kd education academy (9582701166)

Time : 6 Hour | STD 11 Maths | Total Marks : 241

kd 90+ ch- 11 3-D geometry

*** Choose the right answer from the given options. [1 Marks Each]** **[103]**

1. The ratio in which the plane 2x + 3y - 2z + 7 = 0 divides the line segment joining the points (-1, 1, 3), (2, 3, 5) is:

   (A) 3 : 5 (B) 7 : 5 (C) 9 : 11 (D) 1 : 5 externally

2. If A = (2, -3, 1), B = (3, -4, 6) and C is a point of trisection of AB, then C_y =

   (A) $\frac{11}{3}$ (B) -11 (C) $\frac{10}{3}$ (D) $\frac{-11}{3}$

3. The plane XOZ divides the join of (1, -1, 5) and (2, 3, 4) in the ratio $\lambda : 1$ then λ is:

   (A) -3 (B) $\frac{-1}{3}$ (C) 3 (D) $\frac{1}{3}$

4. A point C with position vector $\frac{3a+4b-5c}{3}$ (where a, b and c are non co-planar vectors) divides the line joining A and B in the ratio 2 : 1. If the position vector of A is a - 2b + 3c, then the position vector of B is:

   (A) 2a + 3b - 4c (B) 2a - 3b + 4c (C) 2a + 3b + 4c (D) a + 3b - 4c

5. The plane. ax + by + cz + (-3) = 0 meet the co-ordinate axes in A, B, C. The centroid of the triangle is:

   (A) $(3a, 3b, 3c)$ (B) $\left(\frac{3}{a}, \frac{3}{b}, \frac{3}{c}\right)$ (C) $\left(\frac{a}{3}, \frac{b}{3}, \frac{c}{3}\right)$ (D) $\left(\frac{1}{a}, \frac{1}{b}, \frac{1}{c}\right)$

6. D(2, 1, 0), E(2, 0, 0), F(0, 1, 0) are mid point of the sides BC, CA, AB of ΔABC respectively, The the centroid of ΔABC is:

   (A) $\left(\frac{1}{3}, \frac{1}{3}, \frac{1}{3}\right)$ (B) $\left(\frac{4}{3}, \frac{2}{3}, 0\right)$ (C) $\left(-\frac{1}{3}, \frac{1}{3}, \frac{1}{3}\right)$ (D) $\left(\frac{2}{3}, \frac{1}{3}, \frac{1}{3}\right)$

7. The plane XOZ divides the join of (1, -1, 5) and (2, 3, 4) in the ratio $\lambda : 1$ then λ is:

   (A) -3 (B) $\frac{1}{4}$ (C) 3 (D) $\frac{1}{3}$

8. The image of the point P(1, 3, 4) in the plane 2x - y + z = 0 is:

   (A) (-3, 5, 2) (B) (3, 5, 2) (C) (3, -5, 2) (D) (3, 5, -2)

9. Which octant do the point (-5, 4, 3) lie:

   (A) Octant I (B) Octant II (C) Octant III (D) Octant IV

10. The points (5, 2, 4), (6, -1, 2) and (8, -7, k) are collinear, if k is equal to:

    (A) -2 (B) 2 (C) 3 (D) -1

11. XOZ-plane divides the join of (2, 3, 1) and (6, 7, 1) in the ratio

    (A) 3 : 7 (B) 2 : 7 (C) -3 : 7 (D) -2 : 7

12. Choose the correct answer.

If a parallelopiped is formed by planes drawn through the points (5, 8, 10) and (3, 6, 8) parallel to the coordinate planes, then the length of diagonal of the parallelopiped is:

(A) $2\sqrt{3}$ (B) $3\sqrt{2}$ (C) $\sqrt{2}$ (D) $\sqrt{3}$

13. If the zx-plane divides the line segment joining (1, -1, 5) and (2, 3, 4) in the ratio p : 1 then p + 1 =

(A) $\frac{1}{3}$ (B) $1:3$ (C) $\frac{3}{4}$ (D) $\frac{4}{3}$

14. L is the foot of the perpendicular drawn from a point P(3, 4, 5) on the xy-plane. The coordinates of point L are:

(A) (3, 0, 0) (B) (0, 4, 5) (C) (3, 0, 5) (D) None of these

15. Choose the correct answer.
L is the foot of the perpendicular drawn from a point P(3, 4, 5) on the xy-plane. The coordinates of point L are:

(A) (3, 0, 0). (B) (0, 4, 5). (C) (3, 0, 5). (D) None of these.

