MATHS

BOOKS - HIMALAYA MATHS (KANNADA ENGLISH)

VECTORS AND THEIR APPLICATIONS

Question Bank

1. The three points whose position vectors are i+2j+3k, 3i+4j+7k, 3i-2j-5k

A. form an equilateral triangle

B. form a right angled triangle

C. are collinear

D. fom an isoscets triangle

Answer: C

View Text Solution

View Text Solution

2. The position vectors of the vertices of a triangle are 2i-j+k, i-3j-5k and 3i-4j-4k then it is

A. equilateral triangle

B. isosceles triangle

C. right anglesioscles triangle

D. right angled triangle

Answer: D

View Text Solution

3. The ratio in which the line segment joining the points (2,4,5) and (3,5,-4) is divided by the point (0,2,23) is

A. 0.12638888888889

B. minus 2:3

C. 0.043055555555556

D. minus 1:2

Answer: B

View Text Solution

4. The ration in which the point whose p.v is i+2j+3k divides the join of the points whose p.vs are -2i+3j+5k and 7i-k is

A. minus 3:2

B. 0.043055555555556

C. 0.085416666666667

D. minu 4:3

Answer: B

View Text Solution

5. The position vector of the point, which divides the line segment joining the points (1,3,-9) and (6,-2,-4) in the ratio 2:3 is

A. (3,-1,7)

B. (-3,1,-7)

C. (3,1,-7)

D. (-3,-1,7)

Answer: C

View Text Solution

6. If $\vec{a} = i + \lambda j + k$, $\vec{b} = i + j + k$, and $\left|\vec{a} + \vec{b}\right| = \left|\vec{a}\right| + \left|\vec{b}\right|$, then $\lambda =$

A. minus 1

B. 2

C. minus 2

D. 1

Answer: D

View Text Solution

7. If $\vec{a}$ and $\vec{b}$ are two non zero and different vectors such that $\left|\vec{a}+\vec{b}\right|=\left|\vec{b}-\vec{a}\right|$, then the angle between the vectors $\vec{a}$ and $\vec{b}$ is

A. $\frac{\pi}{3}$

B. $\frac{\pi}{4}$

C. $\frac{\pi}{2}$

D. $\frac{\pi}{6}$

Answer: C

View Text Solution

8. If $\vec{a} = 2i - 3j + k$, $\vec{b} = -i + k$, $\vec{c} = 2j - k$ then area of the parallelogram having diagonals $\vec{a} + \vec{b}$ and $\vec{b} + \vec{c}$ is

A. $\sqrt{21}$

B. $\frac{1}{2}\sqrt{21}$

C. $\sqrt{23}$

D. $\frac{1}{2}\sqrt{23}$

Answer: B

View Text Solution

9. If $\vec{a} = I + 2j + 3k$, $\vec{b} = -i + 2j + k$, $\vec{c} = 3i + j$ and $\vec{a} + \lambda\vec{b}$ is perpendicular to $\vec{c}$, then $\lambda =$

A. 5

B. 4

C. 3

D. 2

Answer: A

View Text Solution

10. If $\vec{a}$ and $\vec{b}$ are unit vectors and α is the angle between them, then $\vec{a} + \vec{b}$ is a unit vector when α =

A. $\frac{\pi}{4}$

B. $\frac{\pi}{3}$

C. $\frac{2\pi}{3}$

D. $\frac{\pi}{2}$

Answer: C

View Text Solution

11. The vectors 2i-mj+3mk and (1+m)i-2mj+k include an acute angle for

A. m = -1/2

B. `m in [-2,-1/2]

C. for all values of m

D. $m < -2 \text{ or } m > -\frac{1}{2}$

Answer: D

View Text Solution

12. If $\vec{n}_1$ and $\vec{n}_2$ are two unit vectors and θ is the angle between them then $\frac{\cos\theta}{2}$.

A. $\frac{1}{2}\left|\vec{n}_1 + \vec{n}_2\right|$

B. $\frac{1}{2}\left|\vec{n}_1 - \vec{n}_2\right|$

C. $\frac{1}{2}\left(\vec{n}_1 + vexn_2\right)$

D. $\left(\frac{\left|\vec{n}_1 \times \vec{n}_2\right|}{2\left|\vec{n}_1\right|\left|\vec{n}_2\right|}\right)$

Answer: A

View Text Solution

13. Let $\vec{a} = \xi + yj + zk$, $\vec{b} = j$. Then the vector $\vec{c}$ for which $\vec{a}, \vec{b}, \vec{c}$ form a right handed system is

A. yj

B. minus zj+xk

C. $\vec{0}$

D. zi-xk

Answer: B

View Text Solution

14. $\vec{u}, \vec{\nu}, \vec{w}$ are the three vectors non-coplanar vectors, then

A. 0

B. $\vec{u} . \left(\vec{v} \times \vec{w}\right)$

C. $\vec{u} . \left(\vec{w} \times \vec{v}\right)$

D. $3\vec{u} \times \left(\vec{v} \times \vec{w}\right)$

Answer: B

View Text Solution

15. If (1-p)I + 2(1+p)j+(3+p)k and 3i+j are right angle to each then the value of p is

A. 2

B. 3

C. 4

D. 5

Answer: D

View Text Solution

16. If $\left|\vec{a}\right| = 3, \left|\vec{b}\right| = 4$ then $\left|\vec{a} + \vec{b}\right| =$

A. 6

B. 5

C. 4

D. 3

Answer: B

View Text Solution

17. If $\vec{a}$ and $\vec{b}$ are two vectors such that $\vec{a}.Vecb = 0$ and $\vec{a} \times \vec{b} = \vec{0}$, then the correct statement is

A. $\vec{a}$ $isparal \leq l \rightarrow$ $\vec{b}$

B. $\vec{a}$ $isperpendicat \rightarrow$ $\vec{b}$

C. $either\ \vec{a} = \vec{0}$ or $\vec{b} = \vec{0}$

D. none of these

Answer: C

View Text Solution

18. If |vec a| = |vec b|, then

A. $\vec{a} = \vec{b}$

B. $\vec{a} + \vec{b} = 1$

C. $\left|\vec{a} + \vec{b}\right| = 0$

D. $\left(\vec{a} + \vec{b}\right) perpendicar \left(\vec{a} - \vec{b}\right)$

Answer: D

View Text Solution

19. If $\vec{a}, \vec{b}, \vec{c}$ are unit vectors such that $\vec{a} + \vec{b} + \vec{c} = \vec{0}$, then the value of $\vec{a}.\vec{b} + \vec{b}.\vec{c} + \vec{c}\vec{a}$ is equal to

A. $\vec{a} + \vec{b} = \vec{c}$

B. `vec a, vec b, vec c taken in order form the sides of a triangle

C. $\vec{b} + \vec{c} = \vec{a}$

D. none of these

Answer: B

Watch Video Solution

20. The $\vec{a}, \vec{b}, \vec{c}$ are three vectors which are respectively perpendicular to $\vec{b} + \vec{c}, \vec{c} + \vec{a}$ and $\vec{a} + \vec{b}$, such that $\left|\vec{a}\right| = 3, \left|\vec{b}\right| = 4, \left|\vec{c}\right| = 5$, then $\left|\vec{a} + \vec{b} + \vec{c}\right| =$

A. $3\sqrt{2}$

B. $\sqrt{3}$

C. $5\sqrt{2}$

D. $2\sqrt{3}$

Answer: C

Watch Video Solution

21. If $\vec{a}$ and $\vec{b}$ are two perpendicular vectors then

A. $\left(\vec{a}+\vec{b}\right)^2=\vec{a}^2+\vec{b}^2$

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

C. $\left(\vec{a}+\vec{b}\right)^2=\left(\vec{a}-\vec{b}\right)^2$

D. All of the above

Answer: D

Watch Video Solution

22. If $\left(\vec{a} \times \vec{b}\right)^2 + \left(\vec{a} . \vec{b}\right)^2 = 144$ and $\left|\vec{a}\right| = 4$ then $\left|\vec{b}\right| =$

A. 16

B. 8

C. 3

D. 12

Answer: C

Watch Video Solution

23. If $\left|\vec{a}\right| = 2, \left|\vec{b}\right| = 5$ and $\left|\vec{a} \times \vec{b}\right| = 8$ then $\vec{a} . \vec{b}$

Watch Video Solution

24. A set of direction cosines of the vector which is equally inclined to coordinate axes is

A. 1/2,1/2,1/2

B. $\frac{\sqrt{3}}{2}, \frac{\sqrt{3}}{2}, \frac{\sqrt{3}}{2}$

C. $\frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}}$

D. $\frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}}$

Answer: D

Watch Video Solution

25. If the direction ratios of a vector are 6,2,3, then its direction cosines are

A. 6/7,2/7,3/7

B. 1/7, 2/7, 3/7

C. 6/7, 1/7, 3/7

D. 6/7, 2/7,1/7

Answer: A

Watch Video Solution

26. A vector makes angles 45^o and 60^o with positive axes of x and y respectively. Then the angle between the vector and the z-axis is

A. 60^o or 45^o

B. 45^o or 135^o

C. 60^o or 120^o

D. 30^o or 150^o

Answer: C

Watch Video Solution

27. If α, β, γ are the angle made by a vector with the coordinate axes, then $\sin^2\alpha + \sin^2\beta + \sin^2\gamma =$

A. minus 1

B. minus 2.3

C. 2

D. 1

Answer: C

Watch Video Solution

28. If α, β, γ are the angle made by a vector with the coordinate axes, then $\cos\alpha + \cos 2\beta + \cos 2\gamma =$

A. minus 1

B. 1

C. 2

D. minus 2

Answer: A

View Text Solution

29. If $\vec{a} = -2i + 3j$, $\vec{b} = i + j + k$, $\vec{c} = \lambda i + 4j + 2k$ are the three coterminal edges of parallelepiped of volume 2 cubic units, then a value of γ is

A. 4

B. 2

C. 1

D. 3

Answer: A

Watch Video Solution

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

A. $2\left[\vec{a}\,\vec{b}\,\vec{c}\right]$

B. $3\left[\vec{a}\,\vec{b}\,\vec{c}\right]$

C. 0

D. none of these

Answer: C

View Text Solution

31. With usual notation [i-j j-k k-i] =

A. 0

B. 1

C. minus 1

D. 4

Answer: A

Watch Video Solution

32. A unit vector coplanar with i+j+2k and i+2j+k and perpendicular to i+j+k is

A. $\frac{1}{\sqrt{2}}(j+k)$

B. $\frac{1}{\sqrt{2}}(-j+k)$

C. $\frac{1}{\sqrt{2}}(i+k)$

D. $\frac{1}{\sqrt{2}}(-i-k)$

Answer: B

View Text Solution

33. The length of the vector i-2j+2k is

A. $\sqrt{14}$

B. 14

C. 3

D. none of these

Answer: C

View Text Solution

34. If $\overrightarrow{O}A = i - 2j + k, \overrightarrow{O}B = 2i + 2j - k$, then $\overrightarrow{B}A =$

A. i + 4j -2k

B. minus i + 4j -2k

C. minus i - 4j +2k

D. i+4j+2k

Answer: C

View Text Solution

35. If $\overrightarrow{a} = i - j + 2k, \overrightarrow{b} = 2i + 3j + k$ and $\overrightarrow{c} = i - k$ then the magnitude of $\overrightarrow{a} + \overrightarrow{2}b - \overrightarrow{3}c$ is

A. $\sqrt{87}$

B. $\sqrt{78}$

C. $\sqrt{89}$

D. $\sqrt{101}$

Answer: B

View Text Solution

36. If A, B, C and D aare four points and $\overrightarrow{A}B = \overrightarrow{D}C$ then $\overrightarrow{A}C + \overrightarrow{B}D =$

A. $2\overrightarrow{A}D$

B. $2\overrightarrow{C}B$

C. $2\overrightarrow{A}C$

D. none of these

Answer: A

Watch Video Solution

37. If $\vec{a} = i - j + k$ and $\vec{b} = 2i + j - k$ then $\left|2\vec{a} - \vec{b}\right| =$

A. 6

B. $\sqrt{3}$

C. $3\sqrt{2}$

D. 18

Answer: C

Watch Video Solution

38. If $\vec{a}$ and $\vec{b}$ are unit vectors then $\vec{a} + \vec{b}$ is

A. also a unit vector

B. a unit vector $\vec{a} perpendicat \to \vec{b}$

C. $aunit \longrightarrow r\vec{a} isparal \leq l \to \vec{b}$

D. none of these

Answer: D

View Text Solution

39. If $\vec{a} = i + j - 2k$, $\vec{b} = -i + 2j + k$ and $\vec{c} = i - 2j + 2k$ then a unit vector parallel to $\vec{a} + \vec{b} + \vec{c}$ is

A. $\frac{1}{\sqrt{6}}(2i + j + k)$

B. $\frac{1}{\sqrt{3}}(i + j + K)$

C. $\frac{1}{\sqrt{6}}(i - 2j + k)$

D. $\frac{1}{\sqrt{3}}(i - j + k)$

Answer: B

Watch Video Solution

40. If $\overrightarrow{O}A = i - j$ and $\overrightarrow{O}B = j - k$, the unit vector perpendicular to the plane AOB is

