**ACTIVE SITE TUTORIALS**

**Date :** 07-09-2019 **TEST ID: 615**

**Time :** 17:15:00 **MATHEMATICS**

**Marks :** 1040

10.VECTOR ALGEBRA

**Single Correct Answer Type**

| 1. | Vector is perpendicular to vectors and and satisfies the condition Then vector is equal to | | | | | | | |
|  | a) |  | b) |  | c) |  | d) | None of these |
| 2. | If and are unit coplanar vectors, then the scalar triple product is | | | | | | | |
|  | a) | 0 | b) | 1 | c) |  | d) |  |
| 3. | Points and are coplanar and . Then the least value of is | | | | | | | |
|  | a) |  | b) | 14 | c) | 6 | d) |  |
| 4. | If and and , thenis equal to | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 5. | A parallelogram is constructed on and, where | and | and andare anti-parallel. Then the length of the longer diagonal is | | | | | | | |
|  | a) | 40 | b) | 64 | c) | 32 | d) | 48 |
| 6. | Let and be three non-coplanar vector and and the vector defined by the relations and . Then the value of the expression is | | | | | | | |
|  | a) | 0 | b) | 1 | c) | 2 | d) | 3 |
| 7. | If the vectors and from the sides , and , respectively, of triangle , then | | | | | | | |
|  | a) |  | | | b) |  | | |
|  | c) |  | | | d) |  | | |
| 8. | Vector and are mutually perpendicular. If and are also mutually perpendicular, then the cosine of the single between andis | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 9. | If is parallel to,then (is equal to | | | | | | | |
|  | a) |  | b) |  | c) |  | d) | None of these |
| 10. | If is the centroid of a triangle , then is equal to | | | | | | | |
|  | a) |  | b) | 3 | c) | 3 | d) | 3 |
| 11. | Vector in the plane of and is such it is equally inclined to andwhere . The value of is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 12. | is a quadrilateral. is the point intersection of the line joining the midpoint of the opposite sides. If is any point and , then is equal to | | | | | | | |
|  | a) | 3 | b) | 9 | c) | 7 | d) | 4 |
| 13. | Let be a point in space and be a point on the line Then, the value of μ for which the vector is parallel to the plane is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 14. | If is any arbitrary point on the circumcircle of the equilateral triangle of side length units, then is always equal to | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 15. | Let the pairsandeach determine a plane. Then the planes are parallel if | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 16. | In the following figure,and are parallel to each other and and are parallel to each other. If , then the value of area area is equal to | | | | | | | |
|  | a) | 7/2 | b) | 3 | c) | 4 | d) | 9/2 |
| 17. | Let and a unit vector be coplanar.If is perpendicular to, then is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 18. | and are the position vectors of two fixed points and is the position vector of a variable point. If moves such that , then the locus of is | | | | | | | |
|  | a) | A plane containing the origin and parallel to two non-collinear vectors and | | | | | | | |
|  | b) | The surface of a sphere described on as its diameter | | | | | | | |
|  | c) | A line passing through points and | | | | | | | |
|  | d) | A set of lines parallel to line | | | | | | | |
| 19. | If and are three mutually perpendicular vectors, then the vector which is equally inclined to these vectors is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 20. | and have position vectors and respectively, such that . Then | | | | | | | |
|  | a) | and bisect each other | | | b) | and bisect each other | | |
|  | c) | and trisect each other | | | d) | and trisect each other | | |
| 21. | If is a real constant and and are variable angled and then the least value of is | | | | | | | |
|  | a) | 6 | b) | 10 | c) | 12 | d) | 3 |
| 22. | Let and be three non-coplanar vectors and be any arbitrary vector. Then  is always equal to | | | | | | | |
|  | a) | [] | b) | 2[] | c) | 3[ | d) | None of these |
| 23. | The scalar equals | | | | | | | |
|  | a) | 0 | b) |  | c) |  | d) | None of these |
| 24. | and are two vectors such that and . If , then find the angle between and | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 25. | The volume of the parallelepiped whose sides are given by and is | | | | | | | |
|  | a) | 4/13 | b) | 4 | c) | 2/7 | d) | 2 |
| 26. | If is a vector whose initial point divides the join of in the ratio and whose terminal point is the origin and , then lies in the interval | | | | | | | |
|  | a) |  | b) |  | c) | [0, 6] | d) | None of these |
| 27. | The number of the distinct real values of λ, for which the vectors , and are coplanar, is | | | | | | | |
|  | a) | Zero | b) | One | c) | Two | d) | Three |
| 28. | If , then is equal to | | | | | | | |
|  | a) | A vector perpendicular to the plane of and | | | b) | A scalar quantity | | |
|  | c) |  | | | d) | None of these | | |
| 29. | Let and be three non-zero vectors such that is a unit vector perpendicular to both and is , then the value of is | | | | | | | |
|  | a) | 0 | | | b) | 1 | | |
|  | c) |  | | | d) |  | | |
| 30. | The position vectors of the point and with respect to the origin are and respectively. If is a point on , such that is the bisector of , then | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 31. | Let and be mutually perpendicular unit vectors. Then for any arbitrary | | | | | | | |
|  | a) |  | | | b) |  | | |
|  | c) |  | | | d) | None of these | | |
| 32. | If and , where and are three non-coplanar vectors, then the value of the expression is | | | | | | | |
|  | a) | 3 | b) | 2 | c) | 1 | d) | 0 |
| 33. | If bisects the angle between and , where isa unit vectors, then | | | | | | | |
|  | a) |  | | | b) |  | | |
|  | c) |  | | | d) |  | | |
| 34. | and are two unit vectors that are mutually perpendicular. A unit vector that is equally inclined to and is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 35. | Let and,be four non-zero vectors such that and .Then is equal to | | | | | | | |
|  | a) |  | b) |  | c) | 0 | d) | None of these |
| 36. | If are any three non-coplanar vectors, then the equation [has roots | | | | | | | |
|  | a) | Real and distinct | b) | Real | c) | Equal | d) | Imaginary |
| 37. | Given that are four vectors such that and , where is a scalar. Then ||is equal to | | | | | | | |
|  | a) |  | b) | (1/2) | c) |  | d) |  |
| 38. | If and are any two vectors of magnitudes 1 and 2 respectively, and then the angle between and is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 39. | For non-zero vectors and holds if and only if | | | | | | | |
|  | a) |  | | | b) |  | | |
|  | c) |  | | | d) |  | | |
| 40. | If and , where is a non-zero vector, then which of the following is not correct | | | | | | | |
|  | a) |  | | | b) |  | | |
|  | c) |  | | | d) | None of these | | |
| 41. | . A vector coplanar with and whose projection on is magnitude is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 42. | A point is the centre of a circle circumscribed about a triangle Then | | | | | | | |
|  | a) |  | | | b) | where G is the centroid of triangle | | |
|  | c) |  | | | d) | None of thee | | |
| 43. | Find the value of so that the points and on the sides and , respectively, of a regular tetrahedron are coplanar. It is given that | | | | | | | |
|  | a) |  | b) |  | c) |  | d) | For no value of |
| 44. | Let and be three units vectors such that . Then which of the following statements is true? | | | | | | | |
|  | a) | is parallel to | | | b) | is perpendicular to | | |
|  | c) | is neither parallel nor perpendicular to | | | d) | None of these | | |
| 45. | A non-zero vector is such that its projections along vectors and are equal, then unit vectors along is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 46. | If , then in the reciprocal system of vectors reciprocal of vector is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 47. | Let be unit vectors such that Which of the following is correct? | | | | | | | |
|  | a) |  | | | b) |  | | |
|  | c) |  | | | d) | are mutually perpendicular | | |
| 48. | For any two vectors and) is always equal to | | | | | | | |
|  | a) |  | b) |  | c) | Zero | d) | None of these |
| 49. | If the vectors are linearly independent satisfying then the most general values of are | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 50. | If , where and are non-coplanar, then | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 51. | Let be distinct and real numbers. The points with position vectors | | | | | | | |
|  | a) | Are collinear | | | b) | From an equilateral triangle | | |
|  | c) | From a scalene triangle | | | d) | Form a right-angled triangle | | |
| 52. | Let Then and are non- coplanar for | | | | | | | |
|  | a) | Some values of | | | b) | Some values of | | |
|  | c) | No values of and | | | d) | For all values of and | | |
| 53. | and are three mutually perpendicular vectors of the same magnitude. If vector satisfies the equation ,then is given by | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 54. | Let two non-collinear unit vectors and from and acute angle. A point moves so that at any time the position vector (where is the origin) is given by . When is farthest form origin , let be the length of and be the unit vector along Then, | | | | | | | |
|  | a) |  | | | b) |  | | |
|  | c) |  | | | d) |  | | |
| 55. | If and then is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 56. | If is a non-zero vector of modulus and is a non-zero scalar, then is a unit vector it | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 57. | Let, , . A vector coplanar to and has a projection along of magnitude then the vector is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) | None of these |
| 58. | Given three non-zero, non-coplanar vectors if the vectors are collinear, then is | | | | | | | |
|  | a) | (0, 0) | b) |  | c) |  | d) |  |
| 59. | Gives three vectors and , two of which are non-collinear.Further if ( is collinear with is collinear with . Find the value of | | | | | | | |
|  | a) | 3 | b) |  | c) | 0 | d) | Cannot be evaluated |
| 60. | A uni-modular tangent vector on the curve is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 61. | In a quadrilateral is the bisector of and , angle between and is . Then the angle between and is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 62. | Let be a tetrahedron such that the edge AB, AC and AD are mutually perpendicular. Let the area of triangles , and be 3,4 sq. units, respectively. Then the area of triangle is | | | | | | | |
|  | a) |  | b) | 5 | c) |  | d) |  |
| 63. | If and are three non-coplanar vectors, then (equals | | | | | | | |
|  | a) | 0 | b) | [] | c) |  | d) |  |
| 64. | If be the volume of a tetrahedron and be the volume of another tetrahedran formed by the centroids of faces of the previous tetrahedron and ’;then is equal to | | | | | | | |
|  | a) | 9 | b) | 12 | c) | 27 | d) | 81 |
| 65. | Resolved part of vector and along vector is and that perpendicular to is thenis equal to | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 66. | Three vectors an taken two at a time form three planes. The three unit vector drawn perpendicular to these three planes form a parallelepiped of volume | | | | | | | |
|  | a) | 1/3 | b) | 4 | c) |  | d) |  |
| 67. | Let be a triangle, the position vectors of whose vertices are respectively is | | | | | | | |
|  | a) | Isosceles | b) | Equilateral | c) | Right angled | d) | None of these |
| 68. | If and are non-collinear, then equals | | | | | | | |
|  | a) |  | b) |  | c) | 0 | d) |  |
| 69. | and )are the vertices of triangle and is any point in the plane of triangle , then is always equal to | | | | | | | |
|  | a) | Zero | b) |  | c) |  | d) | None of these |
| 70. | If and are the unit vectors such that and | | | | | | | |
|  | a) | are non-coplanar | | | b) | are non-coplanar | | |
|  | c) | are non-parallel | | | d) | are parallel and are parallel | | |
| 71. | If the two adjacent sides of two rectangles are represented by vectors and , respectively, then the angle between the vectors andis | | | | | | | |
|  | a) |  | b) |  | c) |  | d) | Cannot be evaluated |
| 72. | If and are unit vectors such that , then angle between and is | | | | | | | |
|  | a) | 0 | b) |  | c) |  | d) | indeterminate |
| 73. | If and are such that [, angle between and is and , then the angle between and is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 74. | Let vectors and be such that .Let and be planes determined by the pairs of vectors and , respectively. Then the angle between and is | | | | | | | |
|  | a) | 0 | b) |  | c) |  | d) |  |
| 75. | is a vector with direction . Assuming the plane as a mirror, the direction cosines of the reflected image of in the plane are | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 76. | If for some non-zero vectors , then the area of the triangle whose vertices are A (and is (are non-coplanar) | | | | | | | |
|  | a) |  | b) |  | c) |  | d) | None of these |
| 77. | Let be the position vectors of points reelative to the origin . If the vector equation =0 holds then a similar equation will also hold w.r.t. to any other origin provided | | | | | | | |
|  | a) |  | | | b) |  | | |
|  | c) |  | | | d) |  | | |
| 78. | Let the position vectors of the points and be and 2 respectively. Vector is perpendicular to the plane containing the orgin and the points and . Then equals | | | | | | | |
|  | a) |  | b) | 1/2 | c) | 1 | d) | None of these |
| 79. | Let and be unit vectors that are perpendicular to each other. Then  will always be equal to | | | | | | | |
|  | a) | 1 | b) | 0 | c) |  | d) | None of these |
| 80. | If and are non-coplanar vectors and is perpendicular to then the value of []is equal to | | | | | | | |
|  | a) | [] | b) | [] | c) |  | d) | [] |
| 81. | In a trapezium, vector is collinear with which of the following is true? | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 82. | The position vectors of points and are and , respectively. The greatest angle of triangle is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) | None of these |
