**Vectors and their Applications**

**Type – 1**

**Choose the most appropriate option (a, b, c or d).**

Q 1. ABCDEF is a regular hexagon where centre O is the origin. If the position vectors of A and B are and  respectively then  is equal to

(a)  (b)  (c)  (d) none of these

Q 2. The position vectors of two vertices and the centroid of a triangle are and respectively. The position vector of the third vertex of the triangle is

(a)  (b)  (c)  (d) none of these

Q 3. Let the position vectors of the points A, B, C be and respectively. Then the ABC is

(a) right angled (b) equilateral (c) isosceles (d) none of these

Q 4. are three vectors of which every pair is noncollinear. If the vector and are collinear with and respectively then is

(a) a unit vector (b) the null vector (c) equally inclined to (d) none of these

Q 5. If and ssuch that then

(a)  (b) λ, μ, v are in AP (c) λ, μ, v are in HP (d) μ, λ, v are in GP

Q 6. The position vectors of three points are and where are noncoplanar vectors. The are collinear when

(a)  (b)  (c)  (d) none of these

Q 7. If and are linearly dependent vectors and then

(a) α = 1, β = – 1 (b) α = 1, β = ± 1 (c) α = – 1, β = ± 1 (d) α = ± 1, β = 1

Q 8. Let and . A vector along one of the bisectors of the angle ∠AOB is

(a)  (b)  (c)  (d) none of these

Q 9. A vector has components 2p and 1 with respect to a rectangular Cartesian system. The axes are rotated through an angle α about the origin in the anticlockwise sense. If the vector has components p + 1 and 1 with respect to the new system then

(a) p = 1, – (b) p = 0 (c) p = – 1 ,  (d) p = 1, – 1

Q 10. If and are two vectors of magnitude inclined at an angle 60° then the angle between  and is

(a) 30° (b) 60° (c) 45° (d) none of these

Q 11. Let Then the angle between and  is

(a)  (b)  (c)  (d) 

Q 12. A vector of magnitude 4 which is equally inclined to the vectors is

(a)  (b)  (c)  (d) none of these

Q 13. If and then cosine of the angle between and is

(a)  (b)  (c)  (d) none of these

Q 14. Let and and . Then is

(a)  (b) 6 (c)  (d) none of these

Q 15. is equal to

(a)  (b)  (c)  (d) none of these

Q 16. If a, b, are unit vectors such that a + b is also a unit vector then the angle between the vectors a and b is

(a)  (b)  (c)  (d) 

Q 17. Ifthen is

(a)  (b)  (c)  (d) 

Q 18. is equal to

(a)  (b) 3 (c)  (d) 

Q 19. is equal to

(a)  (b) 0 (c)  (d) none of these

Q 20. If a,b,c are the pth, qth, rth terms of an HP and

then 

(a) are parallel vectors (b) are orthogonal vectors

(c)  (d) 

Q 21. If and then

(a)  (b)  (c)  (d) 

Q 22. Let and a unit vector  be coplanar. If is perpendicular to then =

(a)  (b)  (c)  (d) 

Q 23. Let and . Then

(a)  (b) are coplanar (c)  (d) none of these

Q 24. Let be three unit vectors such that If  makes angles α, β with respectively then cos α + cos β is equal to

(a)  (b) 1 (c) – 1 (d) none of these

Q 25. If are three vectors of equal magnitude and the angle between each pair of vectors is such that  then is equal to

(a) 2 (b) – 1 (c) 1 (d) 

Q 26. If  and  = 10 then  is

(a) 1 (b)  (c) 3 (d) none of these

Q 27. If and  are unit vectors and α is the angle between them then cosis

(a)  (b)  (c)  (d) none of these

Q 28. If then

(a)  (b)  (c)  (d) none of these

Q 29. Two vectors and are

(a) perpendicular to each other (b) parallel to each other

(c) inclined to each other at an angle  (d) inclined to each other at an angle 

Q 30. Let  and . Avector in the plane if and whose projection on has the magnitude is

(a)  (b)  (c)  (d) 

Q 31. ABC is an equilateral triangle of side a. The value of  is equal to

(a)  (b) 3a2 (c)  (d) none of these

Q 32. If and then is equal to

(a)  (b)  (c)  (d) none of these

Q 33. is equal to

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

Q 34. If are two noncollinear and nonzero vector such that



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

Q 35. If are any three vectors such that then is

(a)  (b)  (c)  (d) none of these

Q 36. Then nit vector perpendicular to both the vectors and and making an acute angle with the vector is

(a)  (b)  (c)  (d) none of these

Q 37. Let and . If is parallel to the plane of the vectors  and then λ is

(a) 1 (b) 0 (c) – 1 (d) 2

Q 38. Let be a unit vector perpendicular to unit vectors  and and if the angle between and be α then is