A. $\frac{1}{\sqrt{I + j - k}}$

B. $\frac{1}{\sqrt{3}}(i + j + k)$

C. $\frac{1}{\sqrt{i - j - k}}$

D. none of these

Answer: B

Watch Video Solution

41. If I,j are unit vectors and $I \times j = k$ then $(i + j) \times (j - i) =$

A. k

B. 2k

C. minus k

D. minus 2k

Answer: B

Watch Video Solution

42. If $\vec{a} = 3i - j + 2k$, $\vec{b} = 2i + j - k$, then $\vec{a} \times \left(\vec{a} . \vec{b}\right)$ is

A. 0

B. $3\vec{a}$

C. $3\sqrt{14}$

D. none of these

Answer: D

View Text Solution

43. The vectors 2i-6j-3k and 4i+3j-k are inclined at

A. $\cos^{-1}\left(\frac{1}{2}\right)$

B. $\sin^{-1}\sqrt{\frac{25}{26}}$

C. $\frac{\pi}{4}$

D. none of these

Answer: B

View Text Solution

44. If $\vec{a}$ and $\vec{b}$ are vectors then

A. $\vec{a}+\vec{b}\, isa \longrightarrow r$ and $\vec{a}\times\vec{b}\, isascalar$

B. $\vec{a}+\vec{b}\, isascalar$ and $\vec{a}\times\vec{b}\, isa \longrightarrow r$

C. $\vec{a}.\vec{b}\, isascalar$

D. $\vec{a}\times I\vec{b}\, isascalar$

Answer: C

View Text Solution

45. If $\vec{a} = -i + j + k$, $\vec{b} = i - j + k$, then a unit vector perpendicular to $\vec{a}$ and $\vec{b}$ is

A. k

B. $\frac{1}{\sqrt{2}}(i + j)$

C. $\frac{1}{\sqrt{j + k}}$

D. $\frac{1}{\sqrt{2}}(i - j)$

Answer: B

Watch Video Solution

46. If $\vec{a} = 2i - 3j$ and $\vec{b} = 2i + 3k$ then, $\left(\vec{a} + \vec{b}\right).\left(\vec{a} - \vec{b}\right)$

A. 0

B. minus 8

C. 9

D. minus 10

Answer: A

Watch Video Solution

47. If $\overrightarrow{OA} = i + 2j + 3k, \overrightarrow{OB} = 3i + j - 2k$ and $\overrightarrow{OC} = 2i - 3j + k$ then $\overrightarrow{AB}.\overrightarrow{AC} =$

A. 15

B. 17

C. 0

D. none of these

Answer: A

Watch Video Solution

48. $\vec{OA} = i + xj + 2k, \vec{OB} = 2i + k$ and $\vec{OC} = -i + j + k$ and $\vec{AB}$ is perpendicular to $\vec{BC}$,then x =

A. 0

B. 3

C. - 3

D. none of these

Answer: C

Watch Video Solution

49. If θ is the angle between $\vec{a} = 2i - j + k$ and $\vec{b} = i + 2j + k$, then $\cos\theta =$

Watch Video Solution

50. $I.\ (j \times k) + j.\ (k \times i) + k.\ (i \times j) =$

A. 0

B. 1

C. 3

D. none of these

Answer: C

Watch Video Solution

51. If $\vec{a} = i + j$ and $\vec{b} = j - k$ then the angle between $\vec{a} + \vec{b}$ and $\vec{a} - \vec{b}$ is

A. 0^o

B. 45^o

C. 60^o

D. 90^o

Answer: D

Watch Video Solution

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

A. 0

B. 6

C. 9

D. 1

Answer: D

Watch Video Solution

53. If $\vec{p}, \vec{q}, \vec{r}$ are any three vectors, which of the following is not correct

A. $\left(\vec{p} + \vec{q}\right) + \vec{r} = \vec{p} + \left(\vec{q} + \vec{r}\right)$

B. $\left(\vec{p} \times \vec{q}\right) . \vec{r} = \vec{p} . \left(\vec{q} \times \vec{r}\right)$

C. $\left(\vec{p} \times \vec{q}\right).\vec{r} = \left(\vec{q} \times \vec{p}\right).\vec{r}$

D. $\left(\vec{p} \times \vec{q}\right).\vec{r}$ represents volume of the parallelepiped with colerminous edges $\vec{p}$, $\vec{q}$ and $\vec{r}$.

Answer: C

Watch Video Solution

54. If 3i-5j + 7k and 2i+xj+2k are orthogonal then x =

A. minus 2

B. 1

C. minus 3

D. 4

Answer: D

Watch Video Solution

55. If $\vec{a} = i + 2j,\ \vec{b} = j + 2k,\ \vec{c} = i + 2k$ then $\vec{a} . \left(\vec{b} \times \vec{c} \right) =$

A. 8

B. 6

C. 4

D. 2

Answer: B

Watch Video Solution

56. If $\left| \vec{a} \right| = 2, \left| \vec{b} \right| = 5$ and $\left| \vec{a} \times \vec{b} \right| = 8$ then $\vec{a} . \vec{b}$

A. such that the angle between them is 90^o

B. collinear vectors

C. such that $\vec{a} + \vec{b} = \vec{0}$

D. such that the angle between then is 60^o

Answer: B

Watch Video Solution

57. The three points whose position vectors are $\vec{a} - \vec{2}b + 3\vec{c}$, $\vec{2}a + \vec{3}b - 4\vec{c}$ and $-7\vec{b} + 10\vec{c}$

A. form a right angled triangle

B. form a equilateral triangle

C. are collinear

D. form an isosceles triangle

Answer: C

Watch Video Solution

58. If the points whose position vectors are 60i+3j, 40i-8j and li-52j are collinear then I =

A. 40

B. 30

C. minus 30

D. minus 40

Answer: D

Watch Video Solution

59. If the vectors $\overrightarrow{a} = ki + 3j$ and $\overrightarrow{b} = 4i + kj(k \neq 0)$ are collinear then

A. $k^2 = 12$

B. k =-3

C. $k^2 = 4$

D. k = -4

Answer: A

Watch Video Solution

60. If $\vec{\alpha}$ and $\vec{\beta}$ are two vectors such atht $\vec{a}.\vec{b}=0$ and $\vec{a}\times\vec{b}=\vec{0}$, then:

A. both vectors are perpendicular

B. both vectors are parallel

C. atleast one of the vector is null vector

D. Such situation cant exist

Answer: C

Watch Video Solution

61. The vectors $\vec{a}+\vec{b}+\vec{c}, 2\vec{a}+\vec{b}+3\vec{c}$ and $\vec{a}+2\vec{b}+3\vec{c}$, where $\vec{a}$, $\vec{b}$, and $\vec{c}$ are non coplanar vectors , are

A. coplanar vectors

B. collinear vectors

C. non coplanar vectors

D. mutually perpendiculat vectors

Answer: C

Watch Video Solution

62. If $\vec{a}$ and $\vec{b}$ are mutually perpendicular unit vectors, then (3 vec a + 2 vec b). (5 vec a - 6 vec b)= `

A. coplanar such that $\vec{A}\ Bperpendicar\vec{C}\ D$

B. non coplanar points

C. collinear points

D. non collinear points

Answer: C

Watch Video Solution

63. If $\left|\vec{a}\right| = 2, \left|\vec{b}\right| = 5$ and $\left|\vec{a} \times \vec{b}\right| = 8$ then $\vec{a} . \vec{b}$

A. 4

B. 3

C. 2

D. 1

Answer: B

Watch Video Solution

64. If $\vec{a}, \vec{b}, \vec{c}$ are non coplanar vectors such that, $\vec{b} \times \vec{c} = \vec{a}, \vec{c} \times \vec{a} = \vec{b}, \vec{a} \times \vec{b} = \vec{c}$, then |vec a + vec b + vec c| = `

A. 1

B. 2

C. 3

D. $\sqrt{3}$

Answer: D

Watch Video Solution

65. If $\left|\vec{a}\right| = 2, \left|\vec{b}\right| = 5$ and $\left|\vec{a} \times \vec{b}\right| = 8$ then $\vec{a} . \vec{b}$

A. $\frac{1}{\sqrt{11}}(i + 3j - k)$

B. $\frac{1}{11}(i - 3j + k)$

C. $\frac{1}{\sqrt{3}}(i + j + k)$

D. $\frac{1}{\sqrt{3}}(i - j + k)$

Answer: A

Watch Video Solution

66. Let $\vec{a} = \hat{i} - 2\hat{j} + 3\hat{k}$. If $\vec{b}$ is a vector such that $\vec{a} . \vec{b} = \left|\vec{b}\right|^2$ and $\left|\vec{a} - \vec{b}\right|$ and $\left|\vec{a} - \vec{b}\right| = \sqrt{7}$, then $\left|\vec{b}\right|$ = _____

A. $3\vec{a}$

B. $\vec{a}$

C. $\vec{0}$

D. $2\vec{a}$

Answer: C

Watch Video Solution

67. If $\vec{a} = 2i - 3j$ and $\vec{b} = 2i + 3k$ then, $\left(\vec{a} + \vec{b}\right) . \left(\vec{a} - \vec{b}\right)$

A. 225

B. 275

C. 325

D. 300

Answer: D

Watch Video Solution

68. If $\vec{a}, \vec{b}, \vec{c}$ are unit vectors such that $\vec{a} + \vec{b} + \vec{c} = \vec{0}$, then the value of $\vec{a}.\vec{b} + \vec{b}.\vec{c} + \vec{c}\vec{a}$ is equal to

A. 1

B. minus 1

C. 44230

D. 0

Answer: B

Watch Video Solution

69. If $\left|\vec{a}\right| = 4, \left|\vec{b}\right| = 2$ and angle between $\vec{a}$ and $\vec{b}$ is $\frac{\pi}{6}$, then $\left(\vec{a} \times \vec{b}\right)^2$ is

A. 48

B. 16

C. $\vec{a}$

D. 15

Answer: B

Watch Video Solution

70. If $\vec{a}, \vec{b}, \vec{c}$ are non coplanar vectors such that, $\vec{b} \times \vec{c} = \vec{a}, \vec{c} \times \vec{a} = \vec{b}, \vec{a} \times \vec{b} = \vec{c}$, then |vec a + vec b + vec c| =

`

A. $p = \vec{a} . \vec{a}\vec{r} = \left(\vec{a} \times \vec{b}\right)$

B. $p = \vec{b} . \vec{a}, \vec{r} = \vec{a} \times \vec{b}$

C. $p = \vec{a} . \vec{a}, \vec{r} = \vec{b} \times \vec{a}$

D. $p = \vec{b} . \vec{b}, \vec{r} = \vec{b} \times \vec{a}$

Answer: C

Watch Video Solution

71. If $\vec{a}, \vec{b}, \vec{c}$ are three vectors such that $\vec{a} . \left(\vec{b} + \vec{c} \right) + \vec{b} . \left(\vec{c} + \vec{a} \right) + \vec{c} . \left(\vec{a} + \vec{b} \right) = 0$ and $\left| \vec{a} \right| = 1, \left| \vec{b} \right| = 4, \left| \vec{c} \right| = 8$, then $\left| \vec{a} + \vec{b} + \vec{c} \right| =$

A. 13

B. 81

C. 9

D. 5

Answer: C

Watch Video Solution

72. Two adjacent sides of a parallelogram ABCD are 2i+4j-5k and i+2j+3k then the value of $\left|\overrightarrow{A}C \times \overrightarrow{B}D\right| =$

A. $20\sqrt{5}$

B. $22\sqrt{5}$

C. $24\sqrt{5}$

D. $26\sqrt{5}$

Answer: B

Watch Video Solution

73. If $\overrightarrow{a} = i + j + k$, $\overrightarrow{a}.\ \overrightarrow{b} = 1$ and $\overrightarrow{a} \times \overrightarrow{b} = j - k$ then $\overrightarrow{b} =$

A. i + 4j -2k

B. i-j+k

C. 2j-k

D. i

Answer: A

Watch Video Solution

74. If $\vec{a} = i - j + k$ and $\vec{b} = 2i + j - k$ then $\left|2\vec{a} - \vec{b}\right| =$

A. minus 1

B. $\sqrt{10} + \sqrt{6}$

C. $\sqrt{59}$

D. $\sqrt{60}$

Answer: C

Watch Video Solution

75. Find the area of the parallelogram whose adjacent sides are determined by the vecor $\vec{a} = 3\hat{i} + \hat{j} + 4\hat{k}$ and $\vec{b} = \hat{i} - \hat{j} + \hat{k}$

A. 0

B. 3

C. 5

D. 8

Answer: A

Watch Video Solution

76. If f(x) is a ploynomial function satisfying $f(x).f\left(\frac{1}{x}\right) = f(x) + f\left(\frac{1}{x}\right)$ and f(3)=28, then f(2) is

A. 1(1/sqrt5, 2/sqrt5,0)`

B. (1,2,0)

C. (0,1,-1)

D. $\left(\frac{1}{\sqrt{5}}, \frac{2}{\sqrt{5}}, \frac{1}{\sqrt{5}}\right)$

Answer: A

Watch Video Solution

77. If $\vec{a}$ and $\vec{b}$ are vectors such that $\left|\vec{a}+\vec{b}\right| = \left|\vec{a}-\vec{b}\right|$, then the angle between $\vec{a}$ and $\vec{b}$ is

A. $\pm\left(\vec{B} \times \vec{C}\right)$

B. $\pm\left(\vec{B} \times \vec{C}\right)$

C. $\pm\left(\vec{B} \times \vec{A}\right)$

D. $\vec{0}$

Answer: A

Watch Video Solution

78. If $\vec{a}, \vec{b}$ and $\vec{c}$ are non coplanar unit vectors such that $\vec{a} \times \left(\vec{b} \times \vec{c}\right) = \frac{\vec{b} + \vec{c}}{\sqrt{2}}$, then

A. angle between $\vec{a}$ and $\vec{b}$ $is \frac{\pi}{4}$

B. angle between $\vec{a}$ and $\vec{b}$ $is \frac{3\pi}{4}$

C. angle between $\vec{a}$ and $\vec{c}$ $is \frac{3\pi}{2}$

D. angle between $\vec{b}$ and $\vec{c}$ $is \frac{3\pi}{4}$

Answer: B

Watch Video Solution

79. $\left(\vec{r} . i\right)\left(\vec{r} \times i\right) + \left(\vec{r} . j\right)\left(\vec{r} \times j\right) + \left(\vec{r} . k\right)\left(\vec{r} \times k\right) =$

A. $2\vec{r}$

B. $\vec{r}$

C. $4\vec{r}$

D. $\vec{0}$

Answer: D

Watch Video Solution

80. The number of vectors of unit length perpendicular to the vectors $\vec{a} = 2i + j + 2k$ and $\vec{b} = j + k$.

A. one

B. two

C. three

D. infinite

Answer: B

Watch Video Solution

81. If $\left|\vec{a}\right| = 4$ and $-3 \leq \lambda \leq 2$, then the range of $\left|\lambda \vec{a}\right|$ is

A. [0,8]

B. [-12, 8]

C. [0, 12]

D. [8,12]

Answer: A

Watch Video Solution

82. If $\vec{a}, \vec{b}, \vec{c}$ are three vectors such that $\vec{a} + \vec{b} + \vec{c} = \vec{0}$ and $\left|\vec{a}\right| = 2, \left|\vec{b}\right| = 3, \left|\vec{c}\right| = 5,$ then the value of $\vec{a}.\vec{b} + \vec{b}.\vec{c} + \vec{c}.\vec{a} =$