16. Find the ratio in which 2x + 3y + 5z = 1 divides the line joining the points (1, 0, -3) and (1, -5, 7):

(A) 1 : 2 (B) 2 : 1 (C) 3 : 2 (D) 2 : 3

17. Three vertices of a parallelogram ABCD are A(1, 2, 3), B(-1, -2, -1) and C(2, 3, 2). Find the fourth vertex D:

(A) (-4, -7, -6) (B) (4, 7, 6) (C) (4, 7, -6) (D) None of these

18. If G is centroid of $\triangle \mathrm{ABC}$ then:

(A) $\vec{G}=\vec{a}+\vec{b}+\vec{c}$ (B) $\vec{G}=\frac{\vec{a}+\vec{b}+\vec{c}}{2}$ (C) $3\vec{G}=\vec{a}+\vec{b}+\vec{c}$ (D) $3\vec{G}=\frac{\vec{a}+\vec{b}+\vec{c}}{2}$

19. What is the distance between the points (2, -1, 3) and (-2, 1, 3):

(A) $2\sqrt{5}$ units (B) 25 units (C) $4\sqrt{5}$ units (D) $\sqrt{5}$ units

20. The distance of the point P(a, b, c) from the x-axis is:

(A) $\sqrt{(\mathrm{a}^2+\mathrm{c}^2)}$ (B) $\sqrt{(\mathrm{a}^2+\mathrm{b}^2)}$ (C) $\sqrt{(\mathrm{b}^2+\mathrm{c}^2)}$ (D) None of these

21. If $\alpha, \beta, \mathrm{y}$ are the angles made by a half ray of a line respectively with positive directions of X-axis, Y-axis and, Z-axis, then $\sin^2\alpha+\sin^2\beta+\sin^2\mathrm{y}=$

(A) 1 (B) 0 (C) -1 (D) None of these

22. Find the image of (-2, 3, 4) in the y z plane:

(A) (-2, 3, 4) (B) (2, 3, 4) (C) (-2, -3, 4) (D) (-2, -3, -4)

23. What is the length of foot of perpendicular drawn from the point P(3, 4, 5) on y-axis:

(A) $\sqrt{41}$ (B) $\sqrt{34}$ (C) 5 (D) None of these

24. The coordinates of a point which divides the line joining the points P(2, 3, 1) and Q(5, 0, 4) in the ratio 1 : 2 are:

(A) $\left(\frac{7}{3}, 1, \frac{5}{3}\right)$ (B) (4, 1, 3) (C) (3, 2, 2) (D) (1, -1, 1)

25. Point A is a + 2b, and a divides AB in the ratio 2 : 3. The position vector of B is:

(A) 2a - b (B) b - 2a (C) a - 3b (D) b

26. G(1, 1, -2) is the centroid of the triangle ABC and D is the mid point of BC. If A = (-1, 1, -4) D=

(A) $\left(\frac{1}{2}, 1, \frac{-5}{2}\right)$ (B) (5, 1, 2) (C) (-5, -1, -2) (D) (2, 1, -1)

27. If the plane 7x + 11y + 13z = 3003 meets the axes in A, B, C then the centroid of $\Delta \mathrm{ABC}$ is:

(A) (143, 91, 77) (B) (143, 77, 91) (C) (91, 143, 77) (D) (143, 66, 91)

