

(D) $\vec{PA} + \vec{PB} + 2\vec{PC} = 0$

36. $\vec{a}, \vec{b}, \vec{c}$ are three non – zero, non – coplanar vectors and $\vec{p}, \vec{q}, \vec{r}$ are three other vectors such that,

$\vec{p} = \frac{\vec{b} \times \vec{c}}{\vec{a} . \vec{b} \times \vec{c}}$, $\vec{q} = \frac{\vec{c} \times \vec{a}}{\vec{a} . \vec{b} \times \vec{c}}$ and $\vec{r} = \frac{\vec{a} \times \vec{b}}{\vec{a} . \vec{b} \times \vec{c}}$, then $[\vec{p}, \vec{q}, \vec{r}]$ equals

(A) $\vec a \cdot \vec b \times \vec c$ (B) $\frac{1}{\vec a \cdot \vec b \times \vec c}$

(C) 0 (D) None of these

37. Let $\vec a = 2\hat i - \hat j + \hat k$, & $\vec c = \hat i + \hat j - 2\hat k$ be three vectors . A vector in the plane of $\vec b$ & $\vec c$ whose projection on $\vec a$ is of magnitude is :

(A) $2\hat i - 3\hat j + 3\hat k$ (B) $2\hat i + 3\hat j + 3\hat k$

(C) $-2\hat i - \hat j + 5\hat k$ (D) $2\hat i + \hat j + 5\hat k$

38. The magnitudes of mutually perpendicular forces $\vec a, \vec b$ & $\vec c$ are 2, 10 and 11 respectively . Then the magnitude of its resultant is :

(A) 12 (B) 15

(C) 9 (D) None of these

39. A vector $\vec a$ has components 2p & 1 with respect to a rectangular cartesian system . The system is rotated through a certain angle about the origin in the anti-clockwise sense . If $\vec a$ has components p + 1 & 1 w.r.t. the new system, then :

(A) p = 0 (B) $p = 1$ or $-\frac{1}{3}$

(C) p = − 1 or (D) p = 1 or − 1

40. Let the value of ,

= (x + 4y) a + (2x + y + 1) $\vec b$ and

= (y − 2x + 2) a + (2x - 3y - 1) $\vec b$,

where & $\vec b$ are non-collinear vectors . If 3 = $2\vec q$, then the value of x & y, will be :

(A) - 1, 2 (B) 2, - 1

(C) 1, 2 (D) 2, 1

41. If (x, y, z) ≠ (0, 0, 0) and $(\hat i + \hat j + 3\hat k)\,x + (3\hat i - 3\hat j + \hat k)\,y + (-4\hat i + 5\hat j)\,z = \lambda\,(x\hat i + y\hat j + z\hat k)$, then the value of λ will be :

(A) - 2, 0 (B) 0 , - 2

(C) - 1, 0 (D) 0, - 1

42. If three non - zero are, $\vec a = a_1\hat i + a_2\hat j + a_3\hat k$,

and . If is the unit vector perpendicular to the vectors $\vec a$ & $\vec b$ and the angle between $\vec a$ & $\vec b$ [illegible]

b_1 b_2 b_3

c_1 c_2 c_3 is $\frac{\pi}{6}$, then is equal to :

(A) 0 (B) $\frac{3\,(\Sigma a_1^2)\,(\Sigma b_1^2)\,(\Sigma c_1^2)}{4}$

(C) 1 (D) $\frac{(\Sigma a_1^2)\,(\Sigma b_1^2)}{4}$

43. The position vector of coplanar points A, B, C, D are respectively in such a way that, $(\vec a - \vec d)\cdot(\vec b - \vec c) = (\vec b - \vec d)\cdot(\vec c - \vec a) = 0$, then the point D of the Δ ABC is :

(A) Incentre (B) Circumcentre

(C) Orthocentre (D) None of these

44. If $\vec{F}_1 = \hat{i} - \hat{j} + \hat{k}$, ,

, and

, then the scalar product

of and $\overrightarrow{AB}$ will be :

(A) 3 (B) 6
(C) 9 (D) 12

45. If the moduli of the vectors, $\vec{a}, \vec{b}, \vec{c}$ are 3, 4, 5 respectively and $\vec{a}$ & $\vec{b} + \vec{c}$, $\vec{b}$ & $\vec{c} + \vec{a}$, $\vec{c}$ & $\vec{a} + \vec{b}$ are mutually perpendicular , then the modulus of $\vec{a} + \vec{b} + \vec{c}$ is :

(A) $\sqrt{12}$ (B) 12
(C) $5\sqrt{2}$ (D) 50

46. If the moduli of $\vec{a}$ & $\vec{b}$ are equal and angle between them is 120° and $\vec{a} \cdot \vec{b} = -8$, then $|\vec{a}|$, is equal to :