A. 1)0

B. 2)1

C. 3)-19

D. 4)-25

Answer: C

Watch Video Solution

83. Projection vectors $\vec{a}$ on $\vec{b}$ is

A. $\left(\frac{\vec{a}.\vec{b}}{|\vec{b}|^2}\right)\vec{b}$

B. $\frac{\vec{a}.\vec{b}}{|\vec{b}|}$

C. $\frac{\vec{a}.\vec{b}}{|\vec{a}|}$

D. $\left(\frac{\vec{a}.\vec{b}}{|\vec{a}|^2}\right)\vec{b}$

Answer: A

Watch Video Solution

84. The vectors $\lambda i + j + 2k, i + \lambda j - k, 2i - j + \lambda k$ are coplanar if

A. $\lambda = -2$

B. $\lambda = 0$

C. $\lambda = 1$

D. $\lambda = -1$

Answer: A

Watch Video Solution

85. If $\left|\vec{a}\right| = 10, \left|\vec{b}\right| = 2$ and $\vec{a} . \vec{b} = 12$ then the value of $\left|\vec{a} \times \vec{b}\right|$ is

A. 5

B. 10

C. 14

D. 16

Answer: D

Watch Video Solution

86. For any vector $\vec{a}$, the value of $\left(\vec{a} \times i\right)^2 + \left(\vec{a} \times j\right)^2 + \left(\vec{a} \times k\right)^2 =$

A. $\vec{a}^2$

B. $3\vec{a}^2$

C. $4\vec{a}^2$

D. $2\vec{a}^2$

Answer: D

Watch Video Solution

87. The vectors from origin to the point A and B are, $\vec{a} = 2i - 3j + 2k$, $\vec{b} = 2i + 3j + k$ respectively, then the area of

triangle OAB is

A. 340

B. $\sqrt{25}$

C. $\sqrt{229}$

D. $\frac{1}{2}\sqrt{229}$

Answer: D

Watch Video Solution

88. The value of λ for which the vectors 3i-6j+k and $2i - 4j + \lambda k$ are parallel is

A. 2/3

B. 3/2

C. 0

D. 1

Answer: A

Watch Video Solution

89. Find the value of λ such that the vectors $\vec{a} = 2i + \lambda j + k$, $\vec{b} = i + 2j + 3k$ are orthogonal

A. 0

B. 1

C. 44230

D. -5/2

Answer: D

Watch Video Solution

90. The angle between two vectors $\vec{a}$ and $\vec{b}$ with magnitudes $\sqrt{3}$ and 4, respectively and $\vec{a} . \vec{b} = 2\sqrt{3}$ is

A. $\frac{\pi}{6}$

B. $\frac{\pi}{3}$

C. $\frac{\pi}{2}$

D. $\frac{5\pi}{2}$

Answer: B

Watch Video Solution

91. The vector having initial and terminal points as (2,5,0) and (-3,7,4) respectively is

A. - i+12j+4k

B. 5i+2j-4k

C. - 5i+2j+4k

D. i+j+k

Answer: C

Watch Video Solution

92. The position vector of the point which divides the join of points $2\vec{a} - 3\vec{b}$ and $\vec{a} + \vec{b}$ in the ratio 3:1 is

A. $\frac{3\vec{a} - 2\vec{b}}{2}$

B. $\frac{7\vec{a} - 8\vec{b}}{4}$

C. $\frac{3\vec{a}}{4}$

D. $\frac{5\vec{a}}{4}$

Answer: D

Watch Video Solution

93. The vector in the direction of the vector i-2j+2k that has magnitude 9 is

A. i-2j+2k

B. (i-2j+2k)/3

C. 3(i-2j+2k)

D. 9(i-2j+2k)

Answer: C

Watch Video Solution

94. If $\left|\vec{a}\right| = 3$ and $-1 \leq k \leq 2$, then $\left|k\vec{a}\right|$ lies in the interval

A. [0, 6]

B. [-3, 6]

C. [3, 6]

D. [1, 2]

Answer: A

Watch Video Solution

95. The unit vector perpendicular to the vectors $\hat{i} - \hat{j}$ and $\hat{i} + \hat{j}$ forming a right-handed system is :

A. k

B. minus k

C. (i-j)/2

D. (i+j)/2

Answer: A

Watch Video Solution

96. If $\vec{a}$ and $\vec{b}$ are unit vectors, then angle between $\vec{a}$ and $\vec{b}$ for $\sqrt{3}\vec{a} - \vec{b}$ to be unit vector is

A. 30^o

B. 45^o

C. 60^o

D. 90^o

Answer: A

Watch Video Solution

97. If θ is the angle between any two vector $\vec{a}$ and $\vec{b}$, then $\left|\vec{a}.\vec{b}\right| = \left|\vec{a} \times \vec{b}\right|$ when θ is equal to

A. 0

B. pi/4

C. pi/2

D. pi

Answer: B

Watch Video Solution

98. $I.\ (j \times k) + j.\ (k \times i) + k.\ (i \times j) =$

A. 0

B. minus 1

C. 1

D. 3

Answer: C

Watch Video Solution

99. Let $\vec{a}.\ \vec{b}$ be two unit vectors and θ is the angle between them. Then $\vec{a} + \vec{b}$ is a unit vector if

A. $\theta = \frac{\pi}{4}$

B. $\theta = \frac{\pi}{3}$

C. $\theta = \frac{\pi}{2}$

D. $\theta = \frac{2\pi}{3}$

Answer: D

Watch Video Solution

100. If θ is the angle between two vectors $\vec{a}$ and $\vec{b}$, then $\vec{a}.Vecb \geq 0$ only when

A. $0 < \theta < \frac{\pi}{2}$

B. $0 \leq \theta \leq \frac{\pi}{2}$

C. $0 < \theta < \pi$

D. $0 \leq \theta \leq \pi$

Answer: B

Watch Video Solution

101. Area of a rectangle having vertices $A\left(-\hat{i}+\frac{1}{2}\hat{j}+4\hat{k}\right), B\left(\hat{i}+\frac{1}{2}\hat{j}+4\hat{k}\right), C\left(\hat{i}-\frac{1}{2}\hat{j}+4\hat{k}\right)$, and $D\left(-\hat{i}\right.$

is

A. 44228

B. 1

C. 2

D. 4

Answer: C

Watch Video Solution

102. Let the vectors $\vec{a}$ and $\vec{b}$ be such that $\left|\vec{a}\right| = 3$ and $\left|\vec{b}\right| = \frac{\sqrt{2}}{3}$, then $\vec{a} \times \vec{b}$ is a unit vector, if the angle between $\vec{a}$ and $\vec{b}$ is

A. $\frac{\pi}{6}$

B. $\frac{\pi}{4}$

C. $\frac{\pi}{3}$

D. $\frac{\pi}{2}$

Answer: B

Watch Video Solution

103. If $\vec{a}$ is a non-zero vector of magnitude a and $\vec{\lambda a}$ a is a unit vector, find the value of λ

A. $\lambda = 1$

B. $\lambda = -1$

C. $a = |\lambda|$

D. $a = \frac{1}{|\lambda|}$

Answer: D

Watch Video Solution

104. If ABCDEF is a regular hexagon then $\vec{A}D + \vec{E}B + \vec{F}C =$

A. $\overrightarrow{A}B$

B. $\overrightarrow{0}$

C. $3\overrightarrow{A}B$

D. $4\overrightarrow{A}B$

Answer: D

Watch Video Solution

105. If A, B, C are the vertices of a triangle whose position vectors are $\overrightarrow{a}, \overrightarrow{b}, \overrightarrow{c}$ and G is the centroid of the triangle ABC, then $\overrightarrow{G}A + \overrightarrow{G}B + \overrightarrow{G}C =$

A. $\frac{1}{3}\left(\overrightarrow{a} + \overrightarrow{b} + \overrightarrow{c}\right)$

B. $\frac{1}{2}\left(\overrightarrow{a} + \overrightarrow{b} + \overrightarrow{c}\right)$

C. $\overrightarrow{0}$

D. $\overrightarrow{a} + \overrightarrow{b} + \overrightarrow{c}$

Answer: C

Watch Video Solution

106. A unit vector parallel to the sum of the vectors $2i + 3j - k$ and $4i + 2j + k$ is

A. $\frac{6i + 5j}{\sqrt{61}}$

B. $\frac{5i + 6j}{\sqrt{61}}$

C. k

D. none of these

Answer: A

Watch Video Solution

107. If $\vec{a}$ and $\vec{b}$ are vectors such that $\left|\vec{a} + \vec{b}\right| = \left|\vec{a} - \vec{b}\right|$, then the angle between $\vec{a}$ and $\vec{b}$ is

A. $\vec{a}$ and $\vec{b}$ are perpendicular

B. $\vec{a}$ and $\vec{b}$ are parallel

C. $\left|\vec{a}\right| = \left|\vec{b}\right|$

D. there is no relationship between $\vec{a}$ and $\vec{b}$

Answer: A

Watch Video Solution

108. Given $\vec{a} = i + j - k$, $\vec{b} = -i + 2j + k$ and $\vec{c} = -i + 2j - k$, a unit vector perpendicular to both $\vec{a} + \vec{b}$ and $\vec{b} + \vec{c}$ is

A. i

B. j

C. k

D. $\frac{i + j + k}{\sqrt{3}}$

Answer: C

Watch Video Solution

109. The direction cosines of the vector, 3i-4j+5k are

A. $\frac{3}{\sqrt{2}}, \frac{-4}{\sqrt{2}}, \frac{1}{\sqrt{2}}$

B. 3/5,-4/5,1/5

C. $\frac{3}{5\sqrt{2}}, \frac{-4}{5\sqrt{2}}, \frac{1}{\sqrt{2}}$

D. $\frac{3}{5\sqrt{2}}, \frac{4}{5\sqrt{2}}, \frac{1}{\sqrt{2}}$

Answer: C

Watch Video Solution

110. If $\vec{c}$ is a unit vector perpendicular to $\vec{a}$ and $\vec{b}$ then the second vector perpendicular to $\vec{a}$ and $\vec{b}$ is

A. $\vec{a} \times \vec{b}$

B. $\vec{c} \times \vec{b}$

C. $-\vec{c}$

D. none of these

Answer: C

Watch Video Solution

111. The area pf the triangle whose two sides are given by 4i - j + k and 3i+j - k is

A. $7\sqrt{2}$

B. $14\sqrt{2}$

C. $\frac{14}{\sqrt{2}}$

D. $\frac{7}{\sqrt{2}}$

Answer: D

Watch Video Solution

112. The adjacent sides of a parallelogram are i+2j+3k and 2i-j+k. Its area is

A. $3\sqrt{5}$

B. $5\sqrt{3}$

C. $\sqrt{15}$

D. $\left(5\sqrt{3}\right)2$

Answer: B

Watch Video Solution

113. The projection of $\vec{a} = 3i + 2k$ on the vector $\vec{b} = 2i + 3j + k$ is,

A. $\frac{8}{\sqrt{35}}$

B. $\frac{8}{\sqrt{39}}$

C. $\frac{8}{\sqrt{14}}$

D. $\sqrt{14}$

Answer: C

Watch Video Solution

114. Find the sine of the angle between the vectors $\hat{i} + 2\hat{j} + 2\hat{k}$ and $3\hat{i} + 2\hat{j} + 6\hat{k}$.

A. $\sqrt{\frac{5}{22}}$

B. $\sqrt{\frac{5}{12}}$

C. $\sqrt{\frac{15}{22}}$

D. $\sqrt{\frac{5}{21}}$

Answer: D

Watch Video Solution

115. If $\left|\vec{a} + \vec{b}\right|^2 = \left|\vec{a}\right|^2 + \left|\vec{b}\right|^2$, then

A. vec a is parallel to vec b

B. vec a is perpendicular to vec b

C. $\vec{a} = \vec{b}$

D. $\left|\vec{a} + \vec{b}\right| = \left|\vec{a}\right| + \left|\vec{b}\right|$

Answer: B

Watch Video Solution

116. Suppose $\vec{a} + \vec{b} + \vec{c} = 0, \left|\vec{a}\right| = 3, \left|\vec{b}\right| = 5, \left|\vec{c}\right| = 7$, then the angle between $\vec{a}$ and $\vec{b}$ is

A. $\frac{\pi}{4}$

B. $\frac{\pi}{2}$

C. $\frac{\pi}{6}$

D. $\frac{\pi}{3}$

Answer: D

Watch Video Solution

117. If $\vec{a}, \vec{b}, \vec{c}$ are mutually perpendicular unit vectors then $\left|\vec{a}+\vec{b}+\vec{c}\right| =$

A. $\sqrt{3}$

B. 3

C. 1

D. 0

Answer: A

Watch Video Solution

118. If θ is the angle between the vectors $\vec{a}$ and $\vec{b}$ then $\frac{\left|\vec{a} \times \vec{b}\right|}{\left|\vec{a} . \vec{b}\right|} =$

A. $\cot\theta$

B. $-\cot\theta$

C. $\tan\theta$

D. `-tan theta

Answer: C

Watch Video Solution

119. If $\vec{a}$ and $\vec{b}$ are unit vectors and θ is the angle between them, then $\left|\vec{a}+\vec{b}\right| =$

A. $2(\sin)\frac{\theta}{2}$

B. 2 units

C. $2\cos\theta$

D. $2(\cos)\frac{\theta}{2}$

Answer: D

Watch Video Solution

120. If $\vec{a}$ and $\vec{b}$ are unit vectors such that θ is the angle between then, $\left|\vec{a} - \vec{b}\right| =$

A. $2\cos\theta$

B. $2\sin\theta$

C. $(\cos)\frac{\theta}{2}$

D. $2(\sin)\frac{\theta}{2}$

Answer: D

Watch Video Solution

121. If $\vec{a} = i + j - 2k$, $\vec{b} = -i + 2j + k$ and $\vec{c} = i - 2j + 2k$ then a unit vector parallel to $\vec{a} + \vec{b} + \vec{c}$ is