28. Graph $x^2 + y^2 = 4$ in 3D looks like:

(A) Circle (B) Cylinder (C) Hemisphere (D) Sphere

29. Find the distance between (12, 3, 4) and (4, 5, 2):

(A) $\sqrt{72}$ (B) $\sqrt{62}$ (C) $\sqrt{64}$ (D) None of these

30. The ratio in which yz-plane divides the line segment joining (-3, 4, 2), (2, 1, 3) is:

(A) -4 : 1 (B) 3 : 2 (C) -2 : 3 (D) 1: 4

31. The perpendicular distance of the point P(3, 3, 4) from the x-axis is

(A) $3\sqrt{2}$ (B) 5 (C) 3 (D) 4

32. The vector equation of a sphere having centre at origin and radius 5 is:

(A) $|\mathrm{r}| = 5$ (B) $|\mathrm{r}| = 25$ (C) $|\mathrm{r}| = \sqrt{5}$ (D) None of these

33. If A = (1, 2, 3), B = (2, 3, 4) and AB is produced upto C such that 2AB = BC then C =

(A) (5, 4, 6) (B) (6, 2, 4) (C) (4, 5, 6) (D) (6, 4, 5)

34. If the distance between the points (a, 0, 1) and (0, 1, 2) is $\sqrt{27}$ then the value of a is:

(A) 5 (B) ± 5 (C) -5 (D) None of these

35. The ratio in which the line joining the points (1, 2, 3) and (-3, 4, -5) is divided by the xy-plane is:

(A) 2 : 5 (B) 3 : 5 (C) 5 : 2 (D) 5 : 3

36. A = (1, 1, 4) and B = (5, -3, 4) are two points. If the points P, Q are on the line AB such that AP = PQ = QB then PQ =

(A) $2\sqrt{2}$ (B) 4 (C) $\sqrt{\frac{32}{9}}$ (D) $\sqrt{2}$

37. The points (-5, 12), (-2, -3), (9, -10), (6, 5) taken in order, form:

(A) Parallelogram (B) Rectangle (C) Rhombus (D) Square

38. In a three dimensional space the equation $x^2 - 5x + 6 = 0$ represents

(A) Points. (B) Planes.

(C) Curves. (D) Pair of straight lines.

39. The cartesian equation of the line is 3x + 1 = 6y - 2 = 1 - z then its direction ratio are:

(A) $\frac{1}{3}, \frac{1}{6}, 1$ (B) $\frac{-1}{3}, \frac{1}{6}, 1$ (C) $\frac{1}{3}, \frac{-1}{6}, 1$ (D) $\frac{1}{3}, \frac{1}{6}, -1$

40. A plane intersects the co ordinate axes at A, B, C. If O = (0, 0, 0) and (1, 1, 1) is the centroid of the tetrahedron OABC, then the sum of the reciprocals of the intercepts of the plane:

(A) 12 (B) $\frac{4}{3}$ (C) 1 (D) $\frac{3}{4}$

41. Find the distance between the points whose position vectors are given as follows: $4\hat{i} + 3\hat{j} - 6\hat{k}, -2\hat{i} + \hat{j} - \hat{k}$

(A) $\sqrt{65}$ (B) $\sqrt{69}$ (C) 1 (D) None of these

42. If the line joining A(1, 3, 4) and B is divided by the point (-2, 3, 5) in the ratio 1 : 3, then B is:

(A) (-11, 3, 8) (B) (-11, 3, -8) (C) (-8, 12, 20) (D) (13, 6, -13)

43. A = (1, -1, 2) and B = (2, 3, 7) are two points. If P, O divide AB in the ratios 2 : 3, -2 : 3 respectively then $P_x + Q_y$ =