(a)  (b)  (c)  (d) none of these

Q 39. If and then

(a)  (b)  (c)  (d) none of these

Q 40. The area of the parallelogram whose diagonals represent the vectors and is

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

Q 41. is equal to

(a)  (b)  (c) 8 (d) none of these

Q 42. Let . If is a vector satisfying and then is

(a)  (b)  (c)  (d) none of these

Q 43. A unit vector perpendicular to the plane passing through the points whose position vector are and is

(a)  (b)  (c)  (d) none of these

Q 44. Let and v, where . Then is equal to

(a) where t is a scalar (b) 

(c)  (d) none of these

Q 45. For the vectors which of the following expressions is not equal to any one of the remaining three option?

(a)  (b)  (c)  (d) 

Q 46. For three noncoplanar vectors the relation hold



holds if and only if

(a)  (b)  (c)  (d) 

Q 47. is equal to

(a)  (b)  (c)  (d) 0

Q 48. is equal to

(a)  (b)  (c) 0 (d) none of these

Q 49. Let be three unit vectors and . If the angle between and is then is equal to

(a)  (b)  (c) 1 (d) none of these

Q 50. Let a,b,c, be three distinct positive real numbers. If lie in a plane, where and , then b us

(a) then AM of a,c (b) then GM if a,c (c) sthem HM of a,c (d) equal to 0

Q 51. Which of the following is not equal to s?

(a)  (b)  (c)  (d) 

Q 52. If = 1 then is equal to

(a) 3 (b) 1 (c) 0 (d) none of these

Q 53. are noncoplanar vectors and are defined as



is equal to

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

Q 54. If are three noncoplanar vectors represented by concurrent edges of a parallelepiped of volume 4 then



is equal to

(a) 12 (b) 4 (c) ± 12 (d) 0

Q 55. If are three noncoplanar nonzero vectors then



Is equal to

(a)  (b)  (c)  (d) none of these

Q 56. Let be a vector perpendicular to , where = 2. If  then l + m + n is

(a) 2 (b) 1 (c) 0 (d) none of these

Q 57. If  are any three vectors in space then is equal to

(a)  (b) 0 (c)  (d) none of these

Q 58. If are three noncoplanar vectors then is equal to

(a) 0 (b)  (c)  (d) 

Q 59.  is equal to

(a) 0 (b)  (c)  (d) none of these

Q 60. If are nonezero and noncolinear vectors then  is equal to

(a)  (b)  (c)  (d) 

Q 61. The three concurrent edges of a parallelpiped respesent the vectors such that =λ. Then the volume of the parallelpiped whose three concurrent edges are the three concurrent diagonals of three faces of the given parallelpiped is

(a) 2λ (b) 3λ (c) λ (d) none of these

Q 62.  is equal to

(a)  (b)  (c)  (d) none of these

Q 63. Let  and be three vectors having magnitudes 1,1 and 2 respectively. If , the acute angle between and is

(a)  (b)  (c)  (d) none of these

Q 64. If is a unit vector then is equal to

(a)  (b)  (c)  (d) none of these

Q 65. Let be three unit vectors such that and the angles between  and be α and β respectively then

(a)  (b)  (c)  (d) none of these

Q 66. Let be three mutually perpendicular vectors of the same magnitude. If a vector satisfies the equation



this x is given by

(a)  (b)  (c)  (d) 

Q 67. If . and x represent dot product and cross product respectively then which of the following is meaningless?

(a)  (b)  (c)  (d) 

Q 68. is equal to

(a)  (b)  (c)  (d) none of these

Q 69. If then is equal to

(a)  (b)  (c)  (d) none of these

Q 70. If are noncoplanar nonzero vectors then



is equal to

(a)  (b)  (c)  (d) none of these

Q 71. If are three noncoplanar nonzero vectors and  is any vector in space then is equal to

(a)  (b)  (c)  (d) none of these

Q 72. Let be three unit vectors of which and  are nonparallel. Let the angle between and  be α and that between and  be α and that between and  be β. If then

(a)  (b)  (c)  (d) none of these

Q 73. Let and . If is a vector such that and the angle between and  is 30° then is equal to

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

Q 74. Let , and be two noncollinear unit vectors. If  and then is

(a)  (b)  (c)  (d) 

Q 75. If be three vectors such that = 4 then is equal to

(a) 8 (b) 16 (c) 64 (d) none of these

Q 76. If is a unit vector such that then



is equal to

(a)  (b) 1 (c)  (d) none of these

Q 77. and are

(a) linearly (b) dependent (c) equal vectors (d) none of these

Q 78. is equal to

(a)  (b)  (c)  (d) none of these

Q 79. If the vector and are coplanar then  is equal to

(a)  (b)  (c)  (d) none of these

Q 80. If and then is equal to

(a) 0 (b) 1 (c) 2 (d) none of these

Q 81. Let and where O, A and C noncollinear points. Let p denote the area of the quadrilateral OAB, and q denote the area of the parallelogram with OA and OC as adjacent sides. Then p/q is equal to