(A) - 5 (B) - 4
(C) 4 (D) 5

47. If = 0 & $\vec{a}$ = (1, a, a^2),

= (1, b, b^2) and = (1, c, c^2) are non - coplanar vectors, then a b c is equal to :

(A) - 1 (B) 0
(C) 1 (D) 4

48. If three vectors, ,

&

represents a cube, then its volume will be :

(A) 616 (B) 308
(C) 154 (D) None of these

49. If are two vectors, then $(\vec{a} \times \vec{b})^2$ equals :

(A) $\begin{vmatrix} \vec{a} \cdot \vec{b} & \vec{a} \cdot \vec{a} \\ \vec{b} \cdot \vec{b} & \vec{b} \cdot \vec{a} \end{vmatrix}$ (B) $\begin{vmatrix} \vec{a} \cdot \vec{a} & \vec{a} \cdot \vec{b} \\ \vec{b} \cdot \vec{a} & \vec{b} \cdot \vec{b} \end{vmatrix}$

(C) $\begin{vmatrix} \vec{a} \cdot \vec{b} \\ \vec{b} \cdot \vec{a} \end{vmatrix}$ (D) None of these

50. The position vector of vertices of a Δ ABC are $4\hat{i} - 2\hat{j}$, $\hat{i} + 4\hat{j} - 3\hat{k}$ and $-\hat{i} + 5\hat{j} + \hat{k}$ respectively . Then angle [illegible] equal to :

$\begin{vmatrix} b & b^2 & 1+b^3 \\ c & c^2 & 1+c^3 \end{vmatrix}$

(A) 30° (B) 45°
(C) 60° (D) 90°

51. If $\vec{a}$ & $\vec{b}$ are unit vectors and $\vec{a} - \vec{b}$ is also a unit vector, then the angle between $\vec{a}$ & $\vec{b}$ is :

(A) $\frac{\pi}{4}$ (B)

(C) (D)

52. If , $\vec{b} = 2\hat{i} - \hat{j} + \hat{k}$ &

, then $\vec{a} \times (\vec{b} \times \vec{c})$ =

(A) (B) $20\hat{i} - 3\hat{j} - 7\hat{k}$

(C) $20\hat{i} + 3\hat{j} - 7\hat{k}$ (D) None of these

53. If $\vec{a}, \vec{b}, \vec{c}$ are coplanar vectors, then

(A) $\begin{vmatrix} \vec{a} & \vec{b} & \vec{c} \\ \vec{b} & \vec{c} & \vec{a} \\ \vec{c} & \vec{a} & \vec{b} \end{vmatrix} = 0$

(B) $\begin{vmatrix} \vec{a} & \vec{b} & \vec{c} \\ \vec{a}.\vec{a} & \vec{a}.\vec{b} & \vec{a}.\vec{c} \\ \vec{b}.\vec{a} & \vec{b}.\vec{b} & \vec{b}.\vec{c} \end{vmatrix} = 0$

(C) $\begin{vmatrix} \vec{a} & \vec{b} & \vec{c} \\ \vec{c}.\vec{a} & \vec{c}.\vec{b} & \vec{c}.\vec{c} \\ \vec{b}.\vec{a} & \vec{b}.\vec{c} & \vec{b}.\vec{b} \end{vmatrix} = 0$

(D) $\begin{vmatrix} \vec{a} & \vec{b} & \vec{c} \\ \vec{a}.\vec{b} & \vec{a}.\vec{a} & \vec{a}.\vec{c} \\ \vec{c}.\vec{a} & \vec{c}.\vec{c} & \vec{c}.\vec{b} \end{vmatrix} = 0$

54. A unit vector which is coplanar to vector, $\hat{i} + \hat{j} + 2\hat{k}$ and $\hat{i} + 2\hat{j} + \hat{k}$ and perpendicular to $\hat{i} + \hat{j} + \hat{k}$, is :

(A) $\frac{\hat{i} - \hat{j}}{\sqrt{2}}$ (B) $\pm\left(\frac{\hat{j} - \hat{k}}{\sqrt{2}}\right)$

(C) $\frac{\hat{k} - \hat{j}}{\sqrt{2}}$ (D) $\frac{\hat{i} + \hat{j} + \hat{k}}{\sqrt{3}}$

55. If $\vec{x}.\vec{a} = 0$, $\vec{x}.\vec{b} = 0$ & $\vec{x}.\vec{c} = 0$ for some non-zero vector $\vec{x}$, then the true statement is :

(A) $[\vec{a}\,\vec{b}\,\vec{c}] = 0$ (B) $[\vec{a}\,\vec{b}\,\vec{c}] \neq 0$

(C) $[\vec{a}\,\vec{b}\,\vec{c}] = 1$ (D) None of these

56. If $\vec{a}$ has magnitude 5 and points north-east & vector has magnitude 5 & points north-west, then | – | is equal to :