(A) $\frac{-38}{5}$ (B) $\frac{38}{5}$ (C) $\frac{-2}{5}$ (D) $\frac{-47}{6}$

44. If the extremities of the diagonal of a square are (1, -2, 3 and (2, -3, 5), then the length of the side is

(A) $\sqrt{6}$ (B) $\sqrt{3}$ (C) $\sqrt{5}$ (D) $\sqrt{7}$

45. In three dimensions, the coordinate axes of a rectangular cartesian coordinate system are:

(A) Three mutually parallel lines

(B) Three mutually perpendicular lines

(C) Two mutually perpendicular lines and any two parallel

(D) None of these

46. An equation of sphere with centre at origin and radius r can be represented as:

(A) $x^2 + y^2 + z^2 = r$ (B) $x^2 + y^2 + z^2 = r^2$

(C) $x^2 + y^2 + z^2 = 2r^2$ (D) None of the above

47. The position vectors of the four angular point of a tetrahedron OABC are (0, 0, 0), (0, 0, 2), (0, 4, 0) and (6, 0, 0) respectively. Find the coordinates of cenroid:

(A) $\left(2, \frac{4}{3}, \frac{2}{3}\right)$ (B) $\left(\frac{6}{4}, 1, \frac{2}{4}\right)$ (C) (0, 0, 0) (D) None of these

48. The perpendicular distance of the point P(6, 7, 8) from xy-plane is

(A) 8 (B) 7 (C) 6 (D) 10

49. Area of quadrilateral whose vertices are (2, 3), (3, 4), (4, 5) and (5, 6), is equal to:

(A) 0 (B) 4 (C) 6 (D) None of these

50. The point A(1, -1, 3), B(2, -4, 5) and C(5, -13, 11) are:

(A) Collinear (B) Non-collinear

(C) Do not say anything (D) None of these

51. Let $\mathrm{P}(\mathrm{x}, \mathrm{y}, \mathrm{z})$ be a point in the first octant, whose projection in the xy-plane is the point Q. Let $\mathrm{OP}=\gamma$; the angle between OQ and the positive x-axis be θ; and the angle between OP and the positive z-axis be ϕ, where O is the origin. Then the distance of P from the x-axis is :

(A) $\gamma\sqrt{1-\sin^2\phi\cos^2\theta}$ (B) $\gamma\sqrt{1+\cos^2\theta\sin^2\phi}$

(C) $\gamma\sqrt{1-\sin^2\theta\cos^2\phi}$ (D) $\gamma\sqrt{1+\cos^2\phi\sin^2\theta}$

52. The co-ordinates axes are rotated through an angle 135^o. If the coordinates of a point P in the new system are known to be $(4, -3)$, then the coordinates of P in the original system are

(A) $\left(\frac{1}{\sqrt{2}}, \frac{7}{\sqrt{2}}\right)$ (B) $\left(\frac{1}{\sqrt{2}}, \frac{-7}{\sqrt{2}}\right)$ (C) $\left(\frac{-1}{\sqrt{2}}, \frac{-7}{\sqrt{2}}\right)$ (D) $\left(\frac{-1}{\sqrt{2}}, \frac{7}{\sqrt{2}}\right)$

53. Two fixed points are $A(a, 0)$ and $B(-a, 0)$. If $\angle A - \angle B = \theta$, then the locus of point C of triangle ABC will be

(A) $x^2+y^2+2xy\tan\theta=a^2$ (B) $x^2-y^2+2xy\tan\theta=a^2$

(C) $x^2+y^2+2xy\cot\theta=a^2$ (D) $x^2-y^2+2xy\cot\theta=a^2$

54. Without changing the direction of coordinate axes, origin is transferred to (h, k), so that the linear (one degree) terms in the equation $x^2+y^2-4x+6y-7$ =0 are eliminated. Then the point (h, k) is

(A) $(3, 2)$ (B) $(-3, 2)$ (C) $(2, -3)$ (D) None of these

55. The mid points of three sides of a triangle are $(1, 2)$; $(-1, 1)$ and $(0, 3)$. Area of this triangle will be (in sq. units)⁻

(A) 2 (B) 3 (C) 4 (D) 6

56. Number of values of λ for which the points given by $(\lambda+1, 1), (2\lambda+1, 3)$ & $(2\lambda+2, 2\lambda)$ are collinear, is-