| 83. | Let and . If is a unit vector such that then equals | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 84. | Given three vectors and such that . Then the resolution of the vectors into compounds with respect to is given by | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 85. | The condition for equations and to be consistent is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 86. | If the diagonals of one of its faces are and and of the edges not containing the given diagonals is then the volume of a parallelepiped is | | | | | | | |
|  | a) | 60 | b) | 80 | c) | 100 | d) | 120 |
| 87. | The vertex of triangle is on the line and the vartices and have respective position vectors and.Let be the area of the triangle and , . Then the range of values of corresponding to is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 88. | The value of for which the angle between and is obuse and the angle between and the - is acute and less than , is | | | | | | | |
|  | a) |  | b) |  | c) | or | d) | None of these |
| 89. | If and are three mutually orthogonal unit vectors, then the triple product equals | | | | | | | |
|  | a) | 0 | b) | 1 or 1 | c) | 1 | d) | 3 |
| 90. | is the incentre of triangle whose corresponding sides are respectively. is always equal to | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 91. | Let and . If is a vector such that and the angle between and is , then |()| is equal to | | | | | | | |
|  | a) | 2/3 | b) | 3/2 | c) | 2 | d) | 3 |
| 92. | If and are unit vectors, then does not exceed | | | | | | | |
|  | a) | 4 | b) | 9 | c) | 8 | d) | 6 |
| 93. | If the vector product of a constant vector with a variable vector in a fixed plane be a constant vector, then the locus of is | | | | | | | |
|  | a) | A straight line perpendicular to | | | b) | A circle with centre and radius equal to | | |
|  | c) | A straight line parallel to | | | d) | None of these | | |
| 94. | The points with position vectors are collinear if | | | | | | | |
|  | a) |  | b) |  | c) |  | d) | None of these |
| 95. | Two adjacent sides of a parallelogram are given by and  . The side is rotated by an acute angle α in the plane of the parallelogram so that becomes . If makes a right angle with the side , then the cosine of the angle α is given by | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 96. | and are three vectors of equal magnitude. The angle between each pair of vectors is such that |. Then || is equal to | | | | | | | |
|  | a) | 2 | b) |  | c) | 1 | d) |  |
| 97. | Value of []is always equal to | | | | | | | |
|  | a) |  | b) |  | c) |  | d) | None of these |
| 98. | If , where and are non-zero vectors, then | | | | | | | |
|  | a) | and can be coplanar | | | b) | and must be coplanar | | |
|  | c) | and cannot be coplanar | | | d) | None of these | | |
| 99. | If and are two vectors, such that and |, then the angle between vectors and is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 100. | The position vectors of the vertices and of a triangle are three units vectors and respectively. A vector is such that andThen triangle is | | | | | | | |
|  | a) | Acute angled | b) | Obtuse angled | c) | Right angled | d) | None of these |
| 101. | Let and be two variable vectors then and are | | | | | | | |
|  | a) | Collinear for unique value of | | | b) | Perpendicular for infinite values of | | |
|  | c) | Zero vectors for unique value of | | | d) | None of these | | |
| 102. | If satisfies then is equal to | | | | | | | |
|  | a) |  | | | b) |  | | |
|  | c) |  | | | d) |  | | |
| 103. | If and then the altitude of the parallelepiped formed by the vectors and having base formed by and is (where is reciprocal vector , etc) | | | | | | | |
|  | a) | 1 | b) |  | c) |  | d) |  |
| 104. | Vectors are laid off from one point. Vector , which is being laid off from the same point dividing the angle between vectors in equal halves and having the magnitude , is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 105. | Given .Then | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 106. | and are unit vectors such that . Angle between and is between and is and between and varies . Then the maximum value of is | | | | | | | |
|  | a) | 3 | b) | 4 | c) |  | d) | 6 |
| 107. | If andare any two vectors of magnitudes 2 and 3, respectively, such that then the maximum values of is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 108. | is the centroid of triangle and and are the midpoints of sides and , respectively.If be the area of quadrilateral and be the area of triangle , then is equal to | | | | | | | |
|  | a) |  | b) | 3 | c) |  | d) | None of these |
| 109. | The value of so that the volume of parallelopiped formed by and  becomes minimum is | | | | | | | |
|  | a) |  | b) | 3 | c) |  | d) |  |
| 110. | If and are three unit vectors inclined to each other at an angle , then the maximum value of is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 111. | Four non-zero vectors will always be | | | | | | | |
|  | a) | Linearly dependent | b) | Linearly independent | c) | Either a or b | d) | None of these |
| 112. | If and are two unit vectors inclined at an angle then is equal to | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 113. | be a point interior to the acute triangle . If is a null vector then w.r.t. triangle , point is its | | | | | | | |
|  | a) | Centroid | b) | Orthocentre | c) | Incentre | d) | Circumcentre |
| 114. | If is a non-zero vector and then | | | | | | | |
|  | a) |  | | | b) |  | | |
|  | c) | and are coplanar | | | d) | None of these | | |
| 115. | If and then and are | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 116. | If then equals to | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 117. | Two vectors in space are equal only if they have equal component in | | | | | | | |
|  | a) | A given direction | | | b) | Two given directions | | |
|  | c) | Three given directions | | | d) | In any arbitrary direction | | |
| 118. | A vector of magnitude coplanar with the vectors and , and perpendicular to the vector ,is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 119. | If are linearly dependent vectors and | then | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 120. | If vectors and are two adjacent sides of a parallelogram, then the vector representing the altitude of the parallelogram which is perpendicular to is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 121. | If then vector in terms of and satisfying the equations and and [is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) | None of these |
| 122. | Locus of the point for which represents a vector with direction cosine ( is the origin) is | | | | | | | |
|  | a) | A circle parallel to the plane with centre on the - axis | | | | | | | |
|  | b) | A cone concentric with the positive -axis having vertex at the origin and the slant height equal to the magnitude of the vector | | | | | | | |
|  | c) | A ray emanating from the origin and making an angle of with the -axis | | | | | | | |
|  | d) | A disc parallel to the plane with centre on the -axis and radius equal to | | | | | | | |
| 123. | Let and be the points on the plane with position vectors and respectively. The quadrilateral must be | | | | | | | |
|  | a) | Parallelogram, which is neither a rhombus nor a rectangle | | | | | | | |
|  | b) | Square | | | | | | | |
|  | c) | Rectangle, but not a square | | | | | | | |
|  | d) | Rhombus, but not a square | | | | | | | |
| 124. | If are three non-zero, non-coplanar vectors and  And  Then, which of the following is a set of mutually orthogonal vectors? | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 125. | If and are two non-collinear vectors and is a triangle is a triangle with side length and satisfying , then triangle is | | | | | | | |
|  | a) | An acute-angled triangle | | | b) | An obtuse-angled triangle | | |
|  | c) | A right-angled triangle | | | d) | An isosceles triangle | | |
| 126. | If and at least one of and is non-zero, then vectors and are | | | | | | | |
|  | a) | Parallel | | | b) | Coplanar | | |
|  | c) | Mutually perpendicular | | | d) | None of these | | |
| 127. | If and are non-zero constant vectors and the scalar is chosen such that is minimum, then the value of +| is equal to | | | | | | | |
|  | a) |  | b) |  | c) | 3 | d) |  |
| 128. | If and are three unit vectors, such that is also a unit vector and and are angles between the vectors and, respectively, then among and | | | | | | | |
|  | a) | All are acute angles | | | b) | All are right angles | | |
|  | c) | At least one is obtuse angle | | | d) | None of these | | |
| 129. | Let , where and are unit vectors and the unit vector is inclined at an angle to both and.If then | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 130. | and are unit vectors and |. The angle between and is and .The value of is | | | | | | | |
|  | a) |  | b) | 1/4, 3/4 | c) |  | d) | , 3/4 |
| 131. | If and then is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 132. | The volume of a tetrahedron formed by the coterminus edges and is 3. Then the volume of the parallelepiped formed by the conterminous edges and is | | | | | | | |
|  | a) | 6 | b) | 18 | c) | 36 | d) | 9 |
| 133. | If and are non-zero non-collinear vectors, then is equal to | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 134. | If are two non-collinear vectors and represent the sides of a satisfying , then is (where is perpendicular to the plane of | | | | | | | |
|  | a) | An acute- angled triangle | | | b) | An obtuse-angled triangle | | |
|  | c) | A right-angled triangle | | | d) | A scalene triangle | | |
| 135. | is equal to (where and are non-zero non-coplanar vectors) | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 136. | a parallelogram, and and are the midpoints of sides and , respectively. If is equal to | | | | | | | |
|  | a) |  | b) | 1 | c) |  | d) | 2 |
| 137. | If in a right- angled triangle , the hypotenuse ,then is equal to | | | | | | | |
|  | a) |  | b) |  | c) |  | d) | None of these |
| 138. | If and are orthogonal unit vectors, then for a vector non-coplanar with and , vector is equal to | | | | | | | |
|  | a) |  | | | b) |  | | |
|  | c) |  | | | d) | None of these | | |
| 139. | If and are non-coplanar unit vectors such that , then the angle between and is | | | | | | | |
|  | a) | 3 | b) |  | c) |  | d) |  |
| 140. | The edges of a parallelopiped are unit length and are parallel to non-coplanar unit vectors such that | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 141. | Let . Then vector satisfying the equations and is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 142. | If and are the position vectors of the vertices and respectively, of triangle , the position vector of the point where the bisector of angle meets , is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 143. | Two adjacent sides of a parallelogram are and. Then the value of is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 144. | Let and be such that and . If the projection of along is equal to that of along and vectors and are perpendicular to each other, then equals | | | | | | | |
|  | a) | 2 | b) |  | c) |  | d) | 14 |
| 145. | If are unit vectors such that and the angle between and is , then the value of | is | | | | | | | |
|  | a) | 1/2 | b) | 1 | c) | 2 | d) | None of these |
| 146. | and are unit vectors. Then for any arbitrary vector is always equal to | | | | | | | |
|  | a) |  | b) |  | c) |  | d) | None of these |
| 147. | Let be the equation of an ellipse in the plane. and are two points whose position vectors are . Then the position vector of a point on the ellipse such that is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) | None of these |
| 148. | Position vector is rotated about origin by angle in such a way that the plane made by it bisects the angle between and. Then its new position is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) | None of these |
| 149. | Vectors and are so placed that the end point of one vector is the starting point of the next vector. Then the vector are | | | | | | | |
|  | a) | Not coplanar | | | b) | Coplanar but cannot from a triangle | | |
|  | c) | Coplanar and from a triangle | | | d) | Coplanar and can from a right-angled triangle | | |
| 150. | Let and be the three vectors having magnitudes 1,5 and 3, respectively, such that the angle between and is and . Then is equal to | | | | | | | |
|  | a) | 0 | b) | 2/3 | c) | 3/5 | d) | 3/4 |
| 151. | If and then is equal to | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 152. | Let and be vectors such that . If |and|, then is | | | | | | | |
|  | a) | 47 | b) |  | c) | 0 | d) | 25 |
| 153. | Let where [.] denotes the greatest integer function. Then the vectorsand are | | | | | | | |
|  | a) | Parallel to each other | | | b) | perpendicular to each other | | |
|  | c) | Inclined at an angle | | | d) | Inclined at | | |
| 154. | If are two unit vectors and is the angle between them, then the unit vector along the angular bisector of will be given by | | | | | | | |
|  | a) |  | b) |  | c) |  | d) | None of these |
| 155. | In triangle is the orthocentre and is the midpoint of . Segment is produced to such that =. The length is equal to | | | | | | | |
|  | a) |  | b) |  | c) |  | d) | None of these |
| 156. | If vectors and are the sides of a , then the length of the medium through is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) | 5 |
| 157. | If |, then the angle between can lie in the interval | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 158. | A vector magnitude 10 along the normal to the curve at its point can be | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 159. | The unit vector orthogonal to vector and making equal angles with the -and -axis is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) | None of these |
| 160. | Let us define the length of a vector . This definition coincides with the usual definition of length of a vector if any only if | | | | | | | |
|  | a) |  | | | b) | Any two of and are zero | | |
|  | c) | Any one of is zero | | | d) |  | | |
| 161. | Let be distinct non-negative numbers. If vectors are coplanar, then is | | | | | | | |
|  | a) | The arithmetic mean of and | | | b) | The geometric mean of and | | |
|  | c) | The harmonic mean of and | | | d) | Equal to zero | | |

