DPP
VECTOR

1. If a and b are P.V. of two points A, B, and C divides AB in ratio 2 : 1, then P.V. of C is

(a) $\frac{a+2b}{3}$ (b) $\frac{2a+b}{3}$

(c) $\frac{a+2}{3}$ (d) $\frac{a+b}{2}$

2. The position vectors of two points A and B are i + j – k and 2i – j + k respectively. Then $|\overrightarrow{AB}|$=

(a) 2 (b) 3 (c) 4 (d) 5

3. The position vector of the points which divides internally in the ratio 2 : 3 the join of the points 2a – 3b and 3a – 2b , is

(a) $\frac{12}{5}a + \frac{13}{5}b$ (b) $\frac{12}{5}a - \frac{13}{5}b$

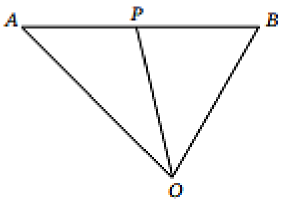
(c) $\frac{3}{5}a - \frac{2}{5}b$ (d) None of these

4. If a, b, c are the position vectors of the vertices A, B, C of the triangle ABC, then the centroid of ΔABC is

(a) $\frac{a+b+c}{3}$ (b) $\frac{1}{2}\left(a + \frac{b+c}{2}\right)$

(c) $a + \frac{b+c}{2}$ (d) $\frac{a+b+c}{2}$

5. If in the given figure $\overrightarrow{OA}$ = a , $\overrightarrow{OB}$ = b and AP : PB = m : n , then $\overrightarrow{OP}$ =



(a) $\frac{ma+nb}{m+n}$ (b) $\frac{na+mb}{m+n}$

(c) ma-nb (d) $\frac{ma-nb}{m-n}$

6. The position vectors of A and B are i – j + 2k and 3i – j + 3k . The position vector of the middle point of the line AB is

(a) $\frac{1}{2}$ i - $\frac{1}{2}$ $j + k$ (b) 2i – j + $\frac{5}{2}$ k

(c) $\frac{3}{2}$ i - $\frac{1}{2}$ $j + \frac{3}{2}$ (d) None of these

7. If the position vectors of the points A and B are i + 3j – k and 3i – j – 3k , then what will be the position vector of the mid point of AB

(a) i + 2j – k (b) 2i + j – 2k

(c) 2i + j – k (d) i + j – 2k

8. A, B, C, D, E are five coplanar points, then $\overrightarrow{DA} + \overrightarrow{DB} + \overrightarrow{DC} + \overrightarrow{AE} + \overrightarrow{BE} + \overrightarrow{CE}$ is equal to

(a) $\overrightarrow{DE}$ (b) $3\overrightarrow{DE}$ (c) $2\overrightarrow{DE}$ (d) $4\overrightarrow{ED}$

9. If a ≠ 0, b ≠ 0 and | a + b| =| a – b| , then the vectors a and b are

(a) Parallel to each other

(b) Perpendicular to each other

(c) Inclined at an angle of 60^o

(d) Neither perpendicular nor

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

(a) 2 (b) 3 (c) 4 (d) 6

11. If O be the circumcentre and O' be the orthocentre of a triangle ABC, then $\overrightarrow{OA} + \overrightarrow{OB} + \overrightarrow{OC}$ =

(a) $2\,\overrightarrow{OO'}$ (b) $2\overrightarrow{O'O}$

(c) $\overrightarrow{OO'}$ (d) $\overrightarrow{O'O}$

12. Let a = i be a vector which makes an angle of 120^o with a unit vector b. Then the unit vector (a + b) is

(a) $-\frac{1}{2}\, i + \frac{\sqrt{3}}{2}$ j (b) $-\frac{\sqrt{3}}{2}$I + $\frac{1}{2}$ j

(c) $\frac{1}{2}$ i + $\frac{\sqrt{3}}{2}$ j (d) $\frac{\sqrt{3}}{2}$ i - $\frac{1}{2}$ j

13. If θ be the angle between the unit vectors a and b, then cos $\frac{\theta}{2}$ =

(a) $\frac{1}{2}\,|a - b|$ (b) $\frac{1}{2}\,|a + b|$

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

14. If |a| = 3 , |b| = 4, |c | = 5 and a + b +c = 0 , then the angle between a and b is

(a) 0 (b) $\frac{\pi}{6}$ (c) $\frac{\pi}{3}$ (d) $\frac{\pi}{2}$

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

(a) $\frac{1}{\sqrt{69}}$(i+2j-8k) (b) $\frac{1}{69}$(i+2j-8k)
(c) $\frac{1}{\sqrt{69}}$(- i - 2j+ 8k) (d) $\frac{1}{69}$(- i - 2j+8k)

16. **If a and b are unit vectors making an angle θ with each other then | a – b|**
(a) 1 (b) 0 (c) $\cos\frac{\theta}{2}$ (d) $2\sin\frac{\theta}{2}$

17. **If the moduli of the vectors a, b, c are 3, 4, 5 respectively and a and b + c, b and c + a, c and a + b are mutually perpendicular, then the modulus of a + b + c is**
(a) $\sqrt{12}$ (b) 12 (c) $5\sqrt{2}$ (d) 50

18. **If a and b are unit vectors and a – b is also a unit vector, then the angle between a and b is**
(a) $\frac{\pi}{4}$ (b) $\frac{\pi}{3}$ (c) $\frac{\pi}{2}$ (d) $\frac{2\pi}{3}$

19. **If a = 3i – 2j + k , b = 2i – 4 j – 3k and c = –i + 2j + 2k , then a + b + c is**
(a) 3i – 4 j (b) 3i + 4 j
(c) 4i – 4 j (d) 4i + 4 j

20. **If x and y are two unit vectors and π is the angle between them, then 21 |x – y | is equal to**
(a) 0 (b) π / 2 (c) 1 (d) π / 4

21. **If D, E, F are respectively the mid points of AB, AC and BC in ΔABC , then $\overrightarrow{BE} + \overrightarrow{AF} =$**
(a) $\overrightarrow{DC}$ (b) $\frac{1}{2}\overrightarrow{BF}$ (c) $2\overrightarrow{BF}$ (d) $\frac{3}{2}\overrightarrow{BF}$

22. **If ABCD is a rhombus whose diagonals cut at the origin O, then $\overrightarrow{OA} + \overrightarrow{OB} + \overrightarrow{OC} + \overrightarrow{OD}$ equals**
(a) $\overrightarrow{AB} + \overrightarrow{AC}$ (b) $\vec{0}$
(c) $2(\overrightarrow{AB} + \overrightarrow{BC})$ (d) $\overrightarrow{AC} + \overrightarrow{BD}$