A. 11

B. 15

C. 18

D. 36

Answer: A

Watch Video Solution

122. For any vector $\vec{a}$, ('vec a' . i) i + (vec a . j)j + (vec a . k)k =`

A. $\vec{a}$

B. $2\vec{a}$

C. $3\vec{a}$

D. $\vec{0}$

Answer: A

Watch Video Solution

123. If $\left|\vec{a}\right| = 5, \left|\vec{b}\right| = 6$ and the angle between $\vec{a}$ and $\vec{b}$ is 60°, then $\vec{a} . \vec{b}$ =

A. 30

B. 15

C. $15\sqrt{3}$

D. $5\sqrt{3}$

Answer: B

Watch Video Solution

124. If $\vec{a}$ and $\vec{b}$ are unit vectors such that $\left|\vec{a} + \vec{b}\right| = 1$, then $\left|\vec{a} - \vec{b}\right| =$

A. 1

B. 2

C. $\sqrt{3}$

D. $\sqrt{5}$

Answer: C

Watch Video Solution

125. If $\left|\overrightarrow{a}\right| = 4$ and $-3 \leq \lambda \leq 2$, then the range of $\left|\lambda \overrightarrow{a}\right|$ is

A. 42614

B. 44289

C. 44230

D. 44259

Answer: B

Watch Video Solution

126. If $\vec{a}, \vec{b}, \vec{c}$ are unit vectors such that $\vec{a} + \vec{b} + \vec{c} = \vec{0}$, then the value of $\vec{a}.\vec{b} + \vec{b}.\vec{c} + \vec{c}\vec{a}$ is equal to

A. minus 2/3

B. 44257

C. 44228

D. minus 3/2

Answer: D

Watch Video Solution

127. If $\left|\vec{a} \times \vec{b}\right| = 4$ and $\left|\vec{a}.\vec{b}\right| = 2, then$|vec a|^(2) . |vec b|^(2) =`

A. 6

B. 2

C. 20

D. 8

Answer: C

Watch Video Solution

128. If $\vec{a} = 3i - 2j + 2k$, $\vec{b} = 6i - 4j - 2k$ and $\vec{c} = 3i - 2j - 4k$, then $\vec{a} . \left(\vec{b} \times \vec{c} \right)$ is

A. 0

B. 120

C. 118

D. 122

Answer: A

Watch Video Solution

129. If $\vec{a}$, $\vec{b}$ and $\vec{c}$ are non coplanar unit vectors such that $\vec{a} \times \left(\vec{b} \times \vec{c} \right) = \frac{\vec{b} + \vec{c}}{\sqrt{2}}$, then

A. 1

B. minus 1

C. 0

D. 2

Answer: C

Watch Video Solution

130. If i+j+k, i-j, i+2j+ak are coplanar then a =

A. 4

B. 3

C. 3/2

D. 0

Answer: A

Watch Video Solution

131. If $ai+j+k$, $i+bj+k$ and $i+j+ck$ are coplanar, then

A. $a + b+ c = 0$

B. $abc = -1$

C. $a+b+ c = abc +2$

D. $ab+ bc + ca = 0$

Answer: C

Watch Video Solution

132. The value of p such that the vectors $2i-j+k$, $i+2j-3k$ and $3i-pj+5k$ are coplanar is

A. -4

B. 44395

C. 4

D. none of these

Answer: C

Watch Video Solution

133. $\left[\vec{a}+\vec{b}\,\vec{b}+\vec{c}\,\vec{c}+\vec{a}\right]=$

A. $\left[\vec{a}\,\vec{b}\,\vec{c}\right]$

B. $\sum\left(\vec{a}.\,\vec{b}\right)\vec{c}$

C. $2\left[\vec{a}\,\vec{b}\,\vec{c}\right]$

D. $\left|\vec{a}\right|\left|\vec{b}\right|\left|\vec{c}\right|$

Answer: C

Watch Video Solution

134. $I.\,(j\times k)+j.\,(k\times i)+k.\,(i\times j)=$

A. 1

B. 3

C. minus 3

D. 0

Answer: B

Watch Video Solution

135. If any vector $\vec{a} \times \left(\vec{b} \times \vec{c}\right) + \vec{b} \times \left(\vec{c} \times \vec{a}\right) + \vec{c} \times \left(\vec{a} \times \vec{b}\right) =$

A. 0

B. $3\vec{a}$

C. $2\vec{a}$

D. $\vec{a}$

Answer: C

Watch Video Solution

136. If $\vec{a}, \vec{b}, \vec{c}$ are three vectors such that $\vec{a}.\left(\vec{b}+\vec{c}\right)+\vec{b}.\left(\vec{c}+\vec{a}\right)+\vec{c}.\left(\vec{a}+\vec{b}\right)=0$ and $\left|\vec{a}\right|=1,\left|\vec{b}\right|=4,\left|\vec{c}\right|=8$, then $\left|\vec{a}+\vec{b}+\vec{c}\right|=$

A. $\vec{0}$

B. $2\left[\vec{a}\,\vec{b}\,\vec{c}\right]$

C. 0

D. $\vec{a}+\vec{b}+\rightarrow$

Answer: A

Watch Video Solution

137. If the area of the parallelogram with $\vec{a}$ and $\vec{b}$ as two adjacent sides is 15 sq. units, then the area of the parallelogram having $3\vec{a}+2\vec{b}$ and $\vec{a}+3\vec{b}$ as two adjacent sides in sq. units is

A. 45

B. 75

C. 105

D. 120

Answer: C

Watch Video Solution

138. If $\overrightarrow{p} = \hat{i} + \hat{j}$, $\overrightarrow{q} = 4\hat{k} - \hat{j}$ and $\overrightarrow{r} = \hat{i} + \hat{k}$ then the unit vector in the direction of $3\overrightarrow{p} + \overrightarrow{q} - 2\overrightarrow{r}$ is

A. i+2j+2k

B. 1/3 (i-2j+2k)

C. 1/3 (i-2j-2k)

D. 1/3 (i+2j+2k)

Answer: D

Watch Video Solution

139. If $\vec{a}$ and $\vec{b}$ are the vectors such that $\left|\vec{a}\right| = 3\sqrt{3}$, $\left|\vec{b}\right| = 4$ and $\left|\vec{a} + \vec{b}\right| = \sqrt{7}$, then the angle between $\vec{a}$ and $\vec{b}$ is

A. 150^o

B. 30^o

C. 60^o

D. 120^o

Answer: A

Watch Video Solution

140. If $\vec{a}$ is vector perpendicular to both $\vec{b}$ and $\vec{c}$, then

A. $\vec{a}.\left(\vec{b} \times \vec{c}\right) = 0$

B. $\vec{a} \times \left(\vec{b} \times \vec{c}\right) = \vec{0}$

C. $\vec{a} \times \left(\vec{b} + \vec{c} \right) = \vec{0}$

D. $\vec{a} + \left(\vec{b} + \vec{c} \right) = \vec{0}$

Answer: B

Watch Video Solution

141. A vector perpendicular to the plane contianing the points $A(1, -1, 2), B(2, 0, -1), C(0, 2, 1)$ is

A. 8i+4j+4k

B. 4i+8j-4k

C. i+j-k

D. 3i+j+2k

Answer: A

Watch Video Solution

142. $\overrightarrow{O}A$ and $\overrightarrow{B}O$ are two vectors of magnitudes 5 and 6 respectively.If $\angle(BOA) = 60^\circ$, then $\overrightarrow{OA}.\overrightarrow{OB}$ is equal to

A. 15

B. 2

C. $15\sqrt{3}$

D. minus 15

Answer: A

Watch Video Solution

143. If $\overrightarrow{a} = 2\hat{i} + 3\hat{j} - \hat{k}$, $\overrightarrow{b} = \hat{i} + 2\hat{j} - 5\hat{k}$, $\overrightarrow{c} = \hat{3}i + 5\hat{j} = \hat{k}$, then a vector perpendicular to $\overrightarrow{a}$ and in the plane containing $\overrightarrow{b}$ and $\overrightarrow{c}$ is

A. 17i+21j-123k

B. minus 17i-21j-97k

C. minus 17i-21j-97k

D. minus 17i-21j+97k

Answer: C

Watch Video Solution

144. The projection of $a = 3i - j + 5k$ on $b = 2i + 3j + k$ is

A. 6

B. $\sqrt{6}$

C. $\sqrt{3}$

D. none of these

Answer: B

Watch Video Solution

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

A. $4\sqrt{5}sq.\ units$

B. $2\sqrt{3}sq.\ units$

C. $\sqrt{13}sq.\ units$

D. $\sqrt{15}sq.\ units$

Answer: C

Watch Video Solution

146. The volume of a parallelopiped whose adjacent sides are $\vec{a} = i + 2j$, $\vec{b} = j + 2k$, and $\vec{c} = 2i - k$ is

A. 6 cu. Units

B. 7 cu. Units

C. 5 cu.units

D. 8 cu.units

Answer: B

Watch Video Solution

147. If ai+j+k, i+bj+k and i+j+ck are coplanar, then

A. all value of x

B. x = 0

C. $x > 0$

D. none of these

Answer: A

Watch Video Solution

148. If A, B, C and D aare four points and $\overrightarrow{AB} = \overrightarrow{DC}$ then $\overrightarrow{AC} + \overrightarrow{BD} =$

A. $2\overrightarrow{AD}$

B. $2\overrightarrow{CB}$

C. $2\overrightarrow{AD}$

D. none of these

Answer: A

Watch Video Solution

149. The value of $\left[\overrightarrow{a} - \overrightarrow{b}, \overrightarrow{b} - \overrightarrow{c}, \overrightarrow{c} - \overrightarrow{a}\right]$ where $\left|\overrightarrow{a}\right| = 1, \left|\overrightarrow{b}\right| = 5, \left|\overrightarrow{c}\right| = 3$ is

A. 0

B. 1

C. 6

D. none of these

Answer: A

Watch Video Solution

150. If the veactors $\vec{a}, \vec{b}$ and $\vec{c}$ form the sides BC,CA and AB respectively of triangle ABC, then :

A. `vec a . vec b + vec b . vec c + vec . vec a=0

B. $\vec{\times}\ \vec{b} = \vec{b} \times \vec{c} = \vec{c} \times \vec{a}$

C. $\vec{a} . \vec{b} = \vec{b} . \vec{c} = \vec{c} . \vec{a}$

D. $\vec{a} \times \vec{b} + \vec{b} \times \vec{c} + \vec{c} \times \vec{a} = \vec{0}$

Answer: B

Watch Video Solution

151. If $\vec{a} = 3i - 5j$ and $\vec{b} = 6i + 3j$ are two vectors $\vec{c}$ a vector such that $\vec{c} = \vec{a} \times \vec{b}$ then $\left|\vec{a}\right| : \left|\vec{b}\right| : \left|\vec{c}\right| =$

A. $\sqrt{34} : \sqrt{45} : \sqrt{39}$

B. $\sqrt{34} : \sqrt{45} : 39$

C. 1.4442708333333

D. 1.6496990740741

Answer: B

Watch Video Solution

152. Given two vectors $\hat{i} + \hat{j}$ and $\hat{i} + 2\hat{j}$, the unit vector coplanar with the two vectors and perpendicular to first is :

A. $\frac{1}{\sqrt{2}}(i +$

B. $\frac{1}{\sqrt{5}}(2i + j)$

C. $\pm\frac{1}{\sqrt{2}}(i + j)$

D. none of these

Answer: C

Watch Video Solution

153. If the vectors $\vec{c}, \vec{a} = x\hat{i} + y\hat{j} + z\hat{k}$ and $\vec{b} = \hat{j}$ are such that $\vec{a}, \vec{c}$ and $\vec{b}$ form a right-handed system, then $\vec{c}$ is :

A. zi-xk

B. $\vec{0}$

C. yi

D. minus zi-xk

Answer: A

Watch Video Solution

154. The vector $\hat{i}+\hat{j}+3\hat{k}$ is rotated through an angle θ and is doubled in magnitude, then it becomes $4\hat{i}+(4x-2)\hat{j}+2\hat{k}$. The value of x is :

A. minus 2/3,2

B. 1/3,2

C. 2/3,0

D. 2,7

Answer: A

Watch Video Solution

155. If $\vec{u}, \vec{v}, \vec{w}$ are three non-coplanar vectors, then $\left(\vec{u}+\vec{v}-\vec{w}\right).\left[\left(\vec{u}-\vec{v}\right)\times\left(\vec{v}-\vec{w}\right)\right]=$

A. $\vec{u}.\left(\vec{v}\times\vec{w}\right)$

B. $\vec{u}.\left(\vec{w}\times\vec{v}\right)$

C. $3\vec{u}.\left(\vec{u}\times\vec{w}\right)$

D. 0

Answer: A

Watch Video Solution

156. If $\vec{u} = i + j$, $\vec{\nu} = i - j$, and $\vec{w} = i + 2j + 3k$. If $\hat{n}$ is a unit vector such that $\vec{u} \cdot \hat{n} = 0$, $\vec{\nu} \cdot \hat{n} = 0$ then $\left|\vec{w} \cdot \hat{n}\right| =$

A. 1

B. 2

C. 3

D. 0

Answer: C

Watch Video Solution

157. The vectro $\overrightarrow{AB} = 3\hat{j} + 4\hat{k}$ and $\overrightarrow{AC} = 5\hat{i} - 2\hat{j} + 4\hat{k}$ are the sides of a triangle ABC. The length of the medium through A is :

A. $\sqrt{72}$

B. $\sqrt{33}$

C. $\sqrt{288}$

D. $\sqrt{18}$

Answer: B

Watch Video Solution

158. $\vec{a}, \vec{b}, \vec{c}$ are three vectors such that $\vec{a} + \vec{b} + \vec{c} = 0, \left|\vec{a}\right| = 1, \left|\vec{b}\right| = 2, \left|\vec{c}\right| = 3,$ then $\vec{a}.\vec{b} + \vec{b}.\vec{c} + \vec{c}.\vec{a} =$

A. -7

B. 7

C.