**Multiple Correct Answers Type**

| 162. | If vectors and =are orthogonal and vector makes an obtuse angle with the -axis, then the value of is | | | | | | | |
|  | a) |  | | | b) |  | | |
|  | c) |  | | | d) |  | | |
| 163. | If vectors and are non-collinear, then is | | | | | | | |
|  | a) | A unit vector | | | b) | In the plane of and | | |
|  | c) | Equally inclined to and | | | d) | Perpendicular to | | |
| 164. | The angles of a triangle, two of whose sides are represented by vectors and where is a non-zero vectors and is a unit vector in the direction of are | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 165. | and are two non-collinear unit vectors, and and Then | is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) | None of these |
| 166. | and are four points such that and ). If intersects at some point , then | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 167. | Let and be two non-collinear unit vectors. If and then | is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 168. | Let be a triangle, the position vectors of whose are . Then is | | | | | | | |
|  | a) | Isosceles | b) | Equilateral | c) | Right angles | d) | None of these |
| 169. | and are non-collinear if and (.Then | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 170. | If non-zero vectors are equally inclined to coplanar vector can be | | | | | | | |
|  | a) |  | | | b) |  | | |
|  | c) |  | | | d) |  | | |
| 171. | The number of vectors of unit length perpendicular to vectors and is | | | | | | | |
|  | a) | One | b) | Two | c) | Three | d) | infinite |
| 172. | A vector has the compounds and 1 w.r.t. a rectangular Cartesian system. This system is rotated through a certain angle about the origin in the counterclockwise sence. If, with respect to a new system, has components and I, then is equal to | | | | | | | |
|  | a) |  | b) |  | c) | 1 | d) | 2 |
| 173. | Let be a unit vector satisfying where |and|Then | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 174. | In a four dimensional space where unit vectors along the axes are , and four non-zero vectors such that no vector can be expressed as linear combination of others and , then | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 175. | If unit vectors and are inclined at an angle such that and then lies in the interval | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 176. | The vectors are collinear, if | | | | | | | |
|  | a) |  | | | b) |  | | |
|  | c) |  | | | d) |  | | |
| 177. | If are three non-coplanar vectors such that , , is , then | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 178. | If and are two vectors and angle between them is , then | | | | | | | |
|  | a) |  | | | | | | | |
|  | b) | if | | | | | | | |
|  | c) | is normal unit vector), if | | | | | | | |
|  | d) |  | | | | | | | |
| 179. | If and are non-coplanar vectors and is a real number, then the vectors are coplanar when | | | | | | | |
|  | a) |  | b) |  | c) |  | d) | No value of |
| 180. | A parallelogram is constructed on vectors if , and angle between and is , then the length of a diagonal of parallogram is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) | None of these |
| 181. | Vectors perpendicular to and in the plane of and are | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 182. | The vectors and are coplanar if is equal to | | | | | | | |
|  | a) | 1 | b) |  | c) | 4 | d) | 0 |
| 183. | If and then  (a) are orthogonal in pairs and  (b) are not orthogonal to each other  (c) are orthogonal in pairs but  (d) are orthogonal but  Or  If then | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 184. | Let and be three non-coplanar vectors and be a non-zero vector, which is perpendicular to ().Now .Then | | | | | | | |
|  | a) |  | | | b) |  | | |
|  | c) | Minimum value of is | | | d) | Minimum value of is | | |
| 185. | If and then which one of the following points lie on the bisector of the angle between and ( is the origin of reference)? | | | | | | | |
|  | a) | (2, 2, 4) | b) | (2, 11, 5) | c) |  | d) | (1, 1, 2) |
| 186. | Let and be non-zero vectors and and  Vectors and are equal. Then | | | | | | | |
|  | a) | and are orthogonal | | | b) | and are collinear | | |
|  | c) | and are orthogonal | | | d) | when is a scalar | | |
| 187. | Which of the following expression are meaningful? | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 188. | If points are collinear, then | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 189. | and are two given vectors. With these vectors as adjacent sides, a parallelogram is constructed. The vector which is the altitude of the parallelogram and which is perpendicular to is | | | | | | | |
|  | a) |  | | | b) |  | | |
|  | c) |  | | | d) |  | | |
| 190. | The sides of a parallelogram are and . The unit vector parallel to one of the diagonals is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 191. | Vector ) is | | | | | | | |
|  | a) | a unit vector | | | | | | | |
|  | b) | Makes an angle with vector | | | | | | | |
|  | c) | Parallel to vector | | | | | | | |
|  | d) | Perpendicular to vector | | | | | | | |
| 192. | Let and be two non-zero perpendicular vectors. A vector satisfying the equation can be | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 193. | If where , then | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 194. | Let and be three vectors. A vectors in the plane of and , whose projection on is of magnitude , is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 195. | The scalars and such that , where and are given vectors, are equal to | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 196. | A vector is equally inclined to three vectors and . Let and be three vectors in the plane of , respectively Then | | | | | | | |
|  | a) |  | | | b) |  | | |
|  | c) |  | | | d) | where | | |
| 197. | are three coplanar unit vectors such that . If three vectors are parallel to and , respectively, and have integral but different magnitudes, then among the following options, can take a value equal to | | | | | | | |
|  | a) | 1 | b) | 0 | c) |  | d) | 2 |
| 198. | If and are three unit vectors such that ,then and being non-parallel) | | | | | | | |
|  | a) | Angle between and is | | | b) | Angle between and is | | |
|  | c) | Angle between and is | | | d) | Angle between and is | | |
| 199. | If side of an equilateral triangle lying in the plane is then sidecan be | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 200. | For three vectors and which of the following expression is not equal to any of the remaining three? | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 201. | Let and be vectors forming right-hand tried. Let and . If , then | | | | | | | |
|  | a) | has least value 2 | | | b) | has least value | | |
|  | c) |  | | | d) | None of these | | |
| 202. | Let and be three vectors. A vector in the plane of whose projection at is of magnitude , is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 203. | If vectors and are non-coplanar and and are distinct scalars, then  implies | | | | | | | |
|  | a) |  | | | b) | Roots of the equation are real | | |
|  | c) |  | | | d) |  | | |
| 204. | If and are non zero vectors such that then | | | | | | | |
|  | a) |  | | | b) |  | | |
|  | c) | Least value of is | | | d) | Least value of is | | |
| 205. | Let and be three coplanar vectors with , and . Then is perpendicular to | | | | | | | |
|  | a) |  | b) |  | c) |  | d) | None of these |
| 206. | If , then which of the following may be true? | | | | | | | |
|  | a) | and are necessarily coplanar | | | b) | lies in the plane of and | | |
|  | c) | lies in the plane of and | | | d) | lies in the plane of and | | |
| 207. | If vectors and form a left-handed system, then is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 208. | and are unimodular and coplanar. A unit vector is perpendicular to them. If , and the angle between and is , then is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 209. | A parallelogram is constructed on the vectors and angle between and is , then the length of a diagonal of the parallelogram is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) | None of these |
| 210. | is equal to | | | | | | | |
|  | a) |  | | | b) |  | | |
|  | c) |  | | | d) |  | | |
| 211. | Vectors and satisfying the vector equation and where and are given vectors, are | | | | | | | |
|  | a) |  | | | b) |  | | |
|  | c) |  | | | d) |  | | |
| 212. | and for all then | | | | | | | |
|  | a) | Vector and are perpendicular to each other | | | | | | | |
|  | b) | Vector and are parallel to each other | | | | | | | |
|  | c) | If vector is of length units, then one of the ordered triplet | | | | | | | |
|  | d) | If then is | | | | | | | |
| 213. | If and are unequal unit vectors such that , then angle between and is | | | | | | | |
|  | a) | 0 | b) |  | c) |  | d) |  |
| 214. | If the resultant of three forces and acting on a particle has a magnitude equal to 5 units, then the value of is | | | | | | | |
|  | a) |  | b) |  | c) | 2 | d) | 4 |
| 215. | If in triangle and , where ||, then | | | | | | | |
|  | a) |  | | | b) |  | | |
|  | c) | Projection of on is equal to | | | d) | Projection of on is equal to | | |
| 216. | If the vectors from a triangle, then may be | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 217. | If , then= | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 218. | Unit vectors and are perpendicular, and unit vector is inclined at an angle to both and . If then | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| 219. | If , then | | | | | | | |
|  | a) |  | | | b) |  | | |
|  | c) |  | | | d) |  | | |
| 220. | Let and be three non-zero vectors such that is a unit vector perpendicular to both vectors and . If the angle between and is then is equal to | | | | | | | |
|  | a) | 0 | | | | | | | |
|  | b) | 1 | | | | | | | |
|  | c) |  | | | | | | | |
|  | d) |  | | | | | | | |
| 221. | The vectors and are coplanar for | | | | | | | |
|  | a) | All values of | b) |  | c) |  | d) | None of these |
| 222. | The vector is rotated through an angle and doubled in magnitude. It now becomes . The values of are | | | | | | | |
|  | a) | 1 | b) |  | c) | 2 | d) | 3/4 |
| 223. | If and then is | | | | | | | |
|  | a) | Parallel to | | | b) | Orthogonal to | | |
|  | c) | Orthogonal to | | | d) | Orthogonal to | | |
| 224. | A vector is equally inclined to three vectors and . Let be three vectors in the plane of , respectively. Then | | | | | | | |
|  | a) |  | | | b) |  | | |
|  | c) |  | | | d) | , where | | |
| 225. | If and are two unit vectors perpendicular to each other and then which of the following is (are) true? | | | | | | | |
|  | a) |  | | | b) |  | | |
|  | c) |  | | | d) |  | | |
| 226. | If is perpendicular to we may have | | | | | | | |
|  | a) |  | | | b) |  | | |
|  | c) |  | | | d) |  | | |