23. **ABCD is a parallelogram with AC and BD as diagonals. Then $\overrightarrow{AC} - \overrightarrow{BD} =$**
(a) $4\overrightarrow{AB}$ (b) $3\overrightarrow{AB}$ (c) $2\overrightarrow{AB}$ (d) $\overrightarrow{AB}$

24. **The vectors b and c are in the direction of north-east and north-west respectively and | b| =| c | = 4 . The magnitude and direction of the vector d = c – b , are**
(a) $4\sqrt{2}$, towards north (b) $4\sqrt{2}$, towards west
(c) 4, towards east (d) 4, towards south

25. **Let a and b be two unit vectors inclined at an angle θ , then sin(θ / 2) is equal to**
(a) $\frac{1}{2}$| a – b | (b) $\frac{1}{2}$| a + b |
(c) | a – b | (d) | a + b |

26. **If a, b, c are three vectors such that a = b + c and the angle between b and c is π / 2 , then**
(a) $a^2 = b^2 + c^2$ (b) $b^2 = c^2 + a^2$
(c) $c^2 = a^2 + b^2$ (d) $2a^2 - b^2 - c^2$
(Note : Here a =| a|, b =| b|, c =| c |)

27. **If the sum of two unit vectors is a unit vector, then the angle between them is equal to**
(a) $\frac{\pi}{6}$ (b) $\frac{\pi}{3}$ (c) $\frac{\pi}{2}$ (d) $\frac{2\pi}{3}$

28. **If | a| = 3 , | b| = 4 and | a + b| = 5 , then | a – b| =**
(a) 6 (b) 5 (c) 4 (d) 3

29. **In the triangle ABC, $\overrightarrow{AB}$ = a, $\overrightarrow{AC}$ = c, $\overrightarrow{BC}$ = b, then**
(a) a + b +c = 0 (b) a + b –c = 0
(c) a –b +c = 0 (d) –a + b +c = 0

30. **If p = 7i – 2j + 3k and q = 3i + j + 5k , then the magnitude of p – 2q is**
(a) $\sqrt{29}$ (b) 4
(c) $\sqrt{62} - 2\sqrt{35}$ (d) $\sqrt{66}$

31. **If C is the middle point of AB and P is any point outside AB, then**
(a) $\overrightarrow{PA} + \overrightarrow{PB}$ = PC
(b) $\overrightarrow{PA} + \overrightarrow{PB} = 2\overrightarrow{PC}$
(c) $\overrightarrow{PA} + \overrightarrow{PB} + \overrightarrow{PC} = 0$
(d) $\overrightarrow{PA} + \overrightarrow{PB} + 2\overrightarrow{PC} = 0$

32. If a = 2i + 5j and b = 2i – j, then the unit vector along a + b will be

(a) $\frac{i-j}{\sqrt{2}}$ (b) i + j

(c) $\sqrt{2}$(i + j) (d) $\frac{i-j}{\sqrt{2}}$

33. What should be added in vector a = 3i + 4 j – 2k to get its resultant a unit vector i

(a) –2i – 4 j + 2k (b) –2i + 4 j – 2k

(c) 2i + 4 j – 2k (d) None of these

34. If a = i + 2j + 3k , b = –i + 2j + k and c = 3i + j , then the unit vector along its resultant is

(a) 3i + 5j + 4k (b) $\frac{3i+5j+4k}{50}$

(c) $\frac{3i+5j+4k}{5\sqrt{2}}$ (d) None of these

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

(a) $\overrightarrow{OP}$ (b) $2\overrightarrow{OP}$ (c) $3\overrightarrow{OP}$ (d) $4\overrightarrow{OP}$

36. The perimeter of a triangle with sides 3i + 4 j + 5k , 4i – 3j – 5k and 7i + j is

(a) $\sqrt{450}$ (b) $\sqrt{150}$

(c) $\sqrt{50}$ (d) $\sqrt{200}$

37. The magnitudes of mutually perpendicular forces a, b and c are 2, 10 and 11 respectively. Then the magnitude of its resultant is

(a) 12 (b) 15 (c) 9 (d) None of these

38. If a = 2i + j – 8k and b = i + 3j – 4k , then the magnitude of a + b =

(a) 13 (b) $\frac{13}{3}$ (c) $\frac{3}{13}$ (d) $\frac{4}{13}$

39. The position vectors of A and B are 2i – 9j – 4k, and 6i – 3j + 8k respectively, then the magnitude of AB is

(a) 11 (b) 12 (c) 13 (d) 14

40. If the position vectors of P and Q are (i + 3j – 7k) and (5i – 2j + 4k) , then | $\overrightarrow{PQ}$| is

(a) $\sqrt{158}$ (b) $\sqrt{160}$

(c) $\sqrt{161}$ (d) $\sqrt{162}$

41. If a, b, c are mutually perpendicular unit vectors, then | a + b + c | =

(a) $\sqrt{3}$ (b) 3 (c) 1 (d) 0

42. Let a = i + j + pk and b = i + j + k , then | a + b| =| a| +| b| , holds for

(a) All real p (b) No real p

(c) p = –1 (d) p = 1

43. For any two vectors a and b, which of the following is true

(a) | a + b| ≥| a| +| b|

(b) | a + b| =| a| +| b|

(c) | a + b| <| a| +| b|

(d) | a + b| ≤| a| +| b|

44. If a and b are the adjacent sides of a parallelogram, then | a + b| =| a – b| is a necessary and sufficient condition for the parallelogram to be a

(a) Rhombus (b) Square

(c) Rectangle (d) Trapezium

45. The direction cosines of vector a = 3i + 4 j + 5k in the direction of positive axis of x, is

(a) $\pm\frac{3}{\sqrt{50}}$ (b) $\frac{4}{\sqrt{50}}$

(c) $\frac{3}{\sqrt{50}}$ (d) $-\frac{4}{\sqrt{50}}$

46. A force is a

(a) Unit vector (b) Localised vector

(c) Zero vector (d) Free vector

47. A zero vector has

(a) Any direction (b) No direction

(c) Many directions (d) None of these

48. The position vectors of two points A and B are i + j – k and 2i – j + k respectively. Then | AB | =

(a) 2 (b) 3 (c) 4 (d) 5

49. The position vector of the points which divides internally in the ratio 2 : 3 the join of the points 2a – 3b and 3a – 2b , is

(a) $\frac{12}{5}a + \frac{13}{5}b$ (b) $\frac{12}{5}a - \frac{13}{5}b$

(c) $\frac{3}{5}a - \frac{2}{5}b$ (d) None of these

50. If a and b are P.V. of two points A, B, and C divides AB in ratio 2 : 1, then P.V. of C is

(a) $\frac{a+2b}{3}$ (b) $\frac{2a+b}{3}$

(c) $\frac{a+2}{3}$ (d) $\frac{a+b}{2}$

51. If three points A, B, C whose position vector are respectively i – 2j – 8k, 5i – 2k and 11i + 3j + 7k are collinear, then the ratio in which B divides AC is