(A) 0 (B) 1 (C) 2 (D) 4

57. Area of the triangle formed by points $(102,-4),(105,-2)$ and $(103,-3)$ -

(A) 1 (B) 2 (C) 0.5 (D) 0.25

58. If the vertices of a triangle be $(0,0)$, $(6,0)$ and $(6,8)$ then its incentre will be

(A) $(2,1)$ (B) $(1,2)$ (C) $(4,2)$ (D) $(2,4)$

59. Coordinates of the orthocentre of the triangle whose sides are $x=3$, $y=4$ and $3x+4y=6$ is

(A) $(0,0)$ (B) $(3,0)$ (C) $(0,4)$ (D) $(3,4)$

60. The incentre of triangle formed by the lines $x=0$, $y=0$ and $3x+4y=12$ is

(A) $\left(\frac{1}{2}, \frac{1}{2}\right)$ (B) $(1,1)$ (C) $\left(1, \frac{1}{2}\right)$ (D) $\left(\frac{11}{2}, 1\right)$

61. The orthocentre of the triangle formed by $(0,0)$, $(8,0)$, (46) is

(A) $\left(4, \frac{8}{3}\right)$ (B) $(3,4)$ (C) $(4,3)$ (D) $(-3,4)$

62. The circumcentre of a triangle formed by the line $xy+2x+2y+4=0$ and $x+y+2=0$ is

(A) $(-1,-1)$ (B) $(0,-1)$ (C) $(1,1)$ (D) $(-1,0)$

63. Orthocentre of the triangle whose vertices are $(0,0)$ $(3,0)$ and $(0,4)$ is

(A) $(0,0)$ (B) $(1,1)$ (C) $(2,2)$ (D) $(3,3)$

64. The incentre of a triangle with vertices $(7,1)$ $(-1,5)$ and $(3+2\sqrt{3}, 3+4\sqrt{3})$ is

(A) $\left(3+\frac{2}{\sqrt{3}}, 3+\frac{4}{\sqrt{3}}\right)$ (B) $\left(1+\frac{2}{3\sqrt{3}}, 1+\frac{4}{3\sqrt{3}}\right)$

(C) $(7,1)$ (D) None of these

65. If the points $(x+1, 2)$, $(1, x+2)$, $\left(\frac{1}{x+1}, \frac{2}{x+1}\right)$ are collinear, then x is

(A) 4 (B) 0 (C) -4 (D) (b) and (c) both

66. $P(2,1)$, $Q(4,-1)$, $R(3,2)$ are the vertices of triangle and if through P and R lines parallel to opposite sides are drawn to intersect in S, then the area of $PQRS$ is

(A) 6 (B) 4 (C) 8 (D) 12

67. The equations of the sides of a triangle are $x+y-5=0$; $x-y+1=0$ and $y-1=0$, then the coordinates of the circumcentre are

(A) $(2,1)$ (B) $(1,2)$ (C) $(2,-2)$ (D) $(1,-2)$

68. The incentre of the triangle formed by $(0,0)$, $(5,12)$, $(16,12)$ is

(A) $(7,9)$ (B) $(9,7)$ (C) $(-9,7)$ (D) $(-7,9)$

69. Circumcenter of the triangle formed by the line $y=x$, $y=2x$ and $y=3x+4$ is

(A) $(6,8)$ (B) $(6,-8)$ (C) $(3,4)$ (D) $(-3,-4)$

70. $P(3,1)$, $Q(6,5)$ and $R(x,y)$ are three points such that the angle PRQ is a right angle and the area of the $\Delta RPQ = 5$, then the number of such points R is

(A) 0 (B) 1 (C) 2 (D) 4

71. In a $\triangle ABC$, the angle bisector BD of $\angle B$ intersects AC in D. Suppose $BC = 2, CD = 1$ and $BD = \frac{3}{\sqrt{2}}$. The perimeter of the $\triangle ABC$ is