|  |  |  |  |
| --- | --- | --- | --- |
| **Assertion - Reasoning Type** | | | |
| This section contain(s) 0 questions numbered 227 to 226. Each question containsstatement 1(Assertion) and statement 2(Reason). Each question has the 4 choices (a), (b), (c) and (d) out of which **only one** is correct. | | | |
|  | a) | Statement 1 is True, Statement 2 is True; Statement 2 **is** correct explanation for Statement 1 | |
|  | b) | Statement 1 is True, Statement 2 is True; Statement 2 **is not** correct explanation for Statement 1 | |
|  | c) | Statement 1 is True, Statement 2 is False | |
|  | d) | Statement 1 is False, Statement 2 is True | |

|  |  |  |  |
| --- | --- | --- | --- |
| 227 | A vector has components and 1 with respect to a rectangular Cartesian system. The axes are rotated through an angle about the origin in the anticlockwise sense | | |
|  | **Statement 1:** | | If the vector has component and I with respect to the new system, then |
|  | **Statement 2:** | | Magnitude of the original vector and the new vector remains the same |

|  |  |  |  |
| --- | --- | --- | --- |
| 228 |  | | |
|  | **Statement 1:** | | If . |
|  | **Statement 2:** | | If is perpendicular to , then . |

|  |  |  |  |
| --- | --- | --- | --- |
| 229 | Let the vectors represent the sides of a regular hexagon. | | |
|  | **Statement 1:** | | Because |
|  | **Statement 2:** | | **II** |

|  |  |  |  |
| --- | --- | --- | --- |
| 230 |  | | |
|  | **Statement 1:** | | If then are perpendicular to each other |
|  | **Statement 2:** | | If the diagonals of a parallelogram are equal in magnitude, then the parallelogram is a rectangle |

|  |  |  |  |
| --- | --- | --- | --- |
| 231 |  | | |
|  | **Statement 1:** | | For the volume of the parallelepiped formed by vectors is maximum |
|  | **Statement 2:** | | The volume of the parallelepiped having three coterminous edges is . |

|  |  |  |  |
| --- | --- | --- | --- |
| 232 |  | | |
|  | **Statement 1:** | | If and are unit vectors inclined at an angle and is a unit vector bisecting the angle between them, then |
|  | **Statement 2:** | | If is an isosceles triangle with , then the vector representing the bisector of angle is given by |

|  |  |  |  |
| --- | --- | --- | --- |
| 233 |  | | |
|  | **Statement 1:** | | If | |
|  | **Statement 2:** | | The length of the diagonals of a rectangle is the same |

|  |  |  |  |
| --- | --- | --- | --- |
| 234 |  | | |
|  | **Statement 1:** | | Let be three points such that and . Then is a tetrahedron |
|  | **Statement 2:** | | Let and be three points such that vectors are non-coplanar. Then is a tetrahedron, where is the origin |

|  |  |  |  |
| --- | --- | --- | --- |
| 235 | Consider three vectors and | | |
|  | **Statement 1:** | |  |
|  | **Statement 2:** | |  |

|  |  |  |  |
| --- | --- | --- | --- |
| 236 | If | | |
|  | **Statement 1:** | | are non-coplanar. |
|  | **Statement 2:** | |  |

|  |  |  |  |
| --- | --- | --- | --- |
| 237 |  | | |
|  | **Statement 1:** | | Distance of point from the plane of points and is |
|  | **Statement 2:** | | Volume of tetrahedron formed by the points and is |

|  |  |  |  |
| --- | --- | --- | --- |
| 238 |  | | |
|  | **Statement 1:** | | and are three mutually perpendicular unit vectors and is a vector such that and are non-coplanar. If then |
|  | **Statement 2:** | | is equally inclined to and |

|  |  |  |  |
| --- | --- | --- | --- |
| 239 |  | | |
|  | **Statement 1:** | | If and , then |
|  | **Statement 2:** | |  |

|  |  |  |  |
| --- | --- | --- | --- |
| 240 |  | | |
|  | **Statement 1:** | | If three point and have position vectors , respectively, and , then the points and must be collinear |
|  | **Statement 2:** | | If for three points ; , then points and must be collinear |

|  |  |  |  |
| --- | --- | --- | --- |
| 241 |  | | |
|  | **Statement 1:** | | If are the direction cosines of any line segment, then |
|  | **Statement 2:** | | If are the direction cosines of a line segment, |

|  |  |  |  |
| --- | --- | --- | --- |
| 242 |  | | |
|  | **Statement 1:** | | If in a  , then the value of is . |
|  | **Statement 2:** | | If in , then |

|  |  |  |  |
| --- | --- | --- | --- |
| 243 |  | | |
|  | **Statement 1:** | | If are coplanar then and are also coplanar. |
|  | **Statement 2:** | | . |

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| --- | --- | --- | --- |
| 244 |  | | |
|  | **Statement 1:** | | *a*re parallel vectors if =9/2 and =2 |
|  | **Statement 2:** | | If are parallel |

|  |  |  |  |
| --- | --- | --- | --- |
| 245 |  | | |
|  | **Statement 1:** | | The direction cosines of one of the angular bisectors of two intersecting lines having direction cosines as are proportional to |
|  | **Statement 2:** | | The angle between the two intersecting lines having direction cosines as and is given by |

|  |  |  |  |
| --- | --- | --- | --- |
| 246 |  | | |
|  | **Statement 1:** | | does not implies that . |
|  | **Statement 2:** | | If then |

|  |  |  |  |
| --- | --- | --- | --- |
| 247 | Let be a non-zero vector satisfying for given non-zero vectors and | | |
|  | **Statement 1:** | |  |
|  | **Statement 2:** | |  |

|  |  |  |  |
| --- | --- | --- | --- |
| 248 |  | | |
|  | **Statement 1:** | | If and are three mutually perpendicular unit vectors, then and may be mutually perpendicular unit vectors |
|  | **Statement 2:** | | Value of determinant and its transpose are the same |

|  |  |  |  |
| --- | --- | --- | --- |
| 249 |  | | |
|  | **Statement 1:** | | If for some non-zero vector are coplanar vectors, then . |
|  | **Statement 2:** | | If are coplanar. |

|  |  |  |  |
| --- | --- | --- | --- |
| 250 |  | | |
|  | **Statement 1:** | | Let and be the position vectors of four points and and . Then points and are coplanar |
|  | **Statement 2:** | | Three non-zero, linearly dependent coinitial vectors coplanar then where and are scalars |

|  |  |  |  |
| --- | --- | --- | --- |
| 251 |  | | |
|  | **Statement 1:** | | Vector is along the bisector of angle between and |
|  | **Statement 2:** | | is equally inclined to and |

|  |  |  |  |
| --- | --- | --- | --- |
| 252 |  | | |
|  | **Statement 1:** | | In |
|  | **Statement 2:** | | If |

|  |  |  |  |
| --- | --- | --- | --- |
| 253 |  | | |
|  | **Statement 1:** | | The identity  Holds for. |
|  | **Statement 2:** | | Which of the following is correct? |

|  |  |  |  |
| --- | --- | --- | --- |
| 254 |  | | |
|  | **Statement 1:** | | If |
|  | **Statement 2:** | |  |

|  |  |  |  |
| --- | --- | --- | --- |
| 255 |  | | |
|  | **Statement 1:** | | If are reciprocal vectors, then |
|  | **Statement 2:** | | If are reciprocal, then . |

|  |  |  |  |
| --- | --- | --- | --- |
| 256 |  | | |
|  | **Statement 1:** | | A component of vector in the direction perpendicular to the direction of vector is |
|  | **Statement 2:** | | A component of vector in the direction of is |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Matrix-Match Type** | | | | | | | | | |
| This section contain(s) 0 question(s). Each question contains Statements given in 2 columns which have to be matched. Statements (A, B, C, D) in **columns I** have to be matched with Statements (p, q, r, s) in **columns II**. | | | | | | | | | |

| 257. |  | | | | | | | | |

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| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Column-I** | | | **Column- II** | | | |
|  | **(A)** | If then angle between and is | | (p) | |  | |
|  | **(B)** | If then angle between and is | | (q) | | Obtuse | |
|  | **(C)** | If then angle between and is | | (r) | |  | |
|  | **(D)** | Angle between and a vector perpendicular to the vector is | | (s) | | acute | |
|  | **CODES :** | | | | | | | |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **A** | **B** | **C** | **D** |  |  |
|  | **a)** | s | r | q | p |  |  |
|  | **b)** | q | s | p | r |  |  |
|  | **c)** | s | p | r | q |  |  |
|  | **d)** | r | q | s | p |  |  |

| 258. | Refer to the following diagram: | | | | | | | | |

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| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Column-I** | | | **Column- II** | | | |
|  | **(A)** | Collinear vectors | | (p) | |  | |
|  | **(B)** | Coinitial vectors | | (q) | |  | |
|  | **(C)** | Equals vectors | | (r) | |  | |
|  | **(D)** | Unlike vectors (same initial point) | | (s) | |  | |
|  | **CODES :** | | | | | | | |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **A** | **B** | **C** | **D** |  |  |
|  | **a)** | P,r,s | q,r,s | p,r | r,s |  |  |
|  | **b)** | q,r | t,s | t,r,s | q,p |  |  |
|  | **c)** | s,t | r | p | s,t |  |  |
|  | **d)** | q,r | t | a,s | t,r |  |  |

| 259. | form the consecutive sides of a regular hexagon | | | | | | | | |

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| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Column-I** | | | **Column- II** | | | |
|  | **(A)** | If | | (p) | |  | |
|  | **(B)** | If | | (q) | |  | |
|  | **(C)** | If | | (r) | |  | |
|  | **(D)** |  | | (s) | |  | |
|  | **CODES :** | | | | | | | |

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| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **A** | **B** | **C** | **D** |  |  |
|  | **a)** | S,t | r | p | s,t |  |  |
|  | **b)** | q,r | p,r | q,s | p |  |  |
|  | **c)** | p,r,s | q,r,s | p,r,d | r,s |  |  |
|  | **d)** | q,r | t,s | t,r,s | q,p |  |  |

| 260. | Given two vectors and | | | | | | | | |

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| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Column-I** | | | **Column- II** | | | |
|  | **(A)** | A vectors coplanar with and | | (p) | |  | |
|  | **(B)** | A vector which is perpendicular to both and | | (q) | |  | |
|  | **(C)** | A vector which is equally inclined to and | | (r) | |  | |
|  | **(D)** | A vector which forms a triangle whit and | | (s) | |  | |
|  | **CODES :** | | | | | | | |

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| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **A** | **B** | **C** | **D** |  |  |
|  | **a)** | P,r | q | p,q,s | p |  |  |
|  | **b)** | q | p,q,s | p | p,r |  |  |
|  | **c)** | p | p,r | q | p,q,s |  |  |
|  | **d)** | p,q,s | p | p,r | p,q |  |  |

| 261. | If and then observes the following lists | | | | | | | | |

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|  | **Column-I** | | | **Column- II** | | | |
|  | **(A)** |  | | (p) | |  | |
|  | **(B)** |  | | (q) | |  | |
|  | **(C)** |  | | (r) | |  | |
|  | **(D)** |  | | (s) | | 2 | |
|  |  |  | | (t) | |  | |
|  |  |  | | (u) | | 4 | |
|  | **CODES :** | | | | | | | |

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| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **A** | **B** | **C** | **D** |  |  |
|  | **a)** | c | a | b | f |  |  |
|  | **b)** | c | a | f | e |  |  |
|  | **c)** | a | c | b | f |  |  |
|  | **d)** | a | c | f | d |  |  |

| 262. | Volume of parallelepiped formed by vectors and is 36 sq. units | | | | | | | | |

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| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Column-I** | | | **Column- II** | | | |
|  | **(A)** | Volume of parallelepiped formed by vectors and is | | (p) | | 0 sq. units | |
|  | **(B)** | Volume of tetrahedron formed by vectors and is | | (q) | | 12 sq. units | |
|  | **(C)** | Volume of parallelepiped formed by vectorsand is | | (r) | | 6sq. units | |
|  | **(D)** | Volume of parallelepiped formed by vectorsand is | | (s) | | 1 sq. units | |
|  | **CODES :** | | | | | | | |