(a) 1 : 2 (b) 2 : 3 (c) 2 : 1 (d) 1 : 1

52. If O is the origin and C is the mid point of A (2, –1) and B (–4, 3). Then value of $\overrightarrow{OC}$ is

(a) i + j (b) i – j (c) –i + j (d) –i – j

53. If the position vectors of P and Q are i + 3j – 7k and 5i – 2j + 4k respectively, then $\overrightarrow{PQ}$ is equal to

(a) –4i + 5j – 11k (b) 4i – 5j + 11k

(c) i + j + k (d) None of these

54. The position vectors of two vertices and the centroid of a triangle are i + j, 2i – j + k and k respectively. The position vector of the third vertex of the triangle is

(a) –3i + 2k (b) 3i – 2k

(c) i k 3 2 + (d) None of these

55. The position vector of three consecutive vertices of a parallelogram are i + j + k , i + 3j + 5k and 7i + 9j + 11k respectively. The position vector of the fourth vertex is

(a) 7(i + j + k) (b) 5(i + j + k)

(c) 6i + 8j +10k (d) None of these

54. If a and b are two non-zero vectors, then the component of b along a is

(a) $\frac{(a.b)a}{b.b}$ (b) $\frac{(a.b)b}{a.a}$ (c) $\frac{(a.b)b}{a.b}$ (d) $\frac{(a.b)a}{a.a}$

55. Projection of the vector i – 2j + k in the direction of the vector 4i – 4 j + 7k will be

(a) $\frac{5\sqrt{6}}{10}$ (b) $\frac{9}{19}$ (c) $\frac{19}{9}$ (d) $\frac{\sqrt{6}}{19}$

56. If a = 4i + 6j and b = 3j + 4k , then the component of a along b is

(a) $\frac{18}{10\sqrt{3}}$ (3j + 4k) (b) $\frac{18}{25}$ (3j + 4k)

(c) $\frac{18}{\sqrt{3}}$ (3j + 4k) (d) (3j + 4k)

57. The projection of vector 2i + 3j – 2k on the vector i + 2j + 3k will be

(a) $\frac{1}{\sqrt{14}}$ (b) $\frac{2}{\sqrt{14}}$ (c) $\frac{3}{\sqrt{14}}$ (d) $\sqrt{14}$

58. If vector a = 2i – 3j + 6k and vector b = –2i + 2j – k , then

$\frac{\text{Projection of vector a on vector b}}{\text{Projection of vector b on vector a}}$ =

(a) $\frac{3}{7}$ (b) $\frac{7}{3}$ (c) 3 (d) 7

59. The projection of a along b is

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

60. If a = 2i + j + 2k and b = 5i – 3j + k , then the projection of b on a is

(a) 3 (b) 4 (c) 5 (d) 6

61. The projection of the vector i + j + k along the vector j is

(a) 1 (b) 0 (c) 2 (d) – 1

62. If $\hat{a}$ is a unit vector and b, a non-zero vector not parallel to $\hat{a}$, then the vector

b –($\hat{a}$. b) $\hat{a}$ is

(a) Parallel to b (b) At right angles to $\hat{a}$

(c) Parallel to $\hat{a}$ (d) At right angles to b

63. The angle between the vectors 2i + 3j + k and 2i – j – k is

(a) 0 (b) $\frac{\pi}{4}$ (c) $\frac{\pi}{6}$ (d) $\frac{\pi}{2}$

64. If a = 2i + 2j + 3k, b = –i + 2j + k and c = 3i + j , then a + tb is perpendicular to c if t =

(a) 2 (b) 4 (c) 6 (d) 8

65. The angle between the vectors 3i + j + 2k and 2i – 2j + 4k is

(a) $\cos^{-1}\frac{2}{\sqrt{7}}$ (b) $\sin^{-1}\frac{2}{\sqrt{7}}$

(c) $\cos^{-1}\frac{2}{\sqrt{5}}$ (d) $\sin^{-1}\frac{2}{\sqrt{5}}$

66. If a, b, c are non zero-vectors such that a . b = a . c, then which statement is true

(a) $b = c$ (b) $a \perp (b - c)$

(c) $b = c$ or $a \perp (b - c)$ (d) None of these

67. The vector $2i + aj + k$ is perpendicular to the vector $2i - j - k$, if a =

(a) 5 (b) – 5 (c) – 3 (d) 3

68. The vector $2i + j - k$ is perpendicular to the vector $i - 4j + \lambda k$, if $\lambda =$

(a) 0 (b) – 1 (c) – 2 (d) – 3

69. If the vectors $ai - 2j + 3k$ and $3i + 6j - 5k$ are perpendicular to each other, then a is given by

(a) 9 (b) 16 (c) 25 (d) 36

70. The value of λ for which the vectors $2\lambda i + j - k$ and $2j + k$ are perpendicular, is

(a) None (b) – 1 (c) 1 (d) Any

71. The angle between the vectors $i - j + k$ and $i + 2j + k$ is

(a) $\cos^{-1}\left(\frac{1}{\sqrt{15}}\right)$ (b) $\cos^{-1}\left(\frac{4}{\sqrt{15}}\right)$

(c) $\cos^{-1}\left(\frac{4}{\sqrt{15}}\right)$ (d) $\frac{\pi}{2}$

72. If λ is a unit vector perpendicular to plane of vector a and b and angle between them is θ, then a . b will be

(a) $|a||b|\sin\theta\,\vec{\lambda}$ (b) $|a||b|\cos\theta\,\vec{\lambda}$

(c) $|a||b|\cos\theta$ (d) $|a||b|\sin\theta$

73. If the vectors $ai + bj + ck$ and $pi + qj + rk$ are perpendicular, then

(a) $(a + b + c)(p + q + r) = 0$

(b) $(a + b + c)(p + q + r) = 1$

(c) $ap + bq + cr = 0$

(d) $ap + bq + cr = 1$

74. If θ be the angle between two vectors a and b, then $a . b \geq 0$ if

(a) $0 \leq \theta \leq \pi$ (b) $\frac{\pi}{2} \leq \theta \leq \pi$

(c) $0 \leq \theta \leq \frac{\pi}{2}$ (d) None of these

75. If $a = 2i + 4j + 2k$ and $b = 8i - 3j + \lambda k$ and $a \perp b$, then value of λ will be

(a) 2 (b) – 1 (c) – 2 (d) 1

76. If a and b are mutually perpendicular vectors, then $(a+ b)^2$

(a) $a + b$ (b) $a - b$

(c) $a^2 - b^2$ (d) $(a - b)^2$

77. If $a = i + 2j - 3k$ and $b = 3i - j + 2k$, then the angle between the vectors $a + b$ and $a - b$ is

(a) 30° (b) 60° (c) 90° (d) 0

78. $a . b = 0$, then

(a) $a \perp b$

(b) $a \| b$

(c) Angle between a and b is 60°

(d) None of these

79. The angle between the vectors
$(2i + 6j + 3k)$ and $(12i - 4j + 3k)$ is

(a) $\cos^{-1}\left(\frac{1}{10}\right)$ (b) $\cos^{-1}\left(\frac{9}{11}\right)$