D. 0

Answer: A

Watch Video Solution

159. A particle acted by constant forces $4\hat{i}+\hat{j}-3\hat{k}$ and $3\hat{i}+\hat{j}-ahtk$ is displaced from the point $\hat{i}+2\hat{j}+3\hat{k}$ to the point $5\hat{i}+4\hat{j}+\hat{k}$. The total work done by the forces is :

A. 30 units

B. 40 units

C. 50 units

D. 20 units

Answer: B

Watch Video Solution

160. If $\vec{a}, \vec{b}, \vec{c}$ are non-coplanar vectors and λ is a real number, then the vectors $\vec{a} + 2\vec{b} + 3\vec{c}, \lambda\vec{b} + \mu\vec{c}$ and $(2\lambda - 1)\vec{c}$ ar non-coplanar for:

A. All value of `lambda

B. All except one value of λ

C. All except two values of λ

D. No value of λ

Answer: C

Watch Video Solution

161. Let $\vec{a}, \vec{b}$ and $\vec{c}$ be three non zero vectors such that no two of these are collinear. If the vector $\vec{a} + 2\vec{b}$ is collinear with $\vec{c}$ and $\vec{b}$ + $3\vec{c}$ is collinear with $\vec{a} then$vec a + 2 vec b + 6 vec c` =

A. $\lambda\vec{a}$

B. $\lambda \overrightarrow{b}$

C. $\lambda \overrightarrow{c}$

D. $\overrightarrow{0}$

Answer: D

Watch Video Solution

162. If $\overrightarrow{u}, \overrightarrow{\nu}, \overrightarrow{w}$ be such that $\left|\overrightarrow{u}\right| = 1, \left|\overrightarrow{\nu}\right| = 2, \left|\overrightarrow{w}\right| = 3$. If the projection $\overrightarrow{\nu}$ along $\overrightarrow{u}$ is equal to that of $\overrightarrow{w}$ along $\overrightarrow{u}$, $\overrightarrow{\nu}$ and $\overrightarrow{w}$ are perpendicular to each other, then $\left|\overrightarrow{u} - \overrightarrow{\nu} + \overrightarrow{w}\right| =$

A. $\sqrt{14}$

B. $\sqrt{7}$

C. 2

D. 14

Answer: A

Watch Video Solution

163. Let $\vec{a}$, $\vec{b}$ and $\vec{c}$ be three non zero vectors such that no two of them are collinear and $\left(\vec{a} \times \vec{b}\right) \times \vec{c} = \frac{1}{3}\left|\vec{b}\right|\left|\vec{c}\right|\vec{a}$ if θ the angle between the vectors $\vec{b}$ and $\vec{c}$ then a value of sin θ is

A. 44256

B. $\frac{\sqrt{3}}{3}$

C. 44257

D. $\frac{2\sqrt{2}}{3}$

Answer: D

Watch Video Solution

164. If $\vec{a} = i - k$, $\vec{b} = i + j + (1 - x)k$ and $\vec{c} = yi + xj + (1 + x - y)k$ then $\left[\vec{a}\ \vec{b}\ \vec{c}\right]$ depends on

A. only x

B. only y

C. neither x nor y

D. both x and y

Answer: C

Watch Video Solution

165. If a, b and c be distinct non negative numbers. If the vectors ai+aj+ck, i+k and ci+cj+bk lie in a plane, then c is

A. the arithmetic mean of a and b

B. the geometrical mean of a and b

C. the harmonic mean of a and b

D. equal to zero

Answer: B

Watch Video Solution

166. For any vector $\vec{a}$, the value of $\left(\vec{a} \times i\right)^2 + \left(\vec{a} \times j\right)^2 + \left(\vec{a} \times k\right)^2 =$

A. $\vec{a}^2$

B. $3\vec{a}^2$

C. $4\vec{a}^2$

D. $2\vec{a}^2$

Answer: D

Watch Video Solution

167. If C is the mid-point of AB and P is an7y pont outside AB, then :

A. $\vec{P}A + \vec{P}B = \vec{P}C$

B. $\vec{P}A + \vec{P}B = 2\vec{P}C$

C. $\vec{P}A + \vec{P}B + \vec{P}C = \vec{0}$

D. $\vec{P}A + \vec{P}B + 2\vec{P}C = \vec{0}$

Answer: B

Watch Video Solution

168. If $\left(\vec{a} \times \vec{b}\right) \times \vec{c} = \vec{a} \times \left(\vec{b} \times \vec{c}\right)$, where $\vec{a}$, $\vec{b}$ and $\vec{c}$ are any three vectors such that $\vec{a} . \vec{b} \neq 0$, $\vec{b} . \vec{c} \neq 0$, then $\vec{a}$ and $\vec{c}$ are

A. parallel

B. inclined at an angle of $\frac{\pi}{3}$ between them

C. inclined at an angle of $\frac{\pi}{6}$ between them

D. perpendicular

Answer: A

Watch Video Solution

169. The values of 'a' for which the points A, B, C with position vectors 2i-j+k, i-3j-5k and ai-3j+k respectively are the vertices of a right angled triangle with $C = \frac{\pi}{2}$ are

A. -2 and -1

B. -2 and 1

C. 2 and -1

D. 2 and 1

Answer: D

Watch Video Solution

170. Let $\vec{a}, \vec{b}$ and $\vec{c}$ of magnitudes 3,4 and 5 repectively. If $\vec{a}$ is perpendicular to $\left(\vec{b} + \vec{c}\right)$, $\vec{b}$ is perpendicular to $\left(\vec{c} + \vec{a}\right)$ and $\vec{c}$ is perpendicular to $\left(\vec{a} + \vec{b}\right)$, then the magnitude of $\vec{a} + \vec{b} + \vec{c}$ is

A. 5

B. $5\sqrt{2}$

C. $5\sqrt{3}$

D. 12

Answer: B

Watch Video Solution

171. If ai+j+k, i+bj+k and i+j+ck are coplanar, then

A. -1/2

B. -2

C. -3

D. -4

Answer: A

Watch Video Solution

172. If ABCD is a quadrilateral with $\overrightarrow{AB} = \overrightarrow{a}, \overrightarrow{AD} = \overrightarrow{b}$ and $\overrightarrow{AC} = 2\overrightarrow{a} + 3\overrightarrow{b}$. If its areas is α times the area of the parallelogram with AB, AD as adjacent sides than $\alpha =$

A. 5

B. $\frac{5}{2}$

C. 1

D. 4

Answer: B

Watch Video Solution

173. A unit vector coplanar with i+j+2k and i+2j+k and perpendicular to i+j+k is

A. $\pm\frac{1}{2}(j+k)$

B. $\pm\frac{1}{\sqrt{-j-k}}$

C. $\pm\frac{1}{\sqrt{2}}(j-k)$

D. $\pm\frac{2}{\sqrt{2}}(j-k)$

Answer: C

Watch Video Solution

174. If $\vec{a}, \vec{b}$ and $\vec{c}$ are non coplanar unit vectors such that $\vec{a}\times\left(\vec{b}\times\vec{c}\right)=\frac{\vec{b}+\vec{c}}{\sqrt{2}}$, then

A. $\frac{3\pi}{4}$

B. $\frac{\pi}{4}$

C. $\frac{\pi}{2}$

D. π

Answer: A

Watch Video Solution

175. Let $\vec{a} = i - j$, $\vec{b} = j - k$, $\vec{c} = k - i$. If $\vec{d}$ is a unit vectors such that $\vec{a} . \vec{d} = 0 = \left[\vec{b}\,\vec{c}\,\vec{d}\right]$, then $\vec{d} =$

A. $\pm \frac{i + j - 2k}{\sqrt{6}}$

B. $\pm \frac{i + j - k}{\sqrt{3}}$

C. $\pm \frac{i + j + k}{\sqrt{3}}$

D. $\pm \vec{k}$

Answer: A

Watch Video Solution

176. Let $\vec{a}$, $\vec{b}$ and $\vec{c}$ be three vectors having magnitudes 1,1, and 2 respectively. If $\vec{a} \times \left(\vec{a} \times \vec{c}\right) + \vec{b} = \vec{0}$, then the angle between $\vec{a}$ and $\vec{c}$ is

A. $\frac{\pi}{4}$

B. $\frac{\pi}{6}$

C. $\frac{\pi}{3}$

D. none of these

Answer: B

Watch Video Solution

177. If $\vec{a}, \vec{b}$, and $\vec{c}$ are vectors such that $\left|\vec{b}\right| = \left|\vec{c}\right|$, then $\left\{\left[\left(\vec{a}+\vec{b}\right)\times\left(\vec{a}+\vec{c}\right)\right]\times\left(\vec{b}\times\vec{c}\right)\right\}.\left(\vec{b}+\vec{c}\right) =$

A. 1

B. -1

C. 0

D. none of these

Answer: C

Watch Video Solution

178. Let $\vec{a}$ and $\vec{b}$ be two non collinear unit vectors. If $\vec{u} = \vec{a} - \left(\vec{a} . \vec{b}\right)\vec{b}$ and $\vec{\nu} = \vec{a} \times \vec{b}$, then $\left|\vec{\nu}\right| =$

A. $\left|\vec{u}\right|$

B. $\left|\vec{u}\right| + \left|\vec{\nu} . \vec{a}\right|$

C. $2\left|\vec{\nu}\right|$

D. $\left|\vec{u}\right| + \vec{u} . \left(\vec{a} + \vec{b}\right)$

Answer: A

Watch Video Solution

179. If $\vec{a} = 2i + j + k$, $\vec{b} = i + 2j - k$ and a unit vector $\vec{c}$ be coplanar. If $\vec{c}$ is perpendicular to a $\vec{a}$ then $\vec{c} =$

A. $\frac{1}{\sqrt{2}}(-j + k)$

B. $\frac{1}{\sqrt{3}}(-i - j - k)$

C. $\frac{1}{\sqrt{5}}(i - 2j)$

D. $\frac{1}{\sqrt{3}}(i-j+k)$

Answer: A

Watch Video Solution

180. Let $\vec{a}=2i+j-2k$ and $\vec{b}=i+j$. If $\vec{c}$ is a vector such that $\vec{a}.\vec{c}=|\vec{c}|, |\vec{c}-\vec{a}|=2\sqrt{2}$ and the angle between $\left(\vec{a}\times\vec{b}\right)$ and $\vec{c}$ is 30^o, then $\left|\left(\vec{a}\times\vec{b}\right)\times\vec{c}\right|=$

A. $\frac{2}{3}$

B. $\frac{3}{2}$

C. 2

D. 3

Answer: B

Watch Video Solution

181. Let $\vec{a}, \vec{b}$ and $\vec{c}$ are unit coplanar vectors then the scalar triple product $\left[2\vec{a} - \vec{b}\, 2\vec{b} - \vec{c}\, 2\vec{c} - \vec{a}\right]$

A. 0

B. 1

C. $-\sqrt{3}$

D. $\sqrt{3}$

Answer: A

Watch Video Solution

182. If $\vec{a}, \vec{b}, \vec{c}$ are unit vectors then $\left|\vec{a} - \vec{b}\right|^2 + \left|\vec{b} - \vec{c}\right|^2 + \left|\vec{c} - \vec{a}\right|^2$ does not exceed.

A. 4

B. 9

C. 8

D. 6

Answer: B

Watch Video Solution

183. Let $\vec{v} = 2i + j - k$ and $\vec{w} = i + 3k$. If $\vec{u}$ is a unit vector, then the maximum values of the scalar triple proudct $\left[\vec{u}\,\vec{v}\,\vec{w}\right] =$

A. minus 1

B. $\sqrt{10} + \sqrt{6}$

C. $\sqrt{59}$

D. $\sqrt{6}$

Answer: C

Watch Video Solution

184. If $\vec{a}$ and $\vec{b}$ are two unit vectors such that $\vec{a} + 2\vec{b}$ and $5\vec{a} - 4\vec{b}$ are perpendicular to each other then the angle between $\vec{a}$ and $\vec{b}$ is

A. 45^o

B. 60^o

C. $\cos^{-1}\left(\frac{1}{3}\right)$

D. $\cos^{-1}\left(\frac{2}{7}\right)$

Answer: B

Watch Video Solution

185. The valur of a so that the volume of parallelopiped formed by vectors $\hat{i} + a\hat{j} + \hat{k}, \hat{j} + a\hat{k}, a\hat{i} + \hat{k}$ becomes minimum is :

A. $\sqrt{3}$

B. 2

C. $\frac{1}{\sqrt{3}}$

D. 3

Answer: C

Watch Video Solution

186. If $\vec{a} = i + j + k$, $\vec{a} . \vec{b} = 1$ and $\vec{a} \times \vec{b} = j - k$ then $\vec{b} =$

A. i-j+k

B. 2j-k

C. i

D. 2i

Answer: C

Watch Video Solution

187. The unit vector which is orthogonal to the vector $\vec{a} = 3i + 2j + 6k$ and is coplanar with the vectors $\vec{b} = 2i + j + k$ and $\vec{c} = i - j + k$ is

A. $\frac{2i - 6j + k}{\sqrt{41}}$

B. $\frac{2i - 3j}{\sqrt{13}}$

C. $\frac{3j - k}{\sqrt{10}}$

D. $\frac{4i - 3j - 3k}{\sqrt{34}}$

Answer: C

Watch Video Solution

188. If $\vec{a}$ and $\vec{b}$ are two unit vectors, then the vector $\left(\vec{a} + \vec{b}\right) \times \left(\vec{a} \times \vec{b}\right)$ is parallel to the vector

A. $\vec{a} + \vec{b}$

B. $2\vec{a} - \vec{b}$

C. $\vec{a} - \vec{b}$

D. $2\vec{a} + \vec{b}$

Answer: C

Watch Video Solution

189. Given $\vec{a} = i + j - k$, $\vec{b} = -i + 2j + k$ and $\vec{c} = -i + 2j - k$, a unit vector perpendicular to both $\vec{a} + \vec{b}$ and $\vec{b} + \vec{c}$ is

A. i-j+k

B. j

C. k

D. none of these

Answer: A

Watch Video Solution

190. A unit vector in the xy plane that makes an angle of 45^o with the vector i+j and an angle of 60^o with the vector 3i-4j is