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| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **A** | **B** | **C** | **D** |  |  |
|  | **a)** | r | s | q | p |  |  |
|  | **b)** | s | r | p | q |  |  |
|  | **c)** | p | q | r | s |  |  |
|  | **d)** | q | p | s | r |  |  |

| 263. | Given two vectors and | | | | | | | | |

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|  | **Column-I** | | | **Column- II** | | | |
|  | **(A)** | Area of triangle formed by and | | (p) | | 3 | |
|  | **(B)** | Area of parallelogram having sides and | | (q) | |  | |
|  | **(C)** | Area of parallelogram having diagonals and | | (r) | |  | |
|  | **(D)** | Volume of parallelepiped formed by and | | (s) | |  | |
|  | **CODES :** | | | | | | | |

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| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **A** | **B** | **C** | **D** |  |  |
|  | **a)** | p | q | r | s |  |  |
|  | **b)** | q | s | p | r |  |  |
|  | **c)** | r | p | s | q |  |  |
|  | **d)** | s | r | q | p |  |  |

| 264. |  | | | | | | | | |

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|  | **Column-I** | | | **Column- II** | | | |
|  | **(A)** | If , angle between each pair of vectors is and , then is equal to | | (p) | | 3 | |
|  | **(B)** | If is perpendicular to is perpendicular tois perpendicular and , then is equal to | | (q) | | 2 | |
|  | **(C)** | and then is equal to | | (r) | | 4 | |
|  | **(D)** | If and then is equal to | | (s) | | 5 | |
|  | **CODES :** | | | | | | | |

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| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **A** | **B** | **C** | **D** |  |  |
|  | **a)** | p | q | r | s |  |  |
|  | **b)** | s | r | q | p |  |  |
|  | **c)** | q | s | p | r |  |  |
|  | **d)** | r | p | s | q |  |  |

| 265. |  | | | | | | | | |

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|  | **Column-I** | | | **Column- II** | | | |
|  | **(A)** | If and are three mutually perpendicular vectors where then [ is | | (p) | |  | |
|  | **(B)** | If and are two unit vectors inclined at , then is | | (q) | | 0 | |
|  | **(C)** | If and are orthogonal unit vectors and , then is | | (r) | | 16 | |
|  | **(D)** | If []=[]=[]=0, each vector being a non-zero vector, then [] is | | (s) | | 1 | |
|  | **CODES :** | | | | | | | |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **A** | **B** | **C** | **D** |  |  |
|  | **a)** | p | q | r | s |  |  |
|  | **b)** | r | p | s | q |  |  |
|  | **c)** | q | s | p | r |  |  |
|  | **d)** | s | r | q | p |  |  |

| 266. |  | | | | | | | | |

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|  | **Column-I** | | | **Column- II** | | | |
|  | **(A)** | The possible value of if and are not consistent, where and are scalars, is | | (p) | |  | |
|  | **(B)** | The angle between vectors and is acute, whereas vector makes an obtuse angle with the axes of coordinates. Then may be | | (q) | |  | |
|  | **(C)** | The possible value of such that and 3 are coplanar is | | (r) | | 2 | |
|  | **(D)** | If and is perpendicular to , then |2|is | | (s) | | 3 | |
|  | **CODES :** | | | | | | | |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **A** | **B** | **C** | **D** |  |  |
|  | **a)** | P,q,r,s | p,q | p,r | r |  |  |
|  | **b)** | p,q | p,r | r | p,q,r,s |  |  |
|  | **c)** | p,r | p,q,r,s | p,q | r |  |  |
|  | **d)** | r | p,r | p,q,r,s | p,q |  |  |

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| **Linked Comprehension Type**  This section contain(s) 26 paragraph(s) and based upon each paragraph, multiple choice questions have to be answered. Each question has atleast 4 choices (a), (b), (c) and (d) out of which **only one** is correct.  **Paragraph for Question Nos. 267 to -267** | | | | | | | | |
| The vertices of a triangle ABC are A≡2,0,2, B≡(-1,1,1) and C≡(1,-2, 4). The points D and E divide the sides AB and CA in the ratio 1 : 2 respectively. Another point F is taken in space such that perpendicular drawn from F on ∆ABC, meets the triangle at the point of intersection of the line segment CD and BE, say P. If the distance from the plane of the ∆ABC is 2 unit, then On the basis of above information, answer the following questions : | | | | |

| 267. | The position vector of is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| **Paragraph for Question Nos. 268 to - 268** | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Let A be the given point whose position vector relative to an origin O be a and ON=n. Let r be the position vector of any point P which lies on the plane and passing through A and perpendicular to ON. Then for any point P on the planeAP∙n=0⇒ r∙a ∙n=0 ⇒ r∙n=a∙n⇒ r∙n=PWhere P is perpendicular distance of the plane from origin.On the basis of above information, answer the following questions : | | | | |

| 268. | The equation of the plane through the point and parallel to the plane is | | | | | | | |
|  | a) |  | | | b) |  | | |
|  | c) |  | | | d) |  | | |
| **Paragraph for Question Nos. 269 to - 269** | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Let a,b,c be three vectors such that a=b=c=4 and angle between a and b is π/3, angle between b and c is π/3 and angle between c and a is π/3.On the basis of above information, answer the following questions : | | | | |

| 269. | The volume of the parallelopiped whose adjacent edges are represented by the vectors , is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| **Paragraph for Question Nos. 270 to - 270** | | | | | | | | |

|  |  |  |  |  |
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| ABCD is a parallelogram. L is a point on BC which divides BC in the ratio 1:2 AL intresects BD at P.M is a point on DC which divides DC in the ratio 1:2 And AM intresects BD in Q | | | | |

| 270. | Point divides in the ratio | | | | | | | |
|  | a) | 1:2 | b) | 1:3 | c) | 3:1 | d) | 2:1 |
| **Paragraph for Question Nos. 271 to - 271** | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Let OABCD be a pentagon in which the sides OA and CB are parallel and the sides OD and AB are parallel. Also OA:CB=2:1 and OD:AB=1:3 | | | | |

| 271. | The ratio | | | | | | | |
|  | a) | 3/4 | b) | 1/3 | c) | 2/5 | d) | 1/2 |
| **Paragraph for Question Nos. 272 to - 272** | | | | | | | | |

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| --- | --- | --- | --- | --- |
| Consider the regular hexagon ABCDEF with centre at O (origin) | | | | |

| 272. | is equal to | | | | | | | |
|  | a) |  | b) |  | c) |  | d) | None of these |
| **Paragraph for Question Nos. 273 to - 273** | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Let u,vand w be three unit vectors such that u+v+w=a,u×v×w=b,u×v×w=c,a∙u=32,a∙v=7/4 and a=2 | | | | |

| 273. | Vector is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| **Paragraph for Question Nos. 274 to - 274** | | | | | | | | |

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| Vectorsx,yand z each of magnitude 2, make an angle of 60° with each other.x×y×z=a,y×z×x=band x×y=c | | | | |

| 274. | Vector is | | | | | | | |
|  | a) |  | | | b) |  | | |
|  | c) |  | | | d) |  | | |
| **Paragraph for Question Nos. 275 to - 275** | | | | | | | | |

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| --- | --- | --- | --- | --- |
| If x×y=a,y×z=b,x∙b=γ,x∙y=1and y∙z=1 | | | | |

| 275. | Vectors is | | | | | | | |
|  | a) |  | | | b) |  | | |
|  | c) |  | | | d) | None of these | | |
| **Paragraph for Question Nos. 276 to - 276** | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Given two orthogonal vectors AandB each of length unity. Let P be the vector satisfying the equation P×B=A-P. Then | | | | |

| 276. | is equal to | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| **Paragraph for Question Nos. 277 to - 277** | | | | | | | | |

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| --- | --- | --- | --- | --- |
| Let a=2i+3j-6k,b=2i-3j+6k and c=-2i+3j+6k.Leta1be the projection of aon band a2 be the projection of a1 on c. Then | | | | |

| 277. | is equal to | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| **Paragraph for Question Nos. 278 to - 278** | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Consider a triangular pyramid ABCD the position vectors of whose angular point are A(3,0,1),B(-1,4,1),C(5,2,3)and D(0,-5,4). Let G be the point of intersection of the medians of triangle BCD | | | | |

| 278. | The length of vector is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) |  |
| **Paragraph for Question Nos. 279 to - 279** | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Vertices of a parallelogram taken in order are A2,-1,4;B1,0-1;C(1,2,3) and D | | | | |

| 279. | The distance between the parallel lines and is | | | | | | | |
|  | a) |  | b) |  | c) |  | d) | 3 |
| **Paragraph for Question Nos. 280 to - 280** | | | | | | | | |

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| Let r be a position vector of a variable point in Cartesion OXY plane such that r.(10j-8i-r)=40 and p1=max{r+2i-3j2},p2=min{r+2i-3j2}. A tangent line is drawn to the curve y=8/x2 at point A with abscissa 2. The drawn line cuts the x-axis at a point B | | | | |

| 280. | is equal to | | | | | | | |
|  | a) | 9 | b) |  | c) |  | d) |  |
| **Paragraph for Question Nos. 281 to - 281** | | | | | | | | |

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| --- | --- | --- | --- | --- |
| AB, AC and AD are three adjacent edges of a parallelepiped. The diagonal of the parallelepiped passing through A and directed away from it is vector a. The vector area of the faces containing vertices A, B, C and A, B, D are b and c, respectively, i.e., AB×AC=b and AD×AB=c. The projection of each edge AB and AC on diagonal vector a is a3 | | | | |

| 281. | Vector is | | | | | | | |
|  | a) |  | | | b) |  | | |
|  | c) |  | | | d) | None of these | | |

**Integer Answer Type**

| 282. | Given that and . Then find the greatest integer less than or equal to | | | | | | | |
| 283. | Find the least positive integral value of for the angle between vectors and is acute | | | | | | | |
| 284. | If and  , then find the value of | | | | | | | |
| 285. | Let and are unit vectors such that and . Find the value of | | | | | | | |
| 286. | If vectors are coplanar, then find the value of | | | | | | | |
| 287. | Find the value of if the volumes of a tetrahedron whose vertices are with position vectors and 7 is 11 cubic unit | | | | | | | |
| 288. | Let are unit vectors such that . If the area of triangle formed by vectors is , then what is the value of ? | | | | | | | |
| 289. | If are unit vectors such that and the between and is , then find the value of | | | | | | | |
| 290. | Let and , where and are non-collinear points. Let denote the area of quadrilateral , and let denote the area of parallelogram with and as adjacent sides. If then find | | | | | | | |
| 291. | Let be a vector on rectangular coordinate system with sloping angle . Suppose that is geometric mean of and , where is the unit vector along -axis. Then find value of | | | | | | | |
| 292. | If the resultant of three forces acting on a particle has a magnitude equal to 5 units, then what is difference in the values of | | | | | | | |
| 293. | Let be a triangle whose centroid is . Orthocentre is and circumcentre is the origin .If is any point in the plane of the triangle such that no three of and are collinear satisfying the relation If , then what is the value of the scalar | | | | | | | |
| 294. | Let a three-dimensional vector satisfies the condition, If , then find the value of | | | | | | | |
| 295. | If and are any two unit vectors, then find the greatest positive integer in the range of | | | | | | | |
| 296. | Find the absolute value of parameter for which the area of the triangle whose vertices are and is minimum | | | | | | | |
| 297. | Let and . Find the value of , such that | | | | | | | |
| 298. | If are two non-zero and non-collinear vectors satisfying where are three distinct real numbers, then find the value of | | | | | | | |
| 299. | Vectors along the adjacent sides of parallelogram are and . Find the length of the longer diagonal of the parallelogram | | | | | | | |
| 300. | Find the work done by the force acting on a particle such that the particle is displaced from point to point | | | | | | | |