(c) $\cos^{-1}\left(\frac{9}{91}\right)$ (d) $\cos^{-1}\left(\frac{1}{9}\right)$

80. If the vectors $ai + 2j + 3k$ and $-i + 5j + ak$ are perpendicular to each other, then a =

(a) 6 (b) – 6 (c) 5 (d) – 5

81. If the angle between two vectors $i + k$ and $i - j + ak$ is $\pi / 3$, then the value of a =

(a) 2 (b) 4 (c) –2 (d) 0

82. (a . b) c and (a . c) b are

(a) Two like vectors

(b) Two equal vectors

(c) Two vectors in direction of a

(d) None of these

83. The angle between the vector $2i + 3j + k$ and $2i - j - k$ is

(a) $\frac{\pi}{2}$ (b) $\frac{\pi}{4}$ (c) $\frac{\pi}{3}$ (d) 0

84. If a = (1, –1, 2), b = (– 2, 3, 5), c = (2, – 2, 4) and i is the unit vector in the x-direction, then $(a - 2b + 3c).i =$

(a) 11 (b) 15 (c) 18 (d) 36

85. If $ai + 6j - k$ and $7i - 3j + 17k$ are perpendicular vectors, then the value of a is

(a) 5 (b) – 5 (c) 7 (d) $\frac{1}{7}$

86. If $a + b \perp a$ and $|b| = \sqrt{2}\,|a|$ then

(a) $(2a + b) || b$ (b) $(2a + b) \perp b$

(c) $(2a - b) \perp b$ (d) $(2a + b) \perp a$

87. If a and b are adjacent sides of a rhombus, then

(a) $a \cdot b = 0$ (b) $a \times b = 0$

(c) $a \cdot a = b \cdot b$ (d) None of these

88. If $|a| = |b|$, then $(a + b).(a - b)$ is

(a) Positive (b) Negative

(c) Zero (d) None of these

89. If $4i + j - k$ and $3i + mj + 2k$ are at right angle, then m =

(a) – 6 (b) – 8 (c) – 10 (d) – 12

90. If the vectors $3i + \lambda j + k$ and $2i - j + 8k$ are perpendicular, then λ is

(a) – 14 (b) 7 (c) 14 (d) $\frac{1}{7}$

91. $(a \cdot i)^2 + (a \cdot j)^2 + (a \cdot k)^2$ is equal to

(a) a^2 (b) 3

(c) $|a.(i + j + k)|^2$ (d) None of these

92. If the vectors $i - 2xj - 3yk$ and $i + 3xj + 2yk$ are orthogonal to each other, then the locus of the point (x, y) is

(a) A circle (b) An ellipse

(c) A parabola (d) A straight line

93. If $\vec{A} = i + 2j + 3k$, $\vec{B} = -i + 2j + k$ and $\vec{C} = 3i + j$, then the value of t such that A + tB is at right angle to vector C, is

(a) 3 (b) 4 (c) 5 (d) 6

94. If a and b are two perpendicular vectors, then out of the following four statements

(i) $(a + b)^2 = (a)^2 + (b)^2$

(ii) $(a - b)^2 = (a)^2 + (b)^2$

(iii) $|a + b|^2 = |a|^2 + |b|^2$

(iv) $(a + b)^2 = (a - b)^2$

(a) Only one is correct

(b) Only two are correct

(c) Only three are correct

(d) All the four are correct

95. If $a = i - 2j$ and $b = 2i + \lambda j$ are parallel, then λ is

(a) 4 (b) 2 (c) –2 (d) – 4

96. The vectors $3i + j - 5k$ and $ai + bj - 15k$ are collinear, if

(a) a = 3, b = 1 (b) a = 9, b = 1

(c) a = 3, b = 3 (d) a = 9, b = 3

97. If a = (1, –1) and b = (–2, m) are two collinear vectors, then m =

(a) 4 (b) 3 (c) 2 (d) 0

98. If a, b, c are the position vectors of three collinear points, then the existence of x, y, z is such that

(a) $xa + yb + zc = 0,\ x + y + z \neq 0$

(b) $xa + yb + zc \neq 0,\ x + y + z = 0$

(c) $xa + yb + zc \neq 0,\ x + y + z \neq 0$

(d) $xa + yb + zc = 0,\ x + y + z = 0$

99. If a and b are two non-collinear vectors, then xa + yb = 0

(a) x = 0, but y is not necessarily zero

(b) y = 0, but x is not necessarily zero

(c) x = 0, y = 0

(d) None of these

100. If a and b are two non-collinear vectors, then xa + yb (where x and y are scalars) represents a vector which is

(a) Parallel to b

(b) Parallel to a

(c) Coplanar with a and b

(d) None of these

101. If a, b, c are non-collinear vectors such that for some scalars x, y, z, $xa + yb + zc = 0$, then

(a) $x = 0, y = 0, z = 0$ (b) $x \neq 0, y \neq 0, z = 0$
(c) $x = 0, y \neq 0, z \neq 0$ (d) $x \neq 0, y \neq 0, z \neq 0$

102. If the position vectors of the points A, B, C be a, b, 3a – 2b respectively, then the points A, B, C are
(a) Collinear
(b) Non-collinear
(c) Form a right angled triangle
(d) None of these

103. If two vertices of a triangle are i – j and j + k , then the third vertex can be
(a) i + k (b) i – 2j – k
(c) i – k (d) 2i – j

104. If the vectors 3i + 2j – k and 6i – 4 xj + yk are parallel, then the value of x and y will be
(a) –1, –2 (b) 1, –2
(c) –1, 2 (d) 1, 2

104. The position vectors of four points P, Q, R, S are 2a + 4c, 5a + 3 $\sqrt{3b}$ + 4c, – 2 $\sqrt{3b}$ + c and 2a + c respectively, then
(a) PQ is parallel to RS
(b) PQ is not parallel to RS
(c) PQ is equal to RS
(d) PQ is parallel and equal to RS

105. The vectors 2i + 3j, 5i + 6j and 8i + λj have their initial points at (1, 1). The value of λ so that the vectors terminate on one straight line, is
(a) 0 (b) 3 (c) 6 (d) 9

106. The points with position vectors 20i + pj, 5i – j and 10i – 13 j are collinear. The value of p is
(a) 7 (b) – 37 (c) – 7 (d) 3