(A) $\frac{17}{2}$ (B) $\frac{15}{2}$ (C) $\frac{17}{4}$ (D) $\frac{15}{4}$

72. In a triangle $ABC, \angle BAC = 90^\circ; AD$ is the altitude from A on to BC. Draw DE perpendicular to AC and DF perpendicular to AB. Suppose $AB = 15$ and $BC = 25$. Then the length of EF is

(A) 12 (B) 10 (C) $5\sqrt{3}$ (D) $5\sqrt{5}$

73. Let ABC be an equilateral triangle with side length a. Let R and r denote the radii of the circumcircle and the incircle of triangle ABC respectively. Then, as a function of a, the ratio $\frac{R}{r}$

(A) strictly increases

(B) strictly decreases

(C) remains constant

(D) strictly increases for $a < 1$ and strictly decrease for $a > 1$

74. If coordinates of the points A and B are $(2,4)$ and $(4,2)$ respectively and point M is such that $A - M - B$ also $AB = 3\,AM$, then the coordinates of M are

(A) $\left(\frac{8}{3}, \frac{10}{3}\right)$ (B) $\left(\frac{10}{3}, \frac{14}{4}\right)$ (C) $\left(\frac{10}{3}, \frac{6}{3}\right)$ (D) $\left(\frac{13}{4}, \frac{10}{4}\right)$

75. What is the equation of the locus of a point which moves such that 4 times its distance from the x-axis is the square of its distance from the origin

(A) $x^2 + y^2 - 4y = 0$ (B) $x^2 + y^2 - 4|y| = 0$ (C) $x^2 + y^2 - 4x = 0$ (D) $x^2 + y^2 - 4|x| = 0$

76. If the equation of the locus of a point equidistant from the points (a_1, b_1) and (a_2, b_2) is $(a_1 - a_2)x + (b_1 - b_2)y + c = 0$, then the value of c is

(A) $a_1^2 - a_2^2 + b_1^2 - b_2^2$ (B) $\sqrt{a_1^2 + b_1^2 - a_2^2 - b_2^2}$

(C) $\frac{1}{2}(a_1^2 + a_2^2 + b_1^2 + b_2^2)$ (D) $\frac{1}{2}(a_2^2 + b_2^2 - a_1^2 - b_1^2)$

77. The locus of the moving point P, such that $2PA = 3PB$ where A is $(0,0)$ and B is $(4,-3)$, is

(A) $5x^2 - 5y^2 - 72x + 54y + 225 = 0$ (B) $5x^2 - 5y^2 + 72x + 54y + 225 = 0$

(C) $5x^2 + 5y^2 + 72x + 54y + 225 = 0$ (D) $5x^2 + 5y^2 - 72x + 54y + 225 = 0$

78. The equation of the locus of all points equidistant from the point $(4,2)$ and the x-axis, is

(A) $x^2 + 8x + 4y - 20 = 0$ (B) $x^2 - 8x - 4y + 20 = 0$

(C) $y^2 - 4y - 8x + 20 = 0$ (D) None of these

79. A point moves in such a way that the sum of square of its distance from the points $A(2,0)$ and $B(-2,0)$ is always equal to the square of the distance between A and B. The locus of the point is

(A) $x^2+y^2-2=0$ (B) $x^2+y^2+2=0$ (C) $x^2+y^2+4=0$ (D) $x^2+y^2-4=0$

80. If the coordinates of a point be given by the equation $x=a(1-\cos\theta),\ y=a\sin\theta$, then the locus of the point will be

(A) A straight line (B) A circle (C) A parabola (D) An ellipse

81. The locus of a point P which moves in such a way that the segment OP, where O is the origin, has slope $\sqrt{3}$ is

(A) $x-\sqrt{3}y=0$ (B) $x+\sqrt{3}y=0$ (C) $\sqrt{3}x+y=0$ (D) $\sqrt{3}x-y=0$

82. The points $(1,1)$, $(0,\sec^2\theta)$, $(\operatorname{cosec}^2\theta,0)$ are collinear for

(A) $\theta=\frac{n\pi}{2}$ (B) $\theta\neq\frac{n\pi}{2}$ (C) $\theta=n\pi$ (D) None of these