**ACTIVE SITE TUTORIALS**

**Date :** 07-09-2019 **TEST ID: 615**

**Time :** 17:15:00 **MATHEMATICS**

**Marks :** 1040

10.VECTOR ALGEBRA

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| **: ANSWER KEY :** |

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

**ACTIVE SITE TUTORIALS**

**Date :** 07-09-2019 **TEST ID: 615**

**Time :** 17:15:00 **MATHEMATICS**

**Marks :** 1040

10.VECTOR ALGEBRA

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| **: HINTS AND SOLUTIONS :** |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | **(a)**  Let  Hence | | | | | | | |
| 2 | **(a)**  and are unit coplanar vectors, and are also coplanar vectors, being linear combination of and  Thus, | | | | | | | |
| 3 | **(a)**  Points and are coplanar. Therefore  Now | | | | | | | |
| 4 | **(a)** | | | | | | | |
| 5 | **(d)**  Therefore, the angle between and is acute  The longer diagonal is given by  Now, | | | | | | | | |
| 6 | **(d)**  Given that are non-coplanar. Therefore,  Also ,  (i)  Now, | | | | | | | |
| 7 | **(b)**  Given (by triangle law). Therefore,  Similarly by taking cross product with we get | | | | | | | |
| 8 | **(a)**  Also, ( | | | | | | | |
| 9 | **(a)**  , where | | | | | | | |
| 10 | **(a)**  We have where is the midpoint of  ( in the ratio 2:1 ) | | | | | | | |
| 11 | **(b)**  Let  is equally inclined to and where | | | | | | | |
| 12 | **(d)**    Let , therefore  , the midpoint of is  , the midpoint of , is  Therefore, the midpoint of is  Similarly the midpoint of is , i.e., | | | | | | | |
| 13 | **(a)**  Given,  (where is origin)    Now,  is parallel to the plane | | | | | | | |
| 14 | **(a)**  Let P.V. of and be and , respectively, and be the circumcentre of equilateral triangle . Then  Now  Similarly,  and  as | | | | | | | |
| 15 | **(c)**  is a vector perpendicular to the plane containing and . Similarly, is a vector perpendicular to the plane containing and  Thus, the two planes will be parallel if their normals, i.e., and are parallel | | | | | | | |
| 16 | **(a)**  Let be the origin.  So, | | | | | | | |
| 17 | **(a)**  As is coplanar with and , we take  Where and are scalars  As is perpendicular to , using (i), we get,  Thus, | | | | | | | |
| 18 | **(c)**  moves on | | | | | | | |
| 19 | **(b)**  Let  Since and are mutually perpendicular vectors, if makes angles with and respectively, then  Similarly | | | | | | | |
| 20 | **(d)**  and trisect each other as L.H.S is the position vector of a point trisecting an , anc R.H.S. that of and | | | | | | | |
| 21 | **(c)**  The given relation can be rewritten as the vector expression  The least value of is 12 | | | | | | | |
| 22 | **(b)**  Similarly,  and, ( | | | | | | | |
| 23 | **(a)**  (using ) | | | | | | | |
| 24 | **(d)**  Putting value of in Eq. (i)  Again, putting the value of in Eq. (i) | | | | | | | |
| 25 | **(d)**  Volume of parallelepiped | | | | | | | |
| 26 | **(b)**  The point that divides and in the ratio of  Also,    Square both sides  or | | | | | | | |
| 27 | **(c)**  Given vectors will be coplanar, if | | | | | | | |
| 28 | **(c)**  vectors and are coplanar  and are collinear | | | | | | | |
| 29 | **(c)**  is the angle between and ) | | | | | | | |
| 30 | **(b)**  Since is isosceles  Hence the internal bisector is perpendicular to and is the miodpoint of and | | | | | | | |
| 31 | **(a)**  Let  Also ,  and | | | | | | | |
| 32 | **(a)**  We have,  Similarly, and | | | | | | | |
| 33 | **(d)**  We must have . Therefore,  If (not acceptable)  For | | | | | | | |
| 34 | **(c)**  Let the required vector be such that  We must have (as and are unit vectors and is equally inclined to and )  Now  Also , | | | | | | | |
| 35 | **(c)**  and | | | | | | | | |
| 36 | **(c)**  The given equation reduces to | | | | | | | |
| 37 | **(d)** | | | | | | | |
| 38 | **(c)**  Angle between and is | | | | | | | |
| 39 | **(d)**  Or  Or  Or  and  and  Or perpendicular to both and | | | | | | | |
| 40 | **(b)**  Taking cross with  Also  Similarly on taking cross product of Eq. (i), we find | | | | | | | |
| 41 | **(b)**  Let the required vector be Then and  Now,  where | | | | | | | |
| 42 | **(c)**  The position vector of the point with respect to itself is | | | | | | | |
| 43 | **(b)**  Let and , then and  Since and are coplanar, then  ( can be written as a linear combination of )  i.e.,  Given  From (i) and (ii), | | | | | | | |
| 44 | **(d)**  are coplanar  No other conclusion can be derives from it | | | | | | | |
| 45 | **(c)**  Let the projection be , then | | | | | | | |
| 46 | **(d)** | | | | | | | |
| 47 | **(b)**  Given  Similarly,  **Alternate**: Since, are unit vectors and  so represent an equilateral triangle. | | | | | | | |
| 48 | **(b)**  Similarly ,  and  Let . Therefore | | | | | | | |
| 49 | **(d)** | | | | | | | |
| 50 | **(d)**  Let . Then  and are coplanar, which is a contradiction  Therefore, | | | | | | | |
| 51 | **(b)**  Let the given position vectors be of points and , respectively. Then  ||=  ||=  Hence, is an equilateral triangle | | | | | | | |
| 52 | **(c)** | | | | | | | |
| 53 | **(b)**  As and are three mutually perpendicular vectors of same magnitude, so let us consider  Also let  Given that satisfies the equation  (i)  Now  Similarly,  and  Substituting these values in the equation, we get | | | | | | | |
| 54 | **(a)**  Given, | | | | | | | |
| 55 | **(a)** | | | | | | | |
| 56 | **(c)**  is a unit vector if and only if | | | | | | | |
| 57 | **(a)**  Let  Since, The projection of  When,  When, | | | | | | | |
| 58 | **(d)**  and | | | | | | | |
| 59 | **(b)**  (i)  and (ii)  (putting | | | | | | | |
| 60 | **(a)**  The position vector of any point at is  Hence, the required unit tangent vector at is ) | | | | | | | |
| 61 | **(c)**    Let  Then from  Let be the angle between and  Now  Denominator of (i)  Now  Denominator of (i)= | | | | | | | |
| 62 | **(a)**  Area of    Now  Substituting the value in (i) | | | | | | | |
| 63 | **(d)** | | | | | | | |
| 64 | **(c)**  Consider a tertrahedron with vertices and  Its volume  Now centroides of the faces and are and , respectively  , ,  Volume of tetrahedron be centroids | | | | | | | |
| 65 | **(c)**  Thus, | | | | | | | |
| 66 | **(d)**  so that unit vector perpendicular to the plane of and is  Similarly, the other two unit vectors are and  The required volume | | | | | | | |
| 67 | **(c)**  Clearly, | | | | | | | |
| 68 | **(c)**  Given  From (i),  From (ii),  From (iii) and (iv),  Since is not parallel to  From (v), and =0  From (iii), | | | | | | | |
| 69 | **(b)**  A vector perpendicular to the plane of and is  Now for any point in the plane of and is | | | | | | | |
| 70 | **(c)**  Let angle between and be and be and and beθ  Since,  So, and  and  and are coplanar vector so option (A) and (B) are incorrect.  Let  As  ∙  Which is a contradiction so option (c) is correct.  Let option (d) is correct    Which is a contradiction so option (d) is incorrect.  **Alternate** Option (c) and (d) may be observed from given in figure. | | | | | | | |
| 71 | **(b)**  We have  (i)  Also  (ii)  Now  and  Angle between and , i.e., (iii)  From (i) and (ii),and .Therefore | | | | | | | |
| 72 | **(d)**  Which is true for all values of and | | | | | | | |
| 73 | **(b)**  Also | | | | | | | |
| 74 | **(a)**  Given that and are vectors such that  is the plane determined by vectors and . Therefore, normal vectors to will be given by  Similarly, is the plane determined by vectors and . Therefore, normal vectors to will be given by  Substituting the values of and in (i), we get  Hence,  Hence, the planes will also be parallel to each other  Thus angle between the planes = 0 | | | | | | | |
| 76 | **(c)**  Any vector can be represented in terms of three non-coplanar vectors and as  Taking dot product with and , respectively, we have,  From (i)  Area of | | | | | | | |
| 77 | **(c)**  Given    Now and so on  Hence  Hence if | | | | | | | |
| 78 | **(a)**  A vector perpendicular to the plane of and is  Now,  Therefore, is parallel to  Hence | | | | | | | |
| 79 | **(a)**  (as | | | | | | | |
| 80 | **(c)**  Given that and are non-coplanar  Again  and are perpendicular | | | | | | | |
| 81 | **(d)**    Hence  or | | | | | | | |
| 82 | **(b)**  Since,  and  Since is the greatest angle. Therefore, | | | | | | | |
| 83 | **(a)**  Let  Where (i)  ( being a unit vector)  or (ii)  Or  Or [using (ii)]  Or (iii)  From (i), (ii) and (iii), we have | | | | | | | |
| 84 | **(c)**  Let  and | | | | | | | |
| 85 | **(c)**  Adding (i) and (ii) we get  Now and asand as well as and are mutually perpendicular  Hence, | | | | | | | |
| 86 | **(d)**  Let  Then  Area of the base of the parallelepiped  Height of the parallelepiped=length of projection of on    Volume of the parallelepiped | | | | | | | |
| 87 | **(d)** | | | | | | | |
| 88 | **(d)**  The angle between and is obtuse. Therefore,  (i)  The angle between and the - is acute and less than . Therefore,  or (ii)  Clearly, (i) and (ii) cannot hold together | | | | | | | |
| 89 | **(b)**  Here | | | | | | | |
| 90 | **(a)**  Let the incentre be at the origin and be and . Then  Incentre is , where and  Incentre is at the origin. Therefore, | | | | | | | |
| 91 | **(b)**  (i)  We have, and  Also given  Given and , using these we get  Substituting values of and in (i), we get | | | | | | | |
| 92 | **(b)**  and are unit vectors  Now  Also,  From (i) and (ii),  Therefore, does not exceed 9 | | | | | | | |
| 93 | **(c)**    Triangles on the same base and between the same parallel will have the same area | | | | | | | |
| 94 | **(a)**  Three points are collinear if | | | | | | | |
| 95 | **(b)** | | | | | | | |
| 96 | **(c)**  and | | | | | | | |
| 97 | **(a)** | | | | | | | |
| 98 | **(c)**  and cannot be coplanar | | | | | | | |
| 99 | **(d)**  ||  (where is the angle between and)  But therefore | | | | | | | |
| 100 | **(c)**  is perpendicular to The triangle is right angled | | | | | | | |
| 101 | **(b)**  If then  Therefore, the two vectors are for infinite values of ‘’ | | | | | | | |
| 102 | **(c)** | | | | | | | |
| 103 | **(d)**  Volume of the parallelepiped formed by ’ and ’ is 4  Therefore, the volume of the parallelepiped formed by and is  Length of altitude | | | | | | | |
| 104 | **(a)**  A vector bisecting the angle between  Required vector | | | | | | | |
| 105 | **(d)**  Solving we get | | | | | | | |
| 106 | **(b)** | | | | | | | |
| 107 | **(c)**  maximum vlue of is | | | | | | | |
| 108 | **(b)**    Let P.V. of and be and , respectively.Therefore | | | | | | | |