Advance

107. The point B divides the arc AC of a quadrant of a circle in the ratio 1 : 2. If O is the centre and $\overrightarrow{OA}$ = a and $\overrightarrow{OB}$ = b , then the vector $\overrightarrow{OC}$ is
(a) b – 2a (b) 2a – b
(c) 3b – 2a (d) None of these

108. The point having position vectors 2i + 3j + 4k, 3i + 4j + 2k, 4i + 2j + 3k are the vectices of
(a) Right angled triangle
(b) Isosceles triangle
(c) Equilateral triangle
(d) Collinear

109. Let p and q be the position vectors of P and Q respectively with respect to O and | p| = p , | q| = q. The points R and S divide PQ internally and 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) 9 p = 4q (d) 4 p = 9q

110. The position vectors of the points A, B, C are (2i + j – k), (3i – 2j + k) and (i + 4 j – 3k) respectively. These points
(a) Form an isosceles triangle
(b) Form a right-angled triangle
(c) Are collinear
(d) Form a scalene triangle

111. ABCDEF is a regular hexagon where centre O is the origin. If the position vectors of A and B are i – j + 2k and 2i + j – k respectively, then $\overrightarrow{BC}$ is equal to
(a) i – j + 2k (b) –i + j – 2k
(c) 3i + 3j – 4k (d) None of these

112. Let $\overrightarrow{AB}$ = 3i + j – k and $\overrightarrow{AC}$ = i – j + 3k . If the point P on the line segment BC is equidistant from AB and AC, then $\overrightarrow{AP}$ is
(a) 2i – k (b) i – 2k
(c) 2i + k (d) None of these

113. If 4i + 7j + 8k, 2i + 3j + 4k, and 2i + 5j + 7k are the position vectors of the vertices A, B and C respectively of triangle ABC. The position vector of the point where the bisector of angle A meets BC, is
(a) $\frac{2}{3}$(–6 i –8j – 6k) (b) $\frac{2}{3}$(6 i+8j + 6k)

(c) $\frac{1}{3}$(6 i +13j + 18k)   (d) $\frac{1}{3}$(5j + 12k)

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

(a) 3a – b   (b) 3b – a
(c) 3a – 2b   (d) 3b – 2a

115. If the position vectors of the points A, B, C, D be 2i + 3j + 5k , i + 2j + 3k , –5i + 4 j – 2k and i + 10 j + 10k respectively, then

(a) $\overrightarrow{AB} = \overrightarrow{CD}$ (b) $\overrightarrow{AB} \parallel \overrightarrow{CD}$
(c) $\overrightarrow{AB} \perp \overrightarrow{CD}$ (d) None of these

116. The position vector of a point C with respect to B is i + j and that of B with respect to A is i – j . The position vector of C with respect to A is

(a) 2i   (b) 2j   (c) –2j   (d) –2i

117. 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 a – b is the position vector of P , then the position vector of B is given by

(a) 7a – 15b   (b) 7a + 15b
(c) 15a – 7b   (d) 15a + 7b

118. The points D, E, F divide BC, CA and AB of the triangle ABC in the ratio 1 : 4, 3 : 2 and 3 : 7 respectively and the point K divides AB in the ratio 1 : 3, then $(\overrightarrow{AD} + \overrightarrow{BE} + \overrightarrow{CF}):\overrightarrow{CK}$ is equal to

(a) 1 : 1   (b) 2 : 5
(c) 5 : 2   (d) None of these

119.Three points whose position vectors are a, b, c will be collinear if

(a) $\lambda a + \mu b = (\lambda + \mu)c$
(b) a ×b + b ×c + c ×a = 0
(c) [a b c] = 0
(d) None of these

120. If p = i – 2j + 3k and q = 3i + j + 2k , then a vector along r which is linear combination of p and q and also perpendicular to q is

(a) i + 5j – 4k   (b) i – 5j + 4k
(c) $-\frac{1}{2}$(i + 5j – 4k)   (d) None of these

121. If a and b are two non zero and non-collinear vectors, then a + b and a – b are

(a) Linearly dependent vectors
(b) Linearly independent vectors
(c) Linearly dependent and independent vectors
(d) None of these

122. If p, q are two non-collinear and non-zero vectors such that (b – c)p × q + (c – a)p + (a – b)q = 0 , where a, b, c are the lengths of the sides of a triangle, then the triangle is

(a) Right angled   (b) Obtuse angled
(c) Equilateral   (d) Isosceles

123. If r = 3i + 2j – 5k, a = 2i – j + k, b = i + 3j – 2k and c = –2i + j – 3k such that $r = \lambda a + \mu b + \nu c$ then

(a) $\mu, \frac{\lambda}{2}, \nu$ are in A.P.   (b) λ, μ, ν are in A.P
(c) λ, μ, ν are in H.P.   (d) μ, λ, ν are in G.P.

124. Let a, b, c are three non-coplanar vectors such that r_1= a – b + c, r_2 =b + c – a, r_3 = c + a + b, r = 2a – 3b +4c. If $r = \lambda_1 r_1 + \lambda_2 r_2 + \lambda_3 r_3$, then

(a) $\lambda_1 = 7$ (b) $\lambda_1 + \lambda_3 = 3$
(c) $\lambda_1 + \lambda_2 + \lambda_3 = 4$ (d) $\lambda_3 + \lambda_2 = 2$

125. If c = 2a – 3b and 2c = 3a + 4b then c and a are

(a) Like parallel vectors
(b) Unlike parallel vectors
(c) Are at right angles
(d) None of these

126. The sides of a triangle are in A.P., then the line joining the centroid to the incentre is parallel to

(a) The largest side   (b) The smaller side
(c) The middle side   (d) None of the sides

127. **In a trapezoid the vector $\overrightarrow{BC} = \lambda\overrightarrow{AD}$. We will then find that $p = \overrightarrow{AC} + \overrightarrow{BD}$ is collinear with AD. If $p = \mu\,\overrightarrow{AD}$, then**
(a) $\mu = \lambda + 1$ (b) $\lambda = \mu + 1$
(c) $\lambda + \mu = 1$ (d) $\mu = 2 + \lambda$

128. **If the vectors $6i - 2j + 3k$, $2i + 3j - 6k$ and $3i + 6j - 2k$ form a triangle, then it is**
(a) Right angled (b) Obtuse angled
(c) Equilateral (d) Isosceles

129. **The vectors $\overrightarrow{AB} = 3i + 4k$ and $\overrightarrow{AC} = 5i - 2j + 4k$ are the sides of a triangle ABC. The length of the median through A is**
(a) $\sqrt{18}$ (b) $\sqrt{72}$
(c) $\sqrt{33}$ (d) $\sqrt{288}$