(a) 4 (b) 6 (c)  (d) none of these

Q 82. The position vectors of the vertices A, B, C of a triangle are and  respectively. The length of the bisector AD of the angle BAC where D is on the line segment BC, is

(a)  (b)  (c)  (d) none of these

Q 83. P is a point on the line through the point A whose position vector is and the line is parallel to the vector . If PA = 6, the position vector of P is

(a)  (b)  (c)  (d) 

Q 84. The coplanar points A,B,C,D are (2 – x, 2, 2), (2, 2 – y, 2), (2, 2, 2, 2 − z) and (1, 1, 1) respectively. Then

(a)  (b) x + y + z = 1 (c)  (d) none of these

Q 85. Let and . If the point P on the line segment BC is equidistant from AB and AC then is

(a)  (b)  (c)  (d) none of these

Q 86. The cosine of the angle between two diagonals of a cube is

(a)  (b)  (c)  (d) none of these

Q 87. If and then the length of the perpendicular from A to the line BC is

(a)  (b)  (c)  (d) none of these

Q 88. The distance of the point (1, 1, 1) from the plane passing through the points (2, 1, 1), (1, 2, 1) and (1, 1, 2) is

(a)  (b) 1 (c)  (d) none of these

Q 89. The projection of the vector one the line whose vector equation is , t being the scalar parameter, is

(a)  (b) 6 (c)  (d) none of these

Q 90. If the vertices of a tetrahedron have the position vectors and then the volume of the volume if of the tetrahedron is

(a)  (b) 1 (c) 2 (d) none of these

**Type 2**

**Choose the correct options. One or more option may be correct.**

Q 91. A line passes through the point whose position vectors are and . The position vector of a point on it at a unit distance from the first point is

(a)  (b)  (c)  (d) none of these

Q 92. A vector of magnitude 2 along bisector of the angle between the two vectors and is

(a)  (b)  (c)  (d) none of these

Q 93. A unit vector coplanar with and , and perpendicular to , is

(a)  (b)  (c)  (d) 

Q 94. A unit vector which is equally inclined to the vectors and is

(a)  (b)  (c)  (d) 

Q 95. If and the angle between and is then equal to

(a) 48 (b) 16 (c)  (d) none of these

Q 96. Three points whose position vectors are will be collinear if

(a)  (b) (c)  (d) none of these

Q 97. Let . Let be a vector perpendicular to and it lies in the x–y plane. A vector in the x­−y plane having projections 1 and 2 along and is

(a)  (b)  (c)  (d) none of these

Q 98. If  are noncoplanar nonzero vectors and is any vector in space then is equal to

(a)  (b)  (c)  (d) none of these

Q 99. If are nonecoplanar vectors such that and then

(a)  (b)  (c)  (d) none of these

Q 100. Let be noncoplanar vectors and then

(a)  (b)  (c)  (d) none of these

Q 101. If are any three vectors then is a vector

(a) perpendicular to  (b) coplanar with and 

(c) parallel to  (D) parallel to either or 

Q 102. If  and then

(a)  (b)  (c)  (d) 

Q 103. If and  then is equal to

(a)  (b)  (C)  (d) none of these

Q 104. The resolved part of the vector along the vector is and that perpendicular to is . Then

(a)  (b)  (c)  (d) 

Q 105.  is equal to

(a)  (b) (c)  (d) 

Q 106. If are any four then is a vactor

(a) perpendicular to 

(b) along the line of intersection of two planes, one containing and the other containing 

(c) equally inclined to both and 

(d) none of these

**Answers**

1b 2a 3b 4b 5a 6c 7d 8c 9a 10a

11b 12c 13b 14a 15b 16d 17b 18a 19a 20b

21b 22a 23b 24c 25c 26b 27a 28b 29d 30c

31c 32a 33b 34c 35a 36a 37b 38c 39c 40b

41c 42a 43b 44b 45c 46c 47a 48c 49a 50c

51c 52a 53d 54c 55a 56c 57c 58c 59a 60b

61a 62a 63c 64c 65c 66b 67d 68c 69a 70b

71a 72b 73b 74a 75b 76a 77a 78a 79b 80a

81b 82a 83b 74a 85c 86a 87b 88a 89c 90a

91a,b 92a,c 93a,d 94a,d 95b,c 96a,b 97a,c 98b,c 99a,b,c 100a,b

101a,b 102c,d 103b,c 104b,c,d 105a,b,c,d 106b,c