| 109 | **(c)**  Volume of parallelopiped,  Put  Which shows is maximum at | | | | | | | |
| 110 | **(c)** | | | | | | | |
| 111 | **(a)**  Four or more than four non-zero vectors are always linearly dependent | | | | | | | |
| 112 | **(a)** | | | | | | | |
| 113 | **(a)**  is centroid | | | | | | | |
| 114 | **(c)**  Then  is non-zero)  are coplanar | | | | | | | |
| 115 | **(a)**  and | | | | | | | |
| 116 | **(a)**  and  Now, | | | | | | | |
| 117 | **(c)**  If This equality must hold for any arbitrary | | | | | | | |
| 118 | **(a)**  A vector coplanar with and and perpendicular to is  But  Now (Given)  Hence the required vector is or | | | | | | | |
| 119 | **(d)**  Given that and are linearly dependent  Also given that  Substituting the value of we get | | | | | | | |
| 120 | **(c)**    Let | | | | | | | |
| 121 | **(a)**  Let  Given :  Again,  Again  Hence, | | | | | | | |
| 122 | **(b)**    from the diagram, it is obvious that locus is a cone concentric with the positive -axis having vertex at the origin and the slant height equal to the magnitude of the vector | | | | | | | |
| 123 | **(a)**  l  is not parallel to and their magnitude are equal.  Quadrilateral must be a parallelogram, which is neither a rhombus nor a rectangle. | | | | | | | |
| 124 | **(b)**  =  Similarly,  Hence, are mutually orthogonal vectors. | | | | | | | |
| 125 | **(c)**  Since are linearly independent,  Hence, is right angled | | | | | | | |
| 126 | **(b)**  Taking dot product of with and , respectively, we have  At least one of and  Hence and are coplanar | | | | | | | |
| 127 | **(d)**  For minimum value  Let and are anti parallel so  So | | | | | | | |
| 128 | **(c)**  One of and should be an obtuse angle | | | | | | | |
| 129 | **(b)**  Taking dot product with and , we have  Squaring both sides, we get  Now (for real value of | | | | | | | |
| 130 | **(a)** | | | | | | | |
| 131 | **(c)**  Using, | | | | | | | |
| 132 | **(c)**  Volume of the required parallelepiped | | | | | | | |
| 133 | **(b)**  Let . Therefore  [  Hence, [] | | | | | | | |
| 134 | **(a)**  As are non-collinear vectors, vectors are linearly independent  Therefore, the triangle is equilateral | | | | | | | |
| 135 | **(c)** | | | | | | | |
| 136 | **(c)**    Let , respectively  Then P.V. of  Also P.V. of =+  And P.V. of | | | | | | | |
| 137 | **(c)**  We have | | | | | | | |
| 138 | **(a)**  Also  Also | | | | | | | |
| 139 | **(a)**  Since  Since and are non-coplanar  and  (because and are unit vectors)  Or | | | | | | | |
| 140 | **(a)**  The volume of the parallelepiped with coterminous edges as is given by    Thus, the required volume of the parallelopiped | | | | | | | |
| 141 | **(c)**  If then  and  and | | | | | | | |
| 142 | **(c)**  Suppose the bisector of angle meets at . Then divides in the ratio  So, P.V. of  But | | | | | | | |
| 143 | **(b)**  ||=2|| | | | | | | | |
| 144 | **(c)**  Given  and  Now,  So | | | | | | | |
| 145 | **(b)** | | | | | | | |
| 146 | **(d)** | | | | | | | |
| 147 | **(a)**    Point lies on (i)  Now from the diagram, according to the given conditions,  or (ii)  Solving (i) and (ii), we get and  Hence point has position vector | | | | | | | |
| 148 | **(b)**  Let be the new position. Then  Also  Also, | | | | | | | |
| 149 | **(b)**  Note that | | | | | | | |
| 150 | **(d)** | | | | | | | |
| 151 | **(d)**  and | | | | | | | |
| 152 | **(b)**  Since , we have  Or  Or  Or | | | | | | | |
| 153 | **(d)**  When | | | | | | | |
| 154 | **(b)**  Vector in the direction of angular bisector of  Unit vector in this direction is    From the figure, position vector of is  Now in triangle  Hence unit vector along the bisector is | | | | | | | |
| 155 | **(a)**  Let the origin of reference be the circumcentre of the triangle  Let and  Then (circumeadius)  Again    Therefore, the P.V. of is . Since is the midpoint of , we have  . But therefore | | | | | | | |
| 156 | **(b)**    Length of | | | | | | | |
| 157 | **(c)** | | | | | | | |
| 158 | **(a)**  Differentiate the curve  at (1,0) is  Unit vector  Again normal vector of magnitude | | | | | | | |
| 159 | **(a)**  Let and be the direction cosines of the required vector  Then, (given). Therefore  Required vector (i)  Now,  Since, is perpendicular to  (ii)  From (i)and (ii), we get:  Hence, required vector | | | | | | | |
| 160 | **(b)**  any two of and c are zero | | | | | | | |
| 161 | **(a)**  and are distinct negative number and vectors are coplanar  are in G.P  So is the G.M. of and | | | | | | | |
| 162 | **(b,d)**  Since makes on obtuse angle with the -axis, its -component is negative  But ( orthogonal)  Now, . Therefore,  not possible as  Now, if  is the third quadrant. Also, is meaningful. If then and | | | | | | | |
| 163 | **(b,c,d)**  Obviously, is a vector in the plane of and and hence perpendicular to  . It is also equally inclined to and as it is along angle bisector | | | | | | | |
| 164 | **(a,b,c)**  Consider    Using the sine law, | | | | | | | |
| 165 | **(a,b)**  Also | | | | | | | |
| 166 | **(a,b)**  Let and    Then and  Since  Solving these, we get  and  and  and | | | | | | | |
| 167 | **(a,c)**  We have where and are unit vectors. Therefore,  Now,  (where )  Also,  is also correct | | | | | | | |
| 168 | **(a,c)**  We have, and . Therefore  and |  Clearly,  Hence, the triangle is right-angled isosceles triangle | | | | | | | |
| 169 | **(a,c)**  Now, Therefore,  But sin | | | | | | | |
| 170 | **(b,d)**  Since and are equally inclined to must be of the from  Now  Also,  Other two vectors cannot be written in the form | | | | | | | |
| 171 | **(b)**  We know that if is perpendicular to as well as , then  As and represent two vectors in opposite directions, we have two possible values of | | | | | | | |
| 172 | **(b,c)**  We have,  On rotation, let be the vector with components and 1 so that  Now  or | | | | | | | |
| 173 | **(b,d)**  Also | | | | | | | |
| 174 | **(a,b,d)**  i.e.,  since and are linearly independent  i.e.,  i.e., | | | | | | | |
| 175 | **(a,b)**  We have,  Now ,  or | | | | | | | |
| 176 | **(a,b,c,d)**  Since, and are collinear.  On comparing  and  For  and  Option (a) is correct.  For ,  and  Option (b) is correct.  For ,  and  Option (c) is correct.  and for  and  Option (d) is correct. | | | | | | | |
| 177 | **(a,c)**  ….(i)  On putting the values of and, in Eq. (i) and then compare. Then, we get | | | | | | | |
| 178 | **(a,b,c,d)**  From (i) and (ii),  If , then Therefore,  and | | | | | | | |
| 179 | **(a,b,c)**  For coplanar vectors, | | | | | | | |
| 180 | **(b,c)** | | | | | | | |
| 181 | **(b,d)**  Let and  Let required vector  are coplanar  Also, and are perpendicular  Options and are correct | | | | | | | |
| 182 | **(a,b,c,d)**  and are coplanar  We have determinant of their coefficients as  Applying and , we have  Hence | | | | | | | |
| 183 | **(a,d)**  We have,  Now,    Also, | | | | | | | |
| 184 | **(b,d)**  Similarly, and  Since we want the minimum value of  The minimum value of is | | | | | | | |
| 185 | **(a,c,d)** | | | | | | | |
| 186 | **(b,d)**  either and are collinear is perpendicular to both and ) | | | | | | | |
| 187 | **(a,c)**  Dot product of two vectors gives a scalar quantity | | | | | | | |
| 188 | **(a,b,d)**  Points and are collinear  Now  Vector must be collinear  and | | | | | | | |
| 189 | **(a,b,c)**  We have,  projection of on    Now, in  Also, | | | | | | | |
| 190 | **(a,d)**  Let and  Then the diagonals of the parallelogram are  i.e.,  So, unit vectors along the diagonals are | | | | | | | |
| 191 | **(a,c,d)**  Let . Then  Let  Let . Then | | | | | | | |
| 192 | **(a,b,c,d)**  Since and are non-coplnar  **(**sinc**e** )  and  Thus, , where is the parameter | | | | | | | |
| 193 | **(a,c)**  Taking cross with in the first equation, we get  and  Also | | | | | | | | |
| 194 | **(a,c)**  We have  Any vector in the plane of and is  Given that the magnitude of projection of on is  or  Therefore, the required vector is either or | | | | | | | |
| 195 | **(a,c)**  Here  Similarly, | | | | | | | |
| 196 | **(c,d)**  Since and are coplanar vectors  Further, since is equally inclined to and | | | | | | | |
| 197 | **(c,d)**  Let in the plane  Let . Therefore,  can take a value equal to and 2 | | | | | | | |
| 198 | **(b,c)**  and  and | | | | | | | |
| 200 | **(c)**  But | | | | | | | |
| 201 | **(a,c)**  We have[. Therefore,  **a**. (using A.M. G.M)  **b**. Similarly, use A.MG.M | | | | | | | |
| 202 | **(a,c)**  Let  Or ...(i)  Projection of on is .  or  Putting in Eq. (i), we get  Or | | | | | | | |
| 203 | **(a,b,d)**  when and are non-coplanar  Therefore,  Obviously, is satisfied by due due to (i)  which is true | | | | | | | |
| 204 | **(a,d)**  (using A.M. G.M.) | | | | | | | |
| 205 | **(a,b,c)**  It is given that and are coplanar vectors. Therefore,  is perpendicular to and | | | | | | | |
| 206 | **(b,c,d)**  Either or must lie in the plane of and | | | | | | | |
| 207 | **(b,d)**  For and to form a left-handed system  (i) is satisfied by options (b) and (d) | | | | | | | |
| 208 | **(a,b)**  Given,  [and are coplanar]  or  From (i), | | | | | | | |
| 209 | **(b,c)**  Since,  Then,    , similarly | | | | | | | |
| 210 | **(a,b,c)**  Let and  We know that  Similarly, other parts can be obtained | | | | | | | |
| 211 | **(b,c)**  We have  (given  Also  (using (i) and  and  From (ii) and (iii) | | | | | | | |
| 212 | **(a,b,c,d)**  and | | | | | | | |
| 213 | **(b,d)**  either or  either or  either or | | | | | | | |
| 214 | **(b,c)**  Let be the resultant  Then  Given, . Therefore, | | | | | | | |
| 215 | **(a,b,c)** | | | | | | | |
| 216 | **(a,b,d)** | | | | | | | |
| 217 | **(a,b,c)**  We know that then  Given  Hence or or | | | | | | | |
| 218 | **(a,b,c,d)**  Since and are unit vectors inclined at an angle  and  Now  Similarly, by taking dot product on both sides of (i) by , we get  Again,  But | | | | | | | |
| 219 | **(a,c,d)**  Or  Or  Or  Or (  Or | | | | | | | |
| 220 | **(c)**  We are given that  Then  since is to and is to | | | | | | | |
| 221 | **(a,c)**  Since, vectors and are coplanar.  Applying | | | | | | | |
| 222 | **(b,c)**  Let  Given, | | | | | | | |
| 223 | **(a,b,c,d)**  Clearly this vector is parallel to  It is orthogonal to as  It is orthogonal to  As  Also it is orthogonal to | | | | | | | |
| 224 | **(a,d)**  and  Since  Therefore, and are coplanar vectors  Further since is equally inclined to and , we have | | | | | | | |
| 225 | **(a,d)**  Given  and  From (i)  and  Hence | | | | | | | |