130. **If a and b are two unit vectors inclined at an angle 2θ to each other, then $|a + b| < 1$, if**
(a) $\frac{\pi}{3} < \theta < \frac{2\pi}{3}$ (b) $\theta < \frac{\pi}{3}$
(c) $\theta < \frac{2\pi}{3}$ (d) $\theta = \frac{\pi}{2}$

131. **If the position vectors of A and B are $i + 3j - 7k$ and $5i - 2j + 4k$, then the direction cosine of AB along y- axis is [MNR 1989]**
(a) $\frac{4}{\sqrt{162}}$ (b) $-\frac{5}{\sqrt{162}}$ (c) -5 (d) 11

132. **The position vectors of four points A, B, C, D lying in plane are a, b, c, d respectively. They satisfy the relation $|a - d| = |b - d| = |c - d|$, then the point D is**
(a) Centroid of ΔABC
(b) Circumcentre of ΔABC
(c) Orthocentre of ΔABC
(d) Incentre of ΔABC

133. **In a parallelopiped the ratio of the sum of the squares on the four diagonals to the sum of the squares on the three coterminous edges is**
(a) 2 (b) 3 (c) 4 (d) 1

134. **The perimeter of the triangle whose vertices have the position vectors $(i + j + k)$, $(5i + 3j - 3k)$ and $(2i + 5j + 9k)$ is given by**
(a) $15 + \sqrt{157}$ (b) $15 - \sqrt{157}$
(c) $\sqrt{15} - \sqrt{157}$ (d) $\sqrt{15} + \sqrt{157}$

135. **The horizontal force and the force inclined at an angle 60o with the vertical, whose resultant is in vertical direction of P kg, are [IIT 1983]**
(a) P, 2P (b) P, P $\sqrt{3}$
(c) 2P, P $\sqrt{3}$ (d) None of these

136. **If the resultant of two forces is of magnitude P and equal to one of them and perpendicular to it, then the other force is**
(a) P $\sqrt{2}$ (b) P
(c) P $\sqrt{3}$ (d) None of these

137. **ABC is an isosceles triangle right angled at A. Forces of magnitude 2 $\sqrt{2}$, 5 and 6 act along $\overrightarrow{BC}$, $\overrightarrow{CA}$ and $\overrightarrow{AB}$ respectively. The magnitude of their resultant force is**
(a) 4 (b) 5 (c) $11 + 2\sqrt{2}$ (d) 30

138. **If the resultant of two forces of magnitudes P and Q acting at a point at an angle of 60° is $\sqrt{7}$Q, then P / Q is**
(a) 1 (b) 3/2 (c) 2 (d) 4

139. **Five points given by A, B, C, D, E are in a plane. Three forces $\overrightarrow{AC}$, $\overrightarrow{AD}$ and $\overrightarrow{AE}$ act at A and three forces $\overrightarrow{CB}$, $\overrightarrow{DB}$, $\overrightarrow{EB}$ act at B. Then their resultant is**
(a) $2\overrightarrow{AC}$ (b) $3\overrightarrow{AB}$ (c) $3\overrightarrow{DB}$ (d) $2\overrightarrow{BC}$

140. **A point O is the centre of a cricle circumscribed about a triangle ABC. Then $\overrightarrow{OA}$ sin 2A + $\overrightarrow{OB}$ sin 2B + $\overrightarrow{OC}$ sin 2C is equal to**
(a) $(\overrightarrow{OA} + \overrightarrow{OB} + \overrightarrow{OC})$ sin 2A
(b) 3. $\overrightarrow{OG}$, where G is the centroid of triangle ABC
(c) $\vec{O}$
(d) None of these

141. If a + b + c = αd, b + c + d = β a and a, b, c are non-coplanar, then the sum of a + b + c + d =

(a) 0
(b) (β – 1)d + (α – 1)a
(c) (α – 1)d – (β – 1)a
(d) (α – 1)d + (β – 1)a

142. Let a and b be two non-parallel unit vectors in a plane. If the vectors (αa + b) bisects the internal angle between a and b, then α is

(a) $\frac{1}{2}$ (b) 1 (c) 2 (d) 4

143. If a, b, c are three vectors of equal magnitude and the angle between each pair of vectors is $\frac{\pi}{3}$ such that | a +b + c | = $\sqrt{6}$ then | a | is equal to

(a) 2 (b) –1 (c) 1 (d) $\frac{1}{3}\sqrt{6}$

144. Let a, b, c be three unit vectors such that | a + b + c | = 1 and a ⊥ b . If c makes angles α, β with a, b respectively then cosα + cos β is equal to

(a) $\frac{3}{2}$ (b) 1 (c) –1 (d) None of these

145. A vector of magnitude 2 along a bisector of the angle between the two vectors 2i – 2j + k and i + 2j – 2k is

(a) $\frac{3}{\sqrt{10}}$(3i – k) (b) $\frac{3}{\sqrt{26}}$(i -4j+3k)
(c) $\frac{2}{\sqrt{26}}$(i -4j+3k) (d) None of these

146. The vector i + xj + 3k is rotated through an angle θ and doubled in magnitude, then it becomes 4i + (4 x – 2)j + 2k . The value of x is

(a) -$\frac{2}{3}$ (b) $\frac{1}{3}$ (c) $\frac{2}{3}$ (d) 2

147. If I is the centre of a circle inscribed in a triangle ABC, then | $\overrightarrow{BC}$ | $\overrightarrow{IA}$+| $\overrightarrow{CA}$| $\overrightarrow{IB}$ +| $\overrightarrow{AB}$ | $\overrightarrow{IC}$ is

(a) 0 (b) $\overrightarrow{IA}+\overrightarrow{IB}+\overrightarrow{IC}$
(c) $\frac{\overrightarrow{IA}+\overrightarrow{IB}+\overrightarrow{IC}}{3}$ (d) None of these

148. If the vector –i + j – k bisects the angle between the vector e and the vector 3i + 4 j, then the unit vector in the direction of e is

(a) $\frac{1}{15}$(11i +10 j + 2k) (b) $-\frac{1}{15}$(11i -10 j + 2k)
(c) $-\frac{1}{15}$(11i +10 j - 2k) (d) $-\frac{1}{15}$(11i +10 j+ 2k)

149. The sides of a parallelogram are 2i + 4j – 5k, i + 2j + 3k ,then the unit vector parallel to one of the diagonals

(a) $\frac{1}{7}$(3i +6 j - 2k) (b) $\frac{1}{7}$(3i – 6j - 2k)
(c) $\frac{1}{7}$(-3i +6 j - 2k) (d) $\frac{1}{7}$(3i +6 j + 2k)

150. If p, q are two non-collinear and non-zero vectors such that (b – c)p × q + (c – a)p + (a – b)q = 0 , where a, b, c are the lengths of the sides of a triangle, then the triangle is

(a) Right angled (b) Obtuse angled
(c) Equilateral (d) Isosceles

151. If r = 3i + 2j – 5k, a = 2i – j + k, b = i + 3j – 2k and c = –2i + j – 3k such that r = λ a + μ b +ν c then

(a) ν λ μ , 2 , are in A.P.
(b) λ, μ, ν are in A.P.
(c) λ, μ, ν are in H.P.
(d) μ, λ, ν are in G.P.