(A) 25 (B) 5

(C) 7 (D) $5\sqrt{2}$

57. In a regular hexagon ABCDEF, $\overrightarrow{AE}$ is equal to :

(A) $\overrightarrow{AC}+\overrightarrow{AF}+\overrightarrow{AB}$ (B) $\overrightarrow{AC}+\overrightarrow{AF}-\overrightarrow{AB}$

(C) $\overrightarrow{AC}+\overrightarrow{AB}-\overrightarrow{AF}$ (D) None of these

58. $\overrightarrow{OD} + \overrightarrow{DA} + \overrightarrow{DB} + \overrightarrow{DC} =$

(A) $\overrightarrow{OA}+\overrightarrow{OB}+\overrightarrow{OC}$ (B) $\overrightarrow{OA}+\overrightarrow{OB}-\overrightarrow{BD}$

(C) $\overrightarrow{OA}+\overrightarrow{OB}+\overrightarrow{OC}$ (D) None of these

$\sqrt{3}$

59. In a Δ ABC, if $2\,\overrightarrow{AC} = 3\,\overrightarrow{CB}$, then $2\,\overrightarrow{OA} + 3\,\overrightarrow{OB}$ equals :

(A) $5\,\overrightarrow{OC}$ (B) $-\,\overrightarrow{OC}$

(C) $\overrightarrow{OC}$ (D) None of these

60. If $\overrightarrow{AO} + \overrightarrow{OB} = \overrightarrow{BO} + \overrightarrow{OC}$, then A, B, C form :

(A) Equilateral triangle

(B) Eight angled triangle

(C) Isosceles triangle

(D) Line

61. If the position vectors of A and B are $\hat{i} + 3\hat{j} - 7\hat{k}$ and $5\hat{i} - 2\hat{j} + 4\hat{k}$, then the direction cosine of $\vec{AB}$ along y - axis is :

(A) $\frac{4}{\sqrt{162}}$ (B) - $\frac{5}{\sqrt{162}}$

(C) - 5 (D) 11

62. The point B divides the arc AC of a quadrant of a circle in the ratio 1 : 2. If O is the centre and $\vec{OA} = \vec{a}$ and $= \vec{b}$, then the vector is :

(A) $\vec{b} - 2\vec{a}$ (B) $2\vec{a} - \vec{b}$

(C) $3\vec{b} - 2\vec{a}$ (D) None of these

63. The points D, E, F divide BC, CA & AB of the triangle ABC in the ratio 1 : 4, 3 : 2 & 3 : 7 respectively & the point K divides AB in the ratio 1 : 3, then $\left(\vec{AD} + \vec{BE} + \vec{CF}\right) : \vec{CK} =$

(A) 1 : 1 (B) 2 : 5

(C) 5 : 2 (D) None of these

64. If vector $\vec{a} = 2\hat{i} - 3\hat{j} + 6\hat{k}$ and vector , then

=

(A) $\frac{3}{7}$ (B)

(C) 3 (D) 7

65. If be position vector of any point on a sphere & are respectively position vectors of the extremities of a diameter, then :

(A) $\vec{r}$. ( ) = 0

(B) $\vec{r}$. ( ) = 0

(C) ( ) . ( ) = 0

(D) $(\vec{r} - \vec{a})$. ( ) = 0

66. If $\vec{a} \times (\vec{b} \times \vec{c})$ = 0, then :

(A) = 1

(B) $\vec{b}$ parallel to

(C) parallel to

(D) perpendicular to

67. If are three non-coplanar vectors, then

$(\vec{a}+\vec{b}+\vec{c}) . \left[(\vec{a}+\vec{b}) \times (\vec{a}+\vec{c})\right] =$

(A) $[\vec{a}\,\vec{b}\,\vec{c}]$ (B) 2 $[\vec{a}\,\vec{b}\,\vec{c}]$

(C) - $[\vec{a}\,\vec{b}\,\vec{c}]$ (D) 0

Projection of vector $\vec{a}$ on vector $\vec{b}$

Projection of vector $\vec{b}$ on vector $\vec{a}$

68. If $\vec{a}, \vec{b}, \vec{c}$ are non-coplanar unit vectors such that, $\vec{a} \times (\vec{b} \times \vec{c})$ = then the angle between $\vec{a}$ & $\vec{b}$ is :

(A) $\frac{\pi}{4}$ (B)

(C) (D) π

69. Given , & $\vec{c} = -\hat{i}+2\hat{j}-\hat{k}$. A unit vector perpendicular to both $\vec{a}+\vec{b}$ & $\vec{b}+\vec{c}$ is :

(A) $\hat{i}$ (B)

(C) $\hat{k}$ (D)