A. i

B. $\frac{1}{\sqrt{2}}(i+j)$

C. 1/2 (i+j)

D. none of these

Answer: D

Watch Video Solution

191. If $\vec{A} = 2i + 3j + 4k, \vec{B} = i + j + 5k$ and $\vec{C}$ form a left handed system, then $\vec{C}$ is

A. 11i-6j-k

B. minus 11i + 6j +6k

C. 11i-6j+k

D. 11i+6j-k

Answer: B

Watch Video Solution

192. If $\vec{a}, \vec{b}, \vec{c}, \vec{d}$ are the vertices of a square then

A. $\left(\vec{b}-\vec{a}\right)=\left(\vec{c}-\vec{b}\right)$

B. $\vec{a}+\vec{b}+\vec{c}=\vec{0}$

C. $\left(\vec{c}-\vec{a}\right).\left(\vec{d}-\vec{b}\right)=0$

D. none of these

Answer: C

Watch Video Solution

193. If $\vec{a}, \vec{b}, \vec{c}$ are mutually perpendicular unit vectors then $\left|\vec{a}+\vec{b}+\vec{c}\right| =$

A. $\sqrt{2}$

B. 1

C. $\sqrt{3}$

D. 0

Answer: C

Watch Video Solution

194. If $\vec{a}$ and $\vec{b}$ are unit vectors and θ is the angle between them, then $\left|\vec{a}+\vec{b}\right| =$

A. $\frac{\pi}{4}$

B. $\frac{\pi}{3}$

C. $\frac{2\pi}{3}$

D. $\frac{\pi}{2}$

Answer: B

Watch Video Solution

195. The ratio in which i+2j+3k divides the join of -2i+3j+5k and 7i-k is

A. -3:2

B. 1:2

C. 2:3

D. -4:3

Answer: B

Watch Video Solution

196. If $\left|\vec{a}\right| = 5, \left|\vec{b}\right| = 6, \vec{a} . \vec{b} = 24$ then $\left|\vec{a} \times \vec{b}\right|$ =`

A. $\sqrt{224}$

B. 18

C. $\sqrt{300}$

D. $\sqrt{254}$

Answer: B

Watch Video Solution

197. If α and β are two nonzero and different vectors such that $\left|\vec{\alpha}+\vec{\beta}\right|=\left|\vec{\beta}-\vec{\alpha}\right|$ then the angle between the vectors $\vec{\alpha}$ and $\vec{\beta}$ is

A. $\frac{\pi}{3}$

B. $\frac{\pi}{4}$

C. $\frac{\pi}{2}$

D. $\frac{\pi}{6}$

Answer: C

Watch Video Solution

198. If $\vec{a} = i + \lambda j + k$, $\vec{b} = i + j + k$, then for $\left|\vec{a} + \vec{b}\right| = \left|\vec{a}\right| + \left|\vec{b}\right|$ to be true, the value of $\lambda =$

A. -1

B. 2

C. - 2

D. 1

Answer: D

Watch Video Solution

199. The three points whose position vectors are i+2j+3k, 3i+4j+7k, and -3i-2j-5k

A. form the vertices of an equilateral triangle

B. form the vertices of a right angled triangle

C. are collinear

D. form the vertices of an isosceles triangle

Answer: C

Watch Video Solution

200. If $\vec{a} = i + 2j + 3k$, $\vec{b} = i - 2j + k$, $\vec{c} = 4i + 3j - 2k$ and $\vec{a} + \lambda \vec{b}$ is perpendicular to $\vec{c}$ then $\lambda =$

A. 1

B. 2

C. 3

D. 4

Answer: B

Watch Video Solution

201. If $\vec{a}$ and $\vec{b}$ are unit vectors $\left|\vec{a} \times \vec{b}\right| = 1$ then the angle between $\vec{a}$ and $\vec{b}$ is

A. $\frac{\pi}{4}$

B. $\frac{\pi}{2}$

C. $\frac{\pi}{3}$

D. π

Answer: B

Watch Video Solution

202. If $\left|\vec{a}\right| = 3, \left|\vec{b}\right| = 4$ and $\left|\vec{a} + \vec{b}\right| = 1$, then $\left|\vec{a} - \vec{b}\right| =$

A. 5

B. 6

C. 7

D. 8

Answer: C

Watch Video Solution

203. If the position vectors of A and B are 3i-2j+k and 2i+4j+3k then $\left|\overrightarrow{AB}\right| =$

A. $\sqrt{41}$

B. $\sqrt{29}$

C. $\sqrt{43}$

D. $\sqrt{53}$

Answer: D

Watch Video Solution

204. If $\vec{a}$ and $\vec{b}$ are unit vectors such that $\left|\vec{a} \times \vec{b}\right| = \vec{a} . \vec{b}$, then $\left|\vec{a} + \vec{b}\right|^2 =$

A. 2

B. $2 + \sqrt{2}$

C. $2 - \sqrt{2}$

D. $\sqrt{2}$

Answer: B

Watch Video Solution

205. $\left(\vec{b} \times \vec{c}\right) \times \left(\vec{c} \times \vec{a}\right) =$

A. $\left[\vec{a}\ \vec{b}\ \vec{c}\right]\vec{c}$

B. $\left[\vec{a}\ \vec{b}\ \vec{c}\right]\vec{b}$

C. $\left[\vec{a}\ \vec{b}\ \vec{c}\right]\vec{a}$

D. $\vec{a} \times \left(\vec{b} \times \vec{c} \right)$

Answer: A

Watch Video Solution

206. If $\vec{a} = 2i + 3j - 4k$, $\vec{b} = i + j + k$ and $\vec{c} = 4i + 2j + 3k$, then $\left| \vec{a} \times \left(\vec{b} \times \vec{c} \right) \right| =$

A. $\sqrt{10}$

B. 1

C. 2

D. $\sqrt{5}$

Answer: D

Watch Video Solution

207. If θ is the angle between the vectors 2i-2j+4k and 3i+j+2k then $\sin\theta =$

A. $\frac{2}{10}$

B. $\sqrt{10}$

C. $\frac{2}{\sqrt{10}}$

D. $\frac{2}{\sqrt{7}}$

Answer: B

Watch Video Solution

208. If two out of the three vectors $\vec{a}, \vec{b}, \vec{c}$ are unit vectors, $\vec{a} + \vec{b} + \vec{c} = 0$ and $2\left(\vec{a}.\vec{b} + \vec{b}.\vec{c} + \vec{a}.\vec{c}\right) + 3 = 0$, then the third vector of length

A. 3

B. 2

C. 1

D. 0

Answer: C

Watch Video Solution

209. $(\sin\theta + i\cos\theta)^9$=

A. 3

B. 2

C. 1

D. 0

Answer: D

Watch Video Solution

210. If OACB is a parallelogram with $\overrightarrow{OC} = \overrightarrow{a}$ and $\overrightarrow{AB} = \overrightarrow{b}$ then $\overrightarrow{OA} =$

A. $\overrightarrow{a} + \overrightarrow{b}$

B. $\overrightarrow{a} - \overrightarrow{b}$

C. $\frac{1}{2}\left(\overrightarrow{b} - \overrightarrow{a}\right)$

D. $\frac{1}{2}\left(\overrightarrow{a} - \overrightarrow{b}\right)$

Answer: D

Watch Video Solution

211. If $\overrightarrow{a}, \overrightarrow{b}, \overrightarrow{c}, \overrightarrow{d}$ are the coplanar vectors then $\left(\overrightarrow{a} \times \overrightarrow{b}\right) \times \left(\overrightarrow{c} \times \overrightarrow{d}\right) =$

A. $\overrightarrow{a} + \overrightarrow{b}$

B. $\overrightarrow{a} - \overrightarrow{b}$

C. $\frac{1}{2}\left(\overrightarrow{b} - \overrightarrow{a}\right)$

D. $\frac{1}{2}\left(\vec{a}-\vec{b}\right)$

Answer: D

View Text Solution

212. With usual notation [i-j j-k k-i] =

A. 1

B. $\vec{a}$

C. $\vec{b}$

D. $\vec{0}$

Answer: A

Watch Video Solution

213. If θ is the angle between any two vector $\vec{a}$ and $\vec{b}$, then $\left|\vec{a}.\vec{b}\right| = \left|\vec{a} \times \vec{b}\right|$ when θ is equal to

A. 0

B. 1

C. 3

D. 2

Answer: D

Watch Video Solution

214. If $\vec{a} = i + j$ and $\vec{b} = j - k$ then the angle between $\vec{a} + \vec{b}$ and $\vec{a} - \vec{b}$ is

A. 0

B. π

C. 2 'sqrt3'

D. 2

Answer: C

Watch Video Solution

215. ABCD is a parallelogram, with AC, BD as diagonals. Then $\overrightarrow{A}C - \overrightarrow{B}D =$

A. $2\overrightarrow{A}B$

B. $3\overrightarrow{A}B$

C. $4\overrightarrow{A}B$

D. $\overrightarrow{A}B$

Answer: C

Watch Video Solution

216. If $\vec{a} = i + j + k,\ \vec{b} = i + j,\ \vec{c} = i$ and $\left(\vec{a} \times \vec{b}\right) \times \vec{c} = \lambda \vec{a} + \mu \vec{b}$, then $\lambda + \mu$

A. 0

B. 1

C. 2

D. 3

Answer: A

Watch Video Solution

217. If $\vec{a}$, $\vec{b}$, $\vec{c}$ be the position vectors of the vertices A, B, C respectively of the triangle ABC. The vector area of ABC is

A. 0

B. 1

C. 2

D. 3

Answer: B

View Text Solution

218. If $\vec{a}, \vec{b}, \vec{c}$ are three vectors such that $\vec{a} = \vec{b} + \vec{c}$ and the angle between $\vec{b}$ and $\vec{c}$ is $\frac{\pi}{2}$, then

A. $\frac{1}{2}\left\{\vec{a} \times \left(\vec{b} \times \vec{c}\right) + \vec{b} \times \left(\vec{c} \times \vec{a}\right) + \vec{c} \times \left(\vec{a} \times \vec{b}\right)\right\}$

B. $\frac{1}{2}\left\{\left\{\vec{a} \times \vec{b}\right) + \left(\vec{b} \times \vec{c}\right) + \left(\vec{c} \times \vec{a}\right)\right\}$

C. $\frac{1}{2}\left(\vec{a} + \vec{b} + \vec{c}\right)$

D. `1/2 {vec b. vec c)veca + (vec c .vec a)vec b+ (vec a.vec b)vec c}

Answer: C

View Text Solution

219. If A, B, C are the vertices of a triangle whose position vectors are $\vec{a}, \vec{b}, \vec{c}$ and G is the centroid of the triangle ABC, then $\vec{GA} + \vec{GB} + \vec{GC} =$

A. $2\vec{GB}$

B. $2\vec{GA}$

C. $\vec{O}$

D. $\vec{BG}$

Answer: D

Watch Video Solution

220. If i+2j+3k, 3i+2j+k are sides of parallelogram, then a unit vector parallel to one of the diagonals

A. $\frac{1}{\sqrt{3}}(i+j+k)$

B. $\frac{1}{\sqrt{3}}(i-j+k)$

C. $\frac{1}{\sqrt{3}}(i+j-k)$

D. $\frac{1}{\sqrt{3}}(-i+j+k)$

Answer: D

Watch Video Solution

221. If the vectors $\vec{a} = 2i + 3j + 6k$ and $\vec{b}$ are collinear and $\left|\vec{b}\right| = 21$, then $\vec{b} =$

A. $\pm(2i + 3j + 6k)$

B. $\pm(2i + 3j + 6k)$

C. i+j+k

D. $\pm 21(2i + 3j + 6k)$

Answer: D

Watch Video Solution

222. If $\vec{a} . i = \vec{a} . (2i + j) = \vec{a} . (i + j + 3k) = 1$, then $\vec{a} =$

A. i-k

B. 1/3 (3i+3j+3k)

C. 1/3 (i+j+k)

D. 1/3 (3i-3j+k)

Answer: A

Watch Video Solution

223. If i-2j, 3j+k and $\lambda i + 3j$ are coplanar then $\lambda =$

A. minus 1

B. 44228

C. - 3/2

D. 2

Answer: D

Watch Video Solution

224. The position vector of a point laying on the line joining the points whose position vectors are i+j-k and i-j+k is

A. j

B. i

C. k

D. $\vec{0}$

Answer: B

Watch Video Solution

225. If $\vec{a}+\vec{b}+\vec{c}=0$ and $\left|\vec{a}\right|=3, \left|\vec{b}\right|=4$ and $\left|\vec{c}\right|=\sqrt{37}$, then the angle between $\vec{a}$ and $\vec{b}$ is

A. $\frac{\pi}{4}$

B. $\frac{\pi}{2}$

C. $\frac{\pi}{6}$

D. $\frac{\pi}{3}$

Answer: D

Watch Video Solution

226. Two planes are perpendicular to one another. One of then contains vectors $\vec{a}$ and $\vec{c}$ and other contains vectors $\vec{b}$ and $\vec{d}$ then $\left(\vec{a} \times \vec{c}\right).\left(\vec{b} \times \vec{d}\right) =$

A. 1

B. 0

C. -1

D. None of these

Answer: B

Watch Video Solution

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

A. 0

B. $\left[\vec{a}\ \vec{b}\ \vec{c} \right] . \left[\vec{b}\ \vec{c}\ \vec{a} \right]$

C. $\left[\vec{a}\ \vec{b}\ \vec{c} \right]$

D. none of these

Answer: A

Watch Video Solution

228. A unit vector perpendicular to both i+j and j+k is

A. i-j+k

B. i+j+k

C. $\frac{i+j+k}{\sqrt{3}}$

D. $\frac{i-j+k}{\sqrt{3}}$

Answer: D

Watch Video Solution

229. If $\vec{a}, \vec{b}, \vec{c}$ are non-coplanar vectors and λ is a real number, then $\left[\lambda\left(\vec{a}+\vec{b}\right)\lambda^2\vec{b}\,\lambda\vec{c}\right] = \left[\vec{a}\,\vec{b}+\vec{c}\,\vec{b}\right]$ for

A. no value of λ

B. exactly one value of λ

C. exactly two values of λ

D. exactly three values of λ

Answer: A

Watch Video Solution

230. If the volume of the parallelopiped with $\vec{a}, \vec{b}$ and $\vec{c}$ as coterminous edges is 40 cubic units, then the volume of he parallelopiped having $\vec{b}+\vec{c}, \vec{c}+\vec{a}$ and $\vec{a}+\vec{b}$ as coterminous edges in cubic units is