| 226 | **(a,c)**  and (  We have been given Therefore  or | | | | | | | |
| 227 | **(a)**  Hence a is the correct option | | | | | | | |
| 228 | **(c)**  We have, ...(i)  and ...(ii)  [from Eqs. (i) and (ii) ]  are parallel. | | | | | | | |
| 229 | **(c)**  Since, is not parallel to,    is resultant of , and , vectors.    But for statement II, we have  Which is not possible as is not parallel to  Hence, statement I is true and statement II is false | | | | | | | |
| 230 | **(a)**  are the diagonals of a parallelogram whose sides are  Diagonals of the parallelogram have the same length  The parallelogram is a rectangle | | | | | | | |
| 231 | **(d)**  (say)  is maximum at . | | | | | | | |
| 232 | **(d)**  We know that the unit vector along bisector of unit vector where is the angle between vectors  Hence statement 1 is false, however statement 2 is true | | | | | | | |
| 233 | **(a)**  We have adjacent sides of triangle |  The length of the diagonal is |  Since it satisfies the Pythagoras theorem,  Hence the parallelogram is a rectangle  Hence length of the other diagonal is | | | | | | | |
| 234 | **(a)**  Given vectors are non-coplanar. Hence the answer is (A) | | | | | | | |
| 235 | **(a)**  Statement 2 is true  Also, () | | | | | | | |
| 236 | **(c)**  Since, | | | | | | | |
| 237 | **(d)**  and  Volume of tetrahedron is  Also, the area of the triangle is  Then (distance of from base )area of triangle )  Distance of from base | | | | | | | |
| 238 | **(b)**  Let  (because and are three mutually perpendicular unit vectors)  Similarly,  Hence statement 1 and Statement 2 are correct, but Statement 2 does not explain Statement 1 as it does not give the value of dot products | | | | | | | |
| 239 | **(d)**  Now, | | | | | | | |
| 240 | **(a)**  must be parallel since there is a common point . The points and must be collinear | | | | | | | |
| 241 | **(b)**  Obviously, statement 1 is true  Hence, Statement 2 is true but does not explain Statement 1 as it is result derived using the result in the statement | | | | | | | |
| 242 | **(b)**  Now,  Also, if  Then, | | | | | | | |
| 243 | **(c)**  are coplanar.  and then  Hence, and are also coplanar. | | | | | | | |
| 244 | **(a)**  Thus, both the statements are true and Statement 2 is the correct explanation for statement for Statement 1 | | | | | | | |
| 245 | **(b)**    We know that vector in the direction of angular bisector of unit vectors  Where  Thus unit vector along the bisector is  Hence statement 1 is true  Also, in triangle ABD, by cosine rule  Hence, Statement 2 is true but does not explain Statement 1 | | | | | | | |
| 246 | **(b)**  If then,  Now,  and  But it is true that if does not implies that | | | | | | | |
| 247 | **(b)**  only if and are coplanar  Hence, statement 2 is true  Also, [ even if []  Hence, Statement 2 is not the correct explanation for Statement 1 | | | | | | | |
| 248 | **(a)**  Let the three given unit vectors be and . Since they are mutually perpendicular . Therefore,  Hence, and may be mutually perpendicular | | | | | | | |
| 249 | **(b)**  We have,  are coplanar vectors.  Also,  Also,  Hence, are coplanar. | | | | | | | |
| 250 | **(a)**  Therefore are linearly dependent. Hence by Statement 2 Statement 1 is true | | | | | | | |
| 251 | **(b)**  A vector along the bisector is  Hence is along the bisector. It is obvious that makes an equal angle with and . However, statement 2 does not explain Statement 1, as a vector equally inclined to given two vectors is not necessarily coplanar | | | | | | | |
| 252 | **(c)**  In  is the triangle law of addition  Hence, Statement 1 is true and Statement 2 is false | | | | | | | |
| 253 | **(a)**  Given,  Now,  Similarly, |  Hence, both A and R are true and (R) is correct reason for (A). | | | | | | | |
| 254 | **(c)**  Which is possible only when | | | | | | | |
| 255 | **(a)**  If are reciprocal then,  and | | | | | | | |
| 256 | **(c)**  Component of vector in the direction of is or . Then component in the direction perpendicular to the direction of is | | | | | | | |
| 257 | **(b)**  **a**.  Or  Hence, angle between and is obtuse  **b**.  or  or  Hence, angle between and is acute  **c**.  Hence, is perpendicular to  **d**. lies in the plane of vectors and  A vector perpendicular to this plane is parallel to  Hence, angle is | | | | | | | |
| 258 | **(a)**    (i)  =2 (ii)  (because is parallel to BC and twice its length)  (iii)  (iv)  (v)  (vi)  (vii) | | | | | | | |
| 259 | **(b)**    (i)  =2 (ii)  (because is parallel to BC and twice its length)  (iii)  (iv)  (v)  (vi)  (vii) | | | | | | | |
| 260 | **(a)**  **a**. Vector and are coplanar with and  **b**.  **c**. If is equally inclined to and , then we must have  which is true for vectors in options  **d**. Vector is forming a triangle with and . Then | | | | | | | |
| 261 | **(b)** | | | | | | | |
| 262 | **(a)**  Or  Volume of tetrahedron formed by vectors  and is  and are coplanar | | | | | | | |
| 263 | **(d)**  **a**.  Hence, the area of the triangle is  **b**. The area of the parallelogram is  **c**. The area of a parallelogram whose diagonals are and is  **d**. Volume of the parallelepiped | | | | | | | |
| 264 | **(c)**  **a**.  **b**. is perpendicular to  (i)  I perpendicular to  (ii)  is perpendicular to  (iii)  From (i), (ii) and (iii), we get  **c**.  **d**. We know that  and | | | | | | | |
| 265 | **(b)**  **a**. If and are mutually perpendicular, then  **b**. Given and are two unit vectors, i.e., and angle between them is  Now  **c**. It and are orthogonal  Also, it is given that . Now  (because is a unit vector)  **d**.  therefore and are coplanar (i)  Therefore, and are coplanar (ii)  Also,  Therefore, and are coplanar (iii)  From (i), (ii) and (iii),  and are coplanar. Therefore, | | | | | | | |
| 266 | **(a)**  **a**. Given equations are consistent if  and  **b**.  Angle between  Or  Or  Also makes on obtuse angle with the axes. Therefore,  (ii)  Combining these two, we get  **c**. If vectors and are coplanar, then  Or  Or  Or  **d**.  Now Therefore,  Or  Or  Or  Or | | | | | | | |
| 267 | **(b)**  The vector equations of and are  ...(i)  and ….(ii)  The intersection point of .    and  Substituting the value of in Eq. (ii), we get | | | | | | | |
| 268 | **(d)**  The equation of the plane parallel to the given plane  ...(i)  This plane passes through .  Therefore,  Hence, required plane is | | | | | | | |
| 269 | **(c)**  …..(i)  Now,  From Eq. (i)  Volume of the parallelepiped | | | | | | | |
| 270 | **(c)**    Let and divides in the ratio  Then  Also  From (i) and (ii),  Hence, divides in the ratio 3:1 and divides in the ratio 3:1  Similarly divides in the ratio 1:3  Thus and | | | | | | | |
| 271 | **(c)**  Let the position vectors of and and be and , respectively  Then  (i)  and  Let  Now, divides in the ratio . Therefore,  P.V. of  X also divides in the ratio  P.V. of (iv)  From (iii) and (iv), we get  Hence | | | | | | | |
| 272 | **(c)**  Consider the regular hexagon with centre at (origin) | | | | | | | |
| 273 | **(b)**  Taking dot product of with , we have  (i)  Similarly, taking dot product with we have  (ii)  Also,  Again, taking dot product with we have  (iii)  Adding (i), (ii) and (iii), we have  (iv)  Subtracting (i), (ii) and (iii) from (iv), we have  and  Now, the equation and ( can be written as ( and (  and | | | | | | | |
| 274 | **(d)**  Given that ||| and they are inclined at an angle of with each other  (i)  Similarly, (ii)  (from (i)and (ii))(iii)  Now,  (iv)  (v)  Now, (i)  Similarly, (ii)  Also (i) and (ii) (vi)  Also(  And  Thus from (v), we have 2 or  and | | | | | | | |
| 275 | **(b)**  Given  (i)  (ii)  (iii)  (iv)  (v)  From (ii),  From (i) and (ii)  (vi)  Also from (i), we get  Also from (ii),( | | | | | | | |
| 276 | **(b)**  and | and is given  Now  (taking cross product with on the sides )  Taking dot product with on both sides of (i), we get  Now  are dependent  Also  And | | | | | | | |
| 277 | **(b)** | | | | | | | |
| 278 | **(b)**  Point is . Therefore,  Or    Area of  The length of the perpendicular from the vertex on the opposite face  Projection of on | | | | | | | |
| 279 | **(c)**  Let point be  or  or  or | | | | | | | |
| 280 | **(d)**  Let  , which is a circle centre , radius  Let be . Then  Slope  Equation of | | | | | | | |
| 281 | **(a)**  (i)    (ii)  (iii)  From (i), (ii) and (iii), we get  Now from (ii) and(iii), we get and as | | | | | | | |
| 282 | **(6)**  Let  (given)  So (i)  (ii)  (iii)  Solving, we get | | | | | | | |
| 283 | **(2)**  Let be the adjacent sides of the parallelogram now angle between is acute    Hence the least positive integral value is 2 | | | | | | | |
| 284 | **(7)**  L.H.S. | | | | | | | |
| 285 | **(1)**  Given, and  Now, | | | | | | | |
| 286 | **(9)**  Vector are coplanar | | | | | | | |
| 287 | **(7)**  Let the vertices be and be the origin  Volume of tetrahedron  Or  Or | | | | | | | |
| 288 | **(3)**  Given,  Now vector is along the diagonal of the parallelogram which has adjacent side vector . Since is also a unit vector, triangle formed by vectors is an equilateral triangle  Then, area of triangle is | | | | | | | |
| 289 | **(1)**  Now | | | | | | | |
| 290 | **(6)**  Here  Area of parallelogram with and as adjacent sides  (i)    Area of quadrilateral  Area of Area of  Or [From Eq. (i)] | | | | | | | |
| 291 | **(1)**  Since angle between and is , we have  Given that are in G.P., so  Squaring both sides,  Or  Or | | | | | | | |
| 292 | **(6)**  Let be the resultant  Then  Given , therefore | | | | | | | |
| 293 | **(2)**  L.H.S | | | | | | | |
| 294 | **(6)**  (i)  Or  Or  Or  Or  ( is the angle between and )  Or  Or (ii)  From Eq. (i), we have  Or  Or  Or  Or  Or  Or | | | | | | | |
| 295 | **(5)**  Let angle between and be  We have  Now and  Consider | | | | | | | |
| 296 | **(2)**  Area of  Let  At  So is minimum at | | | | | | | |
| 297 | **(4)**  Or  Or  Or  Or and are not collinear)  Or  Or | | | | | | | |
| 298 | **(9)**  Since and are non-collinear vectors, therefore and are non-coplanar vectors  Coefficient of each vector and is zero  The above three equations will satisfy if the coefficients of and are zero because and are three distinct real numbers  or ,  or and | | | | | | | |
| 299 | **(7)**  Vectors along the sides are  Clearly the vector along the longer diagonal is  Hence length of the longer diagonal is | | | | | | | |
| 300 | **(9)**  Here  of of  Let be the displacement vector  Now work done | | | | | | | |