152. Let a, b, c are three non-coplanar vectors such that r_1 = a- b + c, r_2 = b + c - a, r_3= c + a + b, r = 2a – 3b + 4c. If r = $\lambda_1 r_1 + \lambda_2 r_2 + \lambda_3 r_3$, then

(a) $\lambda_1 = 7$ (b) $\lambda_1 + \lambda_3 = 3$
(c) $\lambda_1 + \lambda_2 + \lambda_3 = 4$ (d) $\lambda_3 + \lambda_2 = 2$

153. If c = 2a – 3b and 2c = 3a + 4b then c and a are

(a) Like parallel vectors
(b) Unlike parallel vectors
(c) Are at right angles
(d) None of these

154. The sides of a triangle are in A.P., then the line joining the centroid to the incentre is parallel to

(a) The largest side (b) The smaller side
(c) The middle side (d) None of the sides

155. In a trapezoid the vector $\overrightarrow{BC} = \lambda\overrightarrow{AD}$. We will then find that p = $\overrightarrow{AC} + \overrightarrow{BD}$ is collinear with AD. If p = μ $\overrightarrow{AD}$, then

(a) $\mu = \lambda + 1$ (b) $\lambda = \mu + 1$

(c) $\lambda + \mu = 1$ (d) $\mu = 2 + \lambda$

156. Three points whose position vectors are a + b, a – b and a + kb will be collinear, if the value of k is

(a) Zero

(b) Only negative real number

(c) Only positive real number

(d) Every real number

157. The points with position vectors 10i + 3j, 12i – 5j and ai + 11j are collinear, If a =

(a) – 8 (b) 4 (c) 8 (d) 12

158. Let the value of p = (x + 4y)a + (2x + y + 1)b and q = (y – 2x + 2)a + (2x – 3y – 1)b , where a and b are non-collinear vectors. If 3p = 2q , then the value of x and y will be

(a) – 1, 2 (b) 2, –1

(c) 1, 2 (d) 2, 1

159. If (x, y, z) ≠ (0, 0, 0) and (i + j + 3k)x + (3i – 3j + k)y + (–4i + 5j)z = λ(xi + yj + zk) , then the value of λ will be

(a) – 2, 0 (b) 0, – 2 (c) – 1, 0 (d) 0, – 1

160. The vectors i + 2j + 3k, λi + 4j + 7k, – 3i – 2j – 5k are collinear, if λ equals

(a) 3 (b) 4 (c) 5 (d) 6

161. If three points A, B and C have position vectors (1, x, 3), (3, 4, 7) and (y, – 2, – 5) respectively and if they are collinear, then (x, y) =

(a) (2, – 3) (b) (– 2, 3)

(c) (2, 3) (d) (– 2, – 3)

162. The position vectors of three points are 2a – b + 3c, a – 2b + λc and μa – 5b where a, b, c are non-coplanar vectors. The points are collinear when

(a) $\lambda = -2, \mu = \frac{9}{4}$ (b) $\lambda = -\frac{9}{4}, \mu = 2$

(c) $\lambda = \frac{9}{4}, \mu = -2$ (d) None of these

163. Three points whose position vectors are a, b, c will be collinear if

(a) λa + μb = (λ + μ)c

(b) a ×b + b ×c + c ×a = 0

(c) [a b c] = 0

(d) None of these

164. If p = i – 2j + 3k and q = 3i + j + 2k , then a vector along r which is linear combination of p and q and also perpendicular to q is

(a) i + 5j – 4k (b) i – 5j + 4k

(c) $-\frac{1}{2}$(i + 5j – 4k) (d) None of these

165. If a and b are two non zero and non-collinear vectors, then a + b and a – b are

(a) Linearly dependent vectors

(b) Linearly independent vectors

(c) Linearly dependent and independent vectors

(d) None of these

166. If a = i + 2j + 2k and b = 3i + 6j + 2k , then a vector in the direction of a and having magnitude as |b| is

(a) 7(i + j + k) (b) $\frac{7}{3}$(i + 2j + 2k

(c) $\frac{7}{9}$(i + j + k) (d) None of these

167. The vector b = 3j + 4k is to be written as the sum of a vector b1 parallel to a = i + j and a vector b_2 perpendicular to a. Then b_1 =

(a) $\frac{3}{2}$(i + j) (b) $\frac{2}{3}$ (i + j)

(c) $\frac{1}{2}$ (i + j) (d) $\frac{1}{3}$ (i + j)

168. The components of a vector a along and perpendicular to the non-zero vector b are respectively

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

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

169. The value of x for which the angle between the vectors a = xi – 3j – k and b = 2xi

+ xj − k is acute and the angle between the vector b and y-axis lies between $\frac{\pi}{2}$ and π are

(a) < 0 (b) > 0 (c) − 2, − 3 (d) 1, 2

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

(a) $\Delta = 0$

(b) $\Delta = 1$

(c) $\Delta =$ any non-zero value

(d) None of these

171. The position vectors of the points A, B and C are i + j + k, i + 5j − k and 2i + 3j + 5k respectively. The greatest angle of the triangle ABC is

(a) 135° (b) 90°

(c) $\cos^{-1}\left(\frac{2}{3}\right)$ (d) $\cos^{-1}\left(\frac{5}{7}\right)$

172. a, b, c are three vectors, such that a + b + c = 0 , | a | = 1,| b| = 2,| c | = 3 , then a .b + b.c + c .a is equal to

(a) 0 (b) − 7 (c) 7 (d) 1

173. A unit vector in xy-plane that makes an angle 45° with the vectors (i + j) and an angle of 60° with the vector (3i − 4 j) is

(a) i (b) $\frac{1}{\sqrt{2}}(i-j)$

(c) $\frac{1}{\sqrt{2}}(i-j)$ (d) None of these

174. The angle between the vectors a + b and a − b , when a = (1, 1, 4) and b = (1, − 1, 4) is

(a) 90° (b) 45° (c) 30° (d) 15°

175. Let u = i + j, v = i − j and w = i + 2j + 3k . If n is a unit vector such that u . n = 0 and v . n = 0, then | w . n| is equal to

(a) 0 (b) 1 (c) 2 (d) 3

176. If a, b, c are the p th , q th , r th terms of an HP and u = (q − r)i+(r - p)j + (p − q)k, v=$\frac{i}{a}+\frac{j}{b}+\frac{k}{c}$**, then**