A. 160

B. 40

C. 80

D. 120

Answer: C

Watch Video Solution

231. The volume of the tetracedron formed by the points $(1,1,1)(2,1,3),(3,2,2)$ and $(3,3,4)$ in cubic units is :

A. 44352

B. 44322

C. 5

D. 44257

Answer: A

Watch Video Solution

232. If $\vec{u} = \vec{a} - \vec{b}, \vec{v} = \vec{a} + \vec{b}$ and $\left|\vec{a}\right| = \left|\vec{b}\right| = 2$, then $\left|\vec{u} \times \vec{v}\right|$ is

A. $2\sqrt{16 - \left(\vec{a} . \vec{b}\right)^2}$

B. $2\sqrt{4 - \left(\vec{a} - \vec{b}\right)^2}$

C. $\sqrt{16 - \left(\vec{a} . \vec{b}\right)^2}$

D. $\sqrt{4 - \left(\vec{a} . \vec{b}\right)^2}$

Answer: B

Watch Video Solution

233. Unit vector perpendicular to $\hat{i} - 2\hat{j} + 2\hat{k}$ and lying in the plance containing $\hat{i} - 2\hat{j} + 2\hat{k}$ and $-\hat{i} + 2\hat{j} + \hat{k}$ is :

A. 8i-7j+11k

B. 8i+7j-11k

C. 8i-7j-11k

D. $\frac{1}{\sqrt{234}}(8i - 7j - 11k)$

Answer: D

Watch Video Solution

234. If $\vec{u}$, $\vec{\nu}$, and $\vec{w}$ are non coplanar vectors and p,q are real numbers, then the equality $\left[3\vec{u}\, p\vec{\nu}\, p\vec{w}\right] - \left[p\vec{\nu}\, \vec{w}\, q\vec{u}\right] - \left[2\vec{w}\, q\vec{\nu}\, q\vec{u}\right] = 0$ holds for

A. all values of (p,q)

B. exactly one value of (p,q)

C. exactly two value of (p,q)

D. more than two not all values of (p,q)

Answer: B

Watch Video Solution

235. If $\vec{a} . i = \vec{a} . (i + j) = \vec{a} . (i + j + k) = 1$, then $\vec{a} =$

A. i-k

B. i+j

C. i+j-k

D. i

Answer: D

Watch Video Solution

236. If $\vec{a}$ and $\vec{b}$ are unit vectors such that $\left|\vec{a}+\vec{b}\right|=1$, then $\left|\vec{a}-\vec{b}\right|=$

A. 1

B. $\sqrt{2}$

C. $\sqrt{3}$

D. $\sqrt{5}$

Answer: C

Watch Video Solution

237. The projection of $a=3i-j+5k$ on $b=2i+3j+k$ is

A. $\frac{8}{\sqrt{39}}$

B. $\frac{8}{\sqrt{35}}$

C. $\sqrt{14}$

D. $\frac{8}{\sqrt{14}}$

Answer: D

Watch Video Solution

238. If $\vec{a} . \vec{b} = -\left|\vec{a}\right|\left|\vec{b}\right|$ then angle between $\vec{a}$ and $\vec{b}$ is

A. 90^o

B. 60^o

C. 45^o

D. 180^o

Answer: D

Watch Video Solution

239. If $\vec{a} + 2\vec{b} + 3\vec{c} = \vec{0}$, then $\left(\vec{a} \times \vec{b}\right) + \left(\vec{b} \times \vec{c}\right) + \left(\vec{c} \times \vec{a}\right) =$

A. $\vec{0}$

B. $6\left(\vec{b} \times \vec{c}\right)$

C. $2\left(\vec{b} \times \vec{c}\right)$

D. $3\left(\vec{a} \times \vec{c}\right)$

Answer: B

Watch Video Solution

240. If $\vec{a}, \vec{b}, \vec{c}$ non zero coplanar vectors, then, $\left[2\vec{a} - \vec{b}\, 3\vec{b} - \vec{c}\, 4\vec{c} - \vec{a}\right] =$

A. 9

B. 27

C. 0

D. 25

Answer: C

Watch Video Solution

241. If $\vec{a}$, $\vec{b}$ and $\vec{c}$ are unit vectors such that $\vec{a} + \vec{b} + \vec{c} = 0$, then $3\vec{a}.\vec{b} + 2\vec{b}.\vec{c} + \vec{c}.\vec{a} =$

A. 3

B. minus 3

C. 1

D. minus 1

Answer: B

Watch Video Solution

242. If the points with position vectors $10\hat{i}+3\hat{j}, 12\hat{i}-5\hat{j}$ and $\lambda\hat{i}+11\hat{j}$ are collinear, then λ is :

A. minus 8

B. 4

C. 8

D. minus 5

Answer: C

Watch Video Solution

243. If $2\hat{i}+3\hat{j}, \hat{i}+\hat{j}+\hat{k}$ and $\lambda\hat{i}+4\hat{j}+2\hat{k}$ taken in an order are coterminous edges of a parallelopoped of volume 2 cu units,then value of λ is

A. minus 4

B. 2

C. 3

D. 4

Answer: D

Watch Video Solution

244. If $\vec{a}, \vec{b}$ and $\vec{c}$ are non coplanar then $\vec{a} \cdot \left\{ \frac{\vec{b} \times \vec{c}}{3\vec{b} \cdot \left(\vec{c} \times \vec{a}\right)} \right\} - \vec{b} \cdot \left\{ \frac{\vec{c} \times \vec{a}}{2\vec{c} \cdot \left(\vec{a} \times \vec{b}\right)} \right\} =$

A. - 1/2

B. - 1/3

C. - 1/6

D. 44348

Answer: C

Watch Video Solution

245. Angle between the vectors $\vec{a}$ and $\vec{b}$, where $\vec{a}$, $\vec{b}$ and $\vec{c}$ are unit vectors satisfying $\vec{a} + \vec{b} + \sqrt{3}\vec{c} = \vec{0}$ is

A. $\frac{\pi}{6}$

B. $\frac{\pi}{4}$

C. $\frac{\pi}{3}$

D. $\frac{\pi}{2}$

Answer: C

Watch Video Solution

246. Let $\vec{a} = 2i - j + k$, $\vec{b} = i + 2j - k$ and $\vec{c} = i + j - 2k$ be three vectors. A vector in the plane of $\vec{b}$ and $\vec{c}$ whose projection on $\vec{a}$ is of magnitude $\sqrt{\frac{2}{3}}$ is

A. 2i+3j-3k

B. $2i+3j+3k$

C. $-2i+5j+5k$

D. $2i+j+5k$

Answer: A

Watch Video Solution

247. The vector $1/3\ (2i-2j+k)$ is

A. unit vector

B. parallel to vector $-i+j-1/2k$

C. perpendicular to the vector $3i+2j-2k$

D. All of the above

Answer: D

Watch Video Solution

248. If $\vec{a}, \vec{b}$ and $\vec{c}$ are non coplanar unit vectors such that $\vec{a} \times \left(\vec{b} \times \vec{c}\right) = \frac{\vec{b} + \vec{c}}{\sqrt{2}}$, then

A. $\frac{3\pi}{4}$

B. $\frac{\pi}{4}$

C. $\frac{\pi}{2}$

D. π

Answer: A

Watch Video Solution

249. Let α, β, γ are distinct real numbers. The points with position vectors $\alpha i + \beta j + \gamma k, \beta i + \gamma j + \alpha k, \gamma i + \alpha j + \beta k$

A. from a right angle triangle

B. form a scalene triangle

C. form an equilateral triangle

D. are collinear

Answer: B

Watch Video Solution

250. A non-zero vector $\vec{a}$ is parallel to the line of intersection of the planes determined by the vectors i, i+j and the plane determined by the vectors i-j, j+k. The angle between $\vec{a}$ and i-2j+2k is

A. $\frac{\pi}{4}$

B. $\frac{\pi}{3}$

C. $\frac{\pi}{6}$

D. $\frac{\pi}{2}$

Answer: A

Watch Video Solution

251. The number of distinct real values of λ for which the vectors $-\lambda^2 i + j + k, i - \lambda^2 j + k$ and $i + j - \lambda^2 k$ are coplanar is

A. 0

B. 1

C. 2

D. 3

Answer: C

Watch Video Solution

252. 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. $\vec{a} \times \vec{b} = \vec{b} \times \vec{c} = \vec{c} \times \vec{a} = \vec{O}$

B. $\vec{a} \times \vec{b} = \vec{b} \times \vec{c} = \vec{c} \times \vec{a} \neq \vec{O}$

C. $\vec{a} \times \vec{b} = \vec{b} \times \vec{c} = \vec{a} \times \vec{c} = \vec{O}$

D. $\vec{a} \times \vec{b}, \vec{b} \times \vec{c}, \vec{c} \times \vec{a}$ are mutually perpendicular

Answer: B

Watch Video Solution

253. Let $\vec{a} = i + 2j + k, \vec{b} = i - j + k, \vec{c} = i + j - k$. A vector coplanar to a $\vec{a}$ and $\vec{b}$ has a projection along $\vec{c}$ of magnitude $\frac{1}{\sqrt{3}}$, then the vector is

A. 4i-j+4k

B. 4i+j-4k

C. 2i+j+k

D. none of these

Answer: A

Watch Video Solution

254. Let $\vec{u}, \vec{v}$ and $\vec{w}$ vectors that $\vec{u}+\vec{v}+\vec{w}=\vec{0}$. If $\left|\vec{u}\right|=3, \left|\vec{v}\right|=4$, and $\left|\vec{w}\right|=5$, then $\vec{u}.\vec{v}+\vec{v}.\vec{w}+\vec{w}.\vec{u}=$

A. 47

B. minus 25

C. 0

D. 25

Answer: B

Watch Video Solution

255. The values of 'a' for which the points A, B, C with position vectors 2i-j+k, i-3j-5k and ai-3j+k respectively are the vertices of a right angled triangle with $C=\frac{\pi}{2}$ are

A. 2 and 1

B. minus 2 and -1

C. minus 2 and 1

D. 2 and -1

Answer: A

Watch Video Solution

256. If the vector $\vec{a} = \hat{i} + a\hat{j} + a^2\hat{k}$, $\vec{b} = \hat{i} + b\hat{j} + b^2\hat{k}$, $\vec{c} = \hat{i} + c\hat{j} + c^2\hat{k}$ are three non-coplanar vectors and $\begin{vmatrix} a & a^2 & 1+a^3 \\ b & b^2 & 1+b^3 \\ c & c^2 & 1+c^3 \end{vmatrix}$ = 0 , then the value of abc is equal to

A. 0

B. 1

C. 2

D. minus 1

Answer: D

Watch Video Solution

257. If $\vec{a}, \vec{b}, \vec{c}$ are non-coplanar vectors and λ is a real number, then $\left[\lambda\left(\vec{a}+\vec{b}\right)\lambda^2\vec{b}\,\lambda\vec{c}\right] = \left[\vec{a}\,\vec{b}+\vec{c}\,\vec{b}\right]$ for

A. exactly two values of λ

B. actly three values of λ

C. no value of λ

D. exactly one values of λ

Answer: C

Watch Video Solution

258. Let $\vec{a} = i + j + k, \vec{b} = i - j + 2k, \vec{c} = xi + (x-2)j - k.$ If the vector $\vec{c}$ lies in the plane $\vec{a}$ and $\vec{b}$, then x =

A. - 4

B. - 2

C. 0

D. 1

Answer: B

Watch Video Solution

259. The non-zero vectors $\vec{b}$ and $\vec{c}$ are related by $\vec{a} = 8\vec{b}$ and $\vec{c} = -7\vec{b}$. Then the angle between $\vec{a}$ and $\vec{c}$ is

A. 0

B. $\frac{\pi}{4}$

C. $\frac{\pi}{2}$

D. π

Answer: D

Watch Video Solution

260. The vectors $\vec{a} = \alpha i + 2j + \beta k$ lies in the plane of the vectors $\vec{b} = i + j$ and $\vec{c} = j + k$ and $\vec{a}$ bisects the angle between $\vec{b}$ and $\vec{c}$. Then, which one of the following gives the possible values of α and β?

A. $\alpha = 2, \beta = 2$

B. $\alpha = 1, \beta = 2$

C. $\alpha = 2, \beta = 1$

D. $\alpha = 1, \beta = 1$

Answer: D

Watch Video Solution

261. If $\vec{u}$, $\vec{\nu}$, and $\vec{w}$ are non coplanar vectors and p,q are real numbers, then the equality $\left[3\vec{u}\, p\vec{\nu}\, p\vec{w}\right] - \left[p\vec{\nu}\, \vec{w}\, q\vec{u}\right] - \left[2\vec{w}\, q\vec{\nu}\, q\vec{u}\right] = 0$ holds for

A. exactly one value of (p,q)

B. exactly two values of (p,q)

C. more than two but not all values of (p,q)

D. all values of (p,q)

Answer: A

Watch Video Solution

262. If $\vec{a} = j - k$ and $\vec{c} = i - j - k$. Then the vector $\vec{b}$ satisfying $\vec{a} \times \vec{b} + \vec{c} = \vec{0}$ and $\vec{a} . \vec{b}$ = 3 is

A. i-j-2k

B. i+j-2k

C. - i+j-2k

D. 2i-j+2k

Answer: C

Watch Video Solution

263. If the vectors $\vec{a} = i - j + 2k$, $\vec{b} = 2i + 4j + k$ and $\vec{c} = \lambda i + j + \mu k$ are mutually perpendicular then $(\lambda, \mu) =$

A. (-2,3)

B. (3, -2)

C. (-3,2)

D. (2,-3)

Answer: C

Watch Video Solution

264. If $\vec{a}$ and $\vec{b}$ are not perpendicular to each other and $\vec{r} \times \vec{a} = \vec{b} \times \vec{a}$, $\vec{r} . \vec{c} = \vec{0}$ then $\vec{r} =$

A. $\vec{a} - \vec{c}$

B. $\vec{b} + x\vec{a}, f \text{ or } allscalars x$

C. $\vec{b} - \left(\frac{\vec{b} \cdot \vec{c}}{\vec{a} \cdot \vec{c}}\right)\vec{a}$

D. none of these

Answer: C

Watch Video Solution

265. If $\vec{a} = \frac{1}{\sqrt{10}}(3i + k)$ and $\vec{b} = \frac{1}{7}(2i + 3j - 6k)$ then the value of $\left(2\vec{a} - \vec{b}\right).\left[\left(\vec{a} \times \vec{b}\right) \times \vec{a} + \left(\vec{a} \times \vec{b}\right) \times 2\vec{b}\right]$ is