70. Force $3\hat{i} + 2\hat{j} + 5\hat{k}$ and $2\hat{i} + \hat{j} - 3\hat{k}$ are acting on a particle and displace it from the point $2\hat{i} - \hat{j} - 3\hat{k}$ to the point $4\hat{i} - 3\hat{j} + 7\hat{k}$, then work done by the force is :

(A) 30 units (B) 36 units
(C) 24 units (D) 18 units

71. The point having position vectors, $2\hat{i} + 3\hat{j} + 4\hat{k}$, $3\hat{i} + 4\hat{j} + 2\hat{k}$ and $4\hat{i} + 2\hat{j} + 3\hat{k}$ are the vertices of :

(A) Right angle triangle
(B) Isosceles triangle
(C) Equilateral triangle
(D) Collinear

72. The distance of the point, B $(\hat{i} + 2\hat{j} + 3\hat{k})$ from the line which is passing through A $(4\hat{i} + 2\hat{j} + 2\hat{k})$ and which is parallel to the vector, $\vec{C} = 2\hat{i} + 3\hat{j} + 6\hat{k}$ is :

(A) 10 (B)
(C) 100 (D) None of these

73. Given the following simultaneous equations for vectors $\vec{x}$ & $\vec{y}$.

$\vec{x} + \vec{y} = \vec{a}$ .... (i)

$\vec{x} \times \vec{y} = \vec{b}$ .... (ii)

$\vec{x} . \vec{a} = 1$ .... (iii)

Then $\vec{x}$ = ______ , = ______ .

(A) $\vec{a}, \vec{a} - \vec{x}$ (B) $\vec{a} - \vec{b}, \vec{b}$
(C) $\vec{b}, \vec{a} - \vec{b}$ (D) None of these

74. Let α, β, γ be distinct real numbers . The points with position vectors, $\alpha\hat{i} + \beta\hat{j} + \gamma\hat{k}$, $\beta\hat{i} + \gamma\hat{j} + \alpha\hat{k}$ and $\gamma\hat{i} + \alpha\hat{j} + \beta\hat{k}$:

(A) Are collinear
(B) Form an equilateral triangle
(C) Form a scalene triangle
(D) Form a right angled triangle

75. Let $\vec{p}$ & $\vec{q}$ be the position vectors of P & Q respectively with respect to O and $|\vec{p}| = p$, $|\vec{q}| = q$. The points R & S divide PQ internally & externally in the ratio 2 : 3 respectively . If $\overrightarrow{OR}$ and $\overrightarrow{OS}$ are perpendicular, then

(A) $9p^2 = 4q^2$ (B) $4p^2 = 9q^2$
(C) $9p = 4q$ (D) $4p = 9q$

76. If $(\vec{a} \times \vec{b})^2 + (\vec{a} . \vec{b})^2 = 144$ & $|\vec{a}| = 4$ then $| \quad | =$

(A) 16 (B) 8
(C) 3 (D) 12

77. The value of c so that for all real x, the vectors and $x\hat{i} + 2\hat{j} + 2cx\hat{k}$ make an obtuse angle are :

(A) $c < 0$ (B) $0 < c < \frac{4}{3}$
(C) - $< c < 0$ (D) $c > 0$

78. ; $\vec{r} \times \vec{b} = \vec{a} \times \vec{b}$; $\vec{a} \neq 0$;

$\neq 0$; $\neq \lambda$, is not perpen. to , then =

(A) − (B) +

(C) × + (D) × +

79. A non-zero vector is parallel to the line of intersection of the plane determined by the vectors, & the plane determined by the vectors, $\hat{i} - \hat{j}, \hat{i} + \hat{k}$. The angle between $\vec{a}$ & the vector is :

(A) $\frac{\pi}{4}$ or $\frac{3\pi}{4}$ (B) $\frac{2\pi}{4}$ or $\frac{3\pi}{4}$

(C) $\frac{\pi}{2}$ or $\frac{3\pi}{2}$ (D) None of these

80. If $\vec{b}$ & $\vec{c}$ are any two non-collinear unit vectors and $\vec{a}$ is any vector, then

=

(A) $\vec{a}$ (B)

(C) (D) 0

81. The value of x for which the angle between the vectors,

and is acute & the angle between $\vec{b}$ and x - axis lies between $\pi/2$ and π satisfy :

(A) $x > 0$ (B) $x < 0$

(C) $x > 1$ only (D) $x < -1$ only

82. If the sum of two unit vectors is a unit vector, then the magnitude of their difference is :

(A) (B) $\sqrt{3}$

(C) 2 (D) $\sqrt{5}$

ANSWERS

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

$(\vec{a}\cdot\vec{b})\,\vec{b} + (\vec{a}\cdot\vec{c})\,\vec{c} + \frac{\vec{a}\cdot(\vec{b}\times\vec{c})}{|\vec{b}\times\vec{c}|}$