(a) u, v are parallel vectors

(b) u, v are orthogonal vectors

(c) u . v = 1

(d) u × v = i + j + k

177. The value of x for which the angle between the vectors a = −3i + xj + k and b = xi + 2xj + k is acute and the angle between b and x-axis lies between $\frac{\pi}{2}$ **and** π **satisfy**

(a) x > 0 (b) x < 0

(c) x > 1 only (d) x < −1 only

178. If the scalar product of the vector i + j + k with a unit vector parallel to the sum of the vectors 2i + 4 j − 5k and λi + 2j + 3k be 1, then λ =

(a) 1 (b) − 1 (c) 2 (d) − 2

179. If a is any vector in space, then

(a) a = (a .i)i + (a .j)j + (a .k)k

(b) a = (a × i) + (a × j) + (a × k)

(c) a = j(a .i)+ k(a .j)+ i(a .k)

(d) a = (a × i)× i + (a × j)× j + (a × k)× k

180. If a, b and c are unit vectors, then $|a-b|^2+|b-c|^2+|c-a|^2$ **does not exceed**

(a) 4 (b) 9 (c) 8 (d) 6

181. If a and b are two unit vectors, such that a + 2b and 5a −4b are perpendicular to each other then the angle between a and b is

(a) 45° (b) 60°

(c) $\cos^{-1}\left(\frac{1}{3}\right)$ (d) $\cos^{-1}\left(\frac{2}{7}\right)$

182. The position vector of coplanar points A, B, C, D are a, b, c and d respectively, in such a way that (a −d).(b −c) = (b −d).(c −a) = 0 , then the point D of the triangle ABC is

(a) Incentre (b) Circumcentre

(c) Orthocentre (d) None of these

183. If $\vec{F}_1 = i - j + k$, $\vec{F}_2 = -i + 2j - k$, $\vec{F}_3 = j - k$ **, A = 4i − 3j− 2k and B = 6i + j − 3k , then the scalar product of F1 + F2 + F3 and AB will be**

(a) 3 (b) 6 (c) 9 (d) 12

184. If the moduli of a and b are equal and angle between them is 120o and a . b = – 8, then | a | is equal to

(a) – 5 (b) – 4 (c) 4 (d) 5

185. The position vector of vertices of a triangle ABC are 4i – 2j, i + 4j – 3k and –i + 5j + k respectively, then ∠ABC =

(a) $\frac{\pi}{6}$ (b) $\frac{\pi}{4}$ (c) $\frac{\pi}{3}$ (d) $\frac{\pi}{2}$

186. A, B, C, D are any four points, then $\overrightarrow{AB}$. $\overrightarrow{CD}$ + $\overrightarrow{BC}$. $\overrightarrow{AD}$ + $\overrightarrow{CA}.\overrightarrow{BD}$ =

(a) $2\overrightarrow{AB}.\overrightarrow{BC}.\overrightarrow{CD}$ (b) $\overrightarrow{AB}+\overrightarrow{BC}+\overrightarrow{CD}$

(c) $5\sqrt{3}$ (d) 0

187. If | a | = 3,| b| = 1,| c | = 4 and a + b + c = 0 , then a .b + b.c + c .a =

(a) – 13 (b) – 10 (c) 13 (d) 10

188. The value of c so that for all real x, the vectors cxi – 6j + 3k, xi + 2j + 2cxk make an obtuse angle are

(a) c < 0 (b) $0 < c < \frac{3}{4}$

(c) $-\frac{3}{4} < c < 0$ (d) c > 0

189. The vector $\frac{1}{3}$ (2i - 2j + k is

(a) A unit vector

(b) Makes an angle $\frac{\pi}{3}$ with the vector 2i – 4 j + 3k

(c) Parallel to the vector – i + j - $\frac{1}{2}$ k

(d) Perpendicular to the vector 3i + 2j – 2k

190. If a, b, c are unit vectors such that a + b + c = 0 , then a . b + b . c + c . a =

(a) 1 (b) 3 (c) $-\frac{3}{2}$ (d) $\frac{3}{2}$

191. A unit vector in the xy-plane which is perpendicular to 4i – 3j + k is

(a) $\frac{i+j}{\sqrt{2}}$ (b) $\frac{1}{5}$ (3i + 4j)

(c) $\frac{1}{5}$ (3i - 4j) (d) None of these

192. The vectors 2i + 3j – 4k and ai + bj + ck are perpendicular, when

(a) a = 2, b = 3, c = –4 (b) a = 4, b = 4, c = 5

(c) a = 4, b = 4, c = –5 (d) None of these

193. The unit normal vector to the line joining i – j and 2i + 3j and pointing towards the origin is

(a) $\frac{4i-j}{\sqrt{17}}$ (b) $\frac{-4i-j}{\sqrt{17}}$ (c) $\frac{2i-3j}{\sqrt{13}}$ (d) $\frac{-2i+3j}{\sqrt{13}}$

ANSWERS

1	a	41	d	81	d	121	b	161	a
2	b	42	d	82	d	122	c	162	c
3	b	43	c	83	d	123	a	163	b
4	a	44	c	84	a	124	b	164	a
5	b	45	b	85	a	125	a	165	b
6	b	46	a	86	a	126	c	166	b
7	b	47	b	87	b	127	a	167	a
8	b	48	b	88	c	128	b	168	b
9	b	49	a	89	c	129	c	169	a
10	b	50	b	90	c	130	a	170	c
11	c	51	c	91	c	131	b	171	b
12	b	52	b	92	a	132	b	172	b
13	d	53	a	93	a	133	c	173	d
14	c	54	a	94	c	134	a	174	a
15	d	55	d	95	d	135	c	175	d
16	c	56	c	96	d	136	a	176	b
17	b	57	b	97	d	137	b	177	b
18	c	58	b	98	c	138	c	178	a
19	c	59	b	99	d	139	b	179	a
20	a	60	c	100	c	140	c	180	b
21	c	61	a	101	c	141	a	181	b
22	c	62	a	102	a	142	b	182	c
23	b	63	b	103	a	143	c	183	c
24	a	64	d	104	a,b,c	144	c	184	c
25	a	65	d	105	a	145	a,c	185	d
26	d	66	b	106	a	146	a,d	186	d
27	b	67	c	107	d	147	a	187	a
28	b	68	d	108	b	148	d	188	c
29	d	69	c	109	c	149	a	189	a,c,d
30	b	70	a	110	c	150	c	190	c
31	d	71	a	111	a	151	a	191	b
32	a	72	d	112	c	152	b	192	b
33	c	73	c	113	b	153	a	193	b
34	d	74	c	114	c	154	c		
35	a	75	c	115	c	155	a		
36	b	76	c	116	d	156	d		
37	a	77	d	117	b	157	c		
38	d	78	c	118	a	158	b		
39	d	79	a	119	a	159	d		
40	a	80	c	120	b	160	a		