A. 3

B. - 5

C. - 3

D. 5

Answer: B

Watch Video Solution

266. If $\vec{u} = \vec{a} - \vec{b}, \vec{v} = \vec{a} + \vec{b}$ and $\left|\vec{a}\right| = \left|\vec{b}\right| = 2$, then $\left|\vec{u} \times \vec{v}\right|$ is

A. $2\sqrt{16 - \left(\vec{a} . \vec{b}\right)^2}$

B. $2\sqrt{4 - \left(\vec{a} . \vec{b}\right)^2}$

C. $\sqrt{16 - \left(\vec{a} . \vec{b}\right)^2}$

D. $\sqrt{4 - \left(\vec{a} . \vec{b}\right)^2}$

Answer: A

Watch Video Solution

267. For any three vectors $\vec{a}, \vec{b}, \vec{c}$ the expression $\left(\vec{a} - \vec{b}\right) . \left[\left(\vec{b} - \vec{c}\right) \times \left(\vec{c} - \vec{a}\right)\right] =$

A. $\left[\vec{a}\,\vec{b}\,\vec{c}\right]$

B. $2\left[\vec{a}\,\vec{b}\,\vec{c}\right]$

C. $\left[\vec{a}\,\vec{b}\,\vec{c}\right]^2$

D. none of these

Answer: D

Watch Video Solution

268. For any vector $\vec{r}$, the value of $i \times \left(\vec{r} \times i\right) + j \times \left(\vec{r} \times j\right) + k \times \left(\vec{r} \times k\right) =$

A. $\vec{0}$

B. $2\vec{r}$

C. $-2\vec{r}$

D. none of these

Answer: B

Watch Video Solution

269. Let the unit vectors $\vec{a}$ and $\vec{b}$ be perpendicular to each other and the unit vector $\vec{c}$ be inclined at an angle θ to both $\vec{a}$ and $\vec{b}$. If $\vec{c} = x\vec{a} + y\vec{b} + z\left(\vec{a} \times \vec{b}\right)$ then,

A. A. $x = \cos\theta, y = \sin\theta, z = \cos 2\theta$

B. B. $x = \sin\theta, y = \cos\theta, z = -\cos 2\theta$

C. C. $x = y = \cos\theta, z^2 = -\cos 2\theta$

D. D. $x = y = \cos\theta, z^2 = -\cos 2\theta$

Answer: D

Watch Video Solution

270. If the points $P\left(\vec{a} + 2\vec{b} + \vec{c}\right), Q\left(2\vec{a} + 3\vec{b}\right), R\left(\vec{b} + t\vec{c}\right)$ are collinear, where $\vec{a}$, $\vec{b}$, $\vec{c}$ are three non-coplanar vectors, the value of t is

A. 1)-2

B. 2)1/2

C. 3)4

D. 4)2

Answer: D

Watch Video Solution

271. If $\vec{a}, \vec{b}, \vec{c}$ are three mutually perpendicular vectors of equal magnitude, then the angle θ which $\vec{a} + \vec{b} + \vec{c}$ makes with any one of three given vectors is given by

A. $\cos^{-1}\left(\frac{1}{\sqrt{3}}\right)$

B. $\cos^{-1}\left(\frac{1}{3}\right)$

C. $\cos^{2}\left(\frac{1}{\sqrt{3}}\right)$

D. none of these

Answer: A

Watch Video Solution

272. If $\vec{a} \times \vec{b} = \vec{c}$ and $\vec{b} \times \vec{c} = \vec{a}$ then

A. $\left|\vec{a}\right| = 1, \vec{b} = \vec{c}$

B. $\left|\vec{c}\right| = 1, \left|\vec{a}\right| = 1$

C. $\left|\vec{b}\right| = 2, \vec{c} = 2\vec{a}$

D. $\left|\vec{b}\right| = 1, \left|\vec{c}\right| = \left|\vec{a}\right|$

Answer: D

Watch Video Solution

273. If the vectors $\vec{r}_1 = ai + j + k, \vec{r}_2 = i + bj + k, \vec{r}_3 = i + j + ck (a \neq 1, b \neq 1, c \neq 1)$ are coplanar then the value of $\frac{1}{1-a} + \frac{1}{1-b} + \frac{1}{1-c} =$

A. minus 1

B. 0

C. 1

D. none of these

Answer: C

Watch Video Solution

274. A unit vector in the xy plane that makes an angle of 45^o with the vector i+j and an angle of 60^o with the vector 3i-4j is

A. i

B. $\frac{i+j}{\sqrt{2}}$

C. $\frac{i-j}{\sqrt{2}}$

D. none of these

Answer: D

Watch Video Solution

275. If $\vec{a}$ and $\vec{b}$ are two unit vectors, then the vector $\left(\vec{a}+\vec{b}\right)\times\left(\vec{a}\times\vec{b}\right)$ is parallel to the vector

A. $\vec{a}+\vec{b}$

B. $\vec{a}-\vec{b}$

C. $2\vec{a}+\vec{b}$

D. $2\vec{a}-\vec{b}$

Answer: B

Watch Video Solution

276. If $\vec{\alpha}=2\hat{i}+3\hat{j}-\hat{k}, \vec{\beta}=-\hat{i}+2\hat{j}-4\hat{k}, \vec{\lambda}=\hat{i}+\hat{j}+\hat{k}$, then $\left(\vec{\alpha}\times\vec{\beta}\right).\left(\vec{\alpha}\times\vec{\gamma}\right)$ is :

A. minus 74

B. 74

C. 64

D. 60

Answer: A

Watch Video Solution

277. If $\vec{a} \times \vec{b} = \vec{c}$ and $\vec{b} \times \vec{c} = \vec{a}$ then

A. $\vec{a} - \vec{b} = \lambda\left(\vec{c} - \vec{d}\right)$

B. $\vec{b} + \vec{c} = \lambda\vec{a}$

C. $\vec{a} + \vec{a}\,b = \lambda\vec{c}$

D. $\vec{a} + \vec{c} = \lambda\vec{b}$

Answer: D

Watch Video Solution

278. If $\vec{a}, \vec{b}, \vec{c}$ are linearly independent vectors and $\Delta = \begin{vmatrix} \vec{a} & \vec{b} & \vec{c} \\ \vec{a}.\vec{a} & \vec{a}.\vec{b} & \vec{a}.\vec{c} \\ \vec{a}.\vec{c} & \vec{b}.\vec{c} & \vec{c}.\vec{c} \end{vmatrix}$ then ,

A. $\Delta = 0$

B. $\Delta = 1$

C. Δ = any non-zero vector

D. none of these

Answer: C

Watch Video Solution

279. If π_1 and π_2 be two planes determined by the pairs of vectors $\vec{a}, \vec{b}$ and $\vec{c}, \vec{d}$ respectively. If the planes π_1 and π_2 are parallels then

A. $\left(\vec{a} \times \vec{c}\right) \times \left(\vec{b} \times \vec{d}\right) = \vec{O}$

B. $\left(\vec{a} \times \vec{c}\right) \times \left(\vec{b} \times \vec{d}\right) = 0$

C. $\left(\vec{a} \times \vec{b}\right) \times \left(\vec{c} \times \vec{d}\right) = 0$

D. $\left(\vec{a} \times \vec{b}\right) \times \left(\vec{c} \times \vec{d}\right) = \vec{O}$

Answer: D

Watch Video Solution

280. If $\vec{a} \times \vec{b} = \vec{c}$ and $\vec{b} \times \vec{c} = \vec{a}$ then

A. $\vec{0}$

B. $\vec{a} \times \vec{b}$

C. $\vec{b} \times \vec{c}$

D. $\vec{c} \times \vec{a}$

Answer: A

Watch Video Solution

281. For any vector $\vec{r}$, $\left(\vec{r}.i\right)^2+\left(\vec{r}.j\right)^2+\left(\vec{r}.k\right)^2=$

A. 1

B. $\left|\vec{r}\right|$

C. $\vec{r}$

D. $\left|\vec{r}\right|^2$

Answer: D

Watch Video Solution

282. If $\left|\vec{a}-\vec{b}\right|=\left|\vec{a}\right|=\left|\vec{b}\right|=1$ then the angle between $\vec{a}$ and $\vec{b}$ is

A. $\frac{\pi}{3}$

B. $\frac{3\pi}{4}$

C. $\frac{\pi}{2}$

D. 0

Answer: A

Watch Video Solution

283. If $\left|\vec{a}\right| = 3, \left|\vec{b}\right| = 5,$ and $\left|\vec{c}\right| = 4$ and $\vec{a} + \vec{b} + \vec{c} = \vec{O}$ then the value of $\left(\vec{a}.\vec{b} + \vec{b}.\vec{c} + \vec{c}.\vec{a}\right) =$

A. 0

B. -25

C. 25

D. none of these

Answer: B

Watch Video Solution

284. Let $\vec{a}, \vec{b}$ and $\vec{c}$ be three vectors. Then scalar triple product $\left[\vec{a}, \vec{b}, \vec{c}\right] =$

A. $\left[\vec{b}\,\vec{a}\,\vec{c}\right]$

B. $\left[\vec{a}\,\vec{c}\,\vec{b}\right]$

C. $\left[\vec{c}\,\vec{b}\,\vec{a}\right]$

D. $\left[\vec{b}\,\vec{c}\,\vec{a}\right]$

Answer: D

Watch Video Solution

285. If $\vec{u}, \vec{v}, \vec{w}$ are three non-coplanar vectors, then $\left(\vec{u}+\vec{v}-\vec{w}\right).\left[\left(\vec{u}-\vec{v}\right)\times\left(\vec{v}-\vec{w}\right)\right] =$

A. $\vec{u}.\left(\vec{v}\times\vec{w}\right)$

B. $\vec{u}.\left(\vec{w}\times\vec{v}\right)$

C. $3\vec{u}.\left(\vec{v}\times\vec{w}\right)$

D. 0

Answer: A

Watch Video Solution

286. A unit vector perpendicular to the plane of $\vec{a} = 2i - 6j - 3k$ and $\vec{b} = 4i + 3j - k$ is

A. $\frac{1}{\sqrt{26}}(4i + 3j - k)$

B. $\frac{1}{7}(2i - 6j - 3k)$

C. $\frac{1}{7}(3i - 2j + 6k)$

D. $\frac{1}{7}(2i - 3j - 6k)$

Answer: C

Watch Video Solution

287. A vector coplanar with vector i+j and j+k and parallel to the vector 2i-2j-4k is

A. i-j

B. i-j-2k

C. i+j-k

D. 3i+3j-6k

Answer: B

Watch Video Solution

288. Let $\vec{a} = 2i + j - 2k$ and $\vec{b} = i + j$. If $\vec{c}$ is a vector such that $\vec{a} . \vec{c} = |\vec{c}|, |\vec{c} - \vec{a}| = 2\sqrt{2}$ and the angle between $\left(\vec{a} \times \vec{b}\right)$ and $\vec{c}$ is 30^o, then $\left|\left(\vec{a} \times \vec{b}\right) \times \vec{c}\right| =$

A. 44257

B. 44230

C. 2

D. 3

Answer: B

Watch Video Solution

289. The volume of the tetracedron formed by the points $(1, 1, 1)(2, 1, 3), (3, 2, 2)$ and $(3, 3, 4)$ in cubic units is :

A. 44352

B. 44322

C. 5

D. 44257

Answer: A

Watch Video Solution

290. If $\left|\vec{a}\right| = 4, \left|\vec{b}\right| = 2, \left|\vec{c}\right| = 6$ and each of the angles between the vectors is 60^o then $\left|\vec{a} + \vec{b} + \vec{c}\right| =$

A. 10

B. $\sqrt{56}$

C. sqrt44`

D. 5

Answer: A

Watch Video Solution

291. The area of the parallelogram with $\vec{a}$ and $\vec{b}$ as adjacent sides is 20 sq. units. Then the areaof the parallelogram having $7\vec{a} + 5\vec{b}$ and $8\vec{a} + 11\vec{b}$ as adjacent sides is

A. 2980 sq. units

B. 740 sq.units

C. 1340 sq.units

D. 3400 sq.units

Answer: B

Watch Video Solution

292. If the triangle with vertices 2i+j, 2j+k, mk+i, has centroid at i+j+k, then m =

A. 1

B. -1

C. 2

D. 3

Answer: C

Watch Video Solution

293. Let $\vec{a} = i - 2j + 3k$, $\vec{b} = 3i + 3j - k$ and $\vec{c} = di + j + (2d - 1)k$. If $\vec{c}$ is parallel to the plane of the vector $\vec{a}$ and $\vec{b}$ then 11d =

A. 2

B. 1

C. -1

D. 0

Answer: C

Watch Video Solution

294. If $\left[\vec{a}, \vec{b}, \vec{c}\right] = 3$ then the volume (in cubic units) of the parallelopiped with $2\vec{a} + \vec{b}, 2\vec{b} + \vec{c}$ and $2\vec{c} + \vec{a}$ as coterminal edges is

A. 15

B. 22

C. 25

D. 27

Answer: D

Watch Video Solution

295. If D, E, F are respectivley the mid points of AB, AC and BC respectively in a triangle ABC, then $\overrightarrow{BE} + \overrightarrow{AF} =$

A. $\overrightarrow{DC}$

B. $\frac{1}{2}\overrightarrow{BF}$

C. $2\overrightarrow{BF}$

D. $\frac{3}{2}\overrightarrow{BF}$

Answer: A

Watch Video Solution

296. If $\left(\overrightarrow{a} \times \overrightarrow{b}\right) \times \overrightarrow{c} = \overrightarrow{a} \times \left(\overrightarrow{b} \times \overrightarrow{c}\right)$, where $\overrightarrow{a}$, $\overrightarrow{b}$ and $\overrightarrow{c}$ are any three vectors such that $\overrightarrow{a} . \overrightarrow{b} \neq 0$, $\overrightarrow{b} . \overrightarrow{c} \neq 0$, then $\overrightarrow{a}$ and $\overrightarrow{c}$ are

A. $\vec{b} \times \left(\vec{c} \times \vec{a}\right) = \vec{O}$

B. $\vec{a} \times \left(\vec{b} \times \vec{c}\right) = \vec{0}$

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

D. (vec c xx vec b) = vec b xx vec a`

Answer: A

Watch Video Solution