83. If $A(at^2,\,2at)$, $B(a/t^2,\,-2a/t)$ and $C(a,\,0)$, then $2a$ is equal to

(A) $A.M.$ of CA and CB (B) $G.M.$ of CA and CB

(C) $H.M.$ of CA and CB (D) None of these

84. Point of intersection of the diagonals of square is at origin and coordinate axis are drawn along the diagonals. If the side is of length a, then one which is not the vertex of square is

(A) $(a\sqrt{2},0)$ (B) $\left(0,\frac{a}{\sqrt{2}}\right)$ (C) $\left(\frac{a}{\sqrt{2}},0\right)$ (D) $\left(-\frac{a}{\sqrt{2}},0\right)$

85. Two vertices of a triangle are $(4,-3)$ and $(-2,5)$. If the orthocentre of the triangle is at $(1,2)$, then the third vertex is

(A) $(-33,-26)$ (B) $(33,26)$ (C) $(26,33)$ (D) None of these

86. The coordinates of the points A,B,C are (x_1,y_1), (x_2,y_2), $(x_3,\,y_3)$ and D divides the line AB in the ratio $l:k$. If P divides the line DC in the ratio $m:k+l$, then the coordinates of P are

(A) $\left(\begin{matrix}\frac{kx_1+lx_2+mx_3}{k+l+m}, \\ \frac{ky_1+ly_2+my_3}{k+l+m}\end{matrix}\right)$ (B) $\left(\begin{matrix}\frac{lx_1+mx_2+kx_3}{l+m+k}, \\ \frac{ly_1+my_2+ky_3}{l+m+k}\end{matrix}\right)$ (C) $\left(\begin{matrix}\frac{mx_1+kx_2+lx_3}{m+k+l}, \\ \frac{my_1+ky_2+ly_3}{m+k+l}\end{matrix}\right)$ (D) None of these

87. Let $A(h,k)$, $B(1,1)$ and $C(2,1)$ be the vertices of a right angled triangle with AC as its hypotenuse. If the area of the triangle is 1 square unit, then the set of values which $'k'$ can take is given by

(A) $-1,3$ (B) $-3,-2$ (C) $1,3$ (D) $0,2$

88. Let $A(2,-3)$ and $B(-2,1)$ be vertices of a triangle $ABC.$ If the centroid of this triangle moves on the line $2x+3y=1$, then the locus of the vertex C is the line

(A) $3x-2y=3$ (B) $2x-3y=7$ (C) $3x+2y=5$ (D) $2x+3y=9$

89. Locus of centroid of the triangle whose vertices are $(a\cos t, a\sin t)$, $(b\sin t, -b\cos t)$ and $(1,0)$, where t is a parameter; is

(A) $(3x-1)^2+(3y)^2=a^2-b^2$ (B) $(3x-1)^2+(3y)^2=a^2+b^2$

(C) $(3x+1)^2+(3y)^2=a^2+b^2$ (D) $(3x+1)^2+(3y)^2=a^2-b^2$

90. The locus of the mid-point of the distance between the axes of the variable line $x\cos\alpha+y\sin\alpha=p$, where p is constant, is

(A) $x^2+y^2=4p^2$ (B) $\frac{1}{x^2}+\frac{1}{y^2}=\frac{4}{p^2}$ (C) $x^2+y^2=\frac{4}{p^2}$ (D) $\frac{1}{x^2}+\frac{1}{y^2}=\frac{2}{p^2}$

91. To remove xy term from the second degree equation $5x^2+8xy+5y^2+3x+2y+5=0$, the coordinates axes are rotated through an angle θ, then θ equals:-

(A) $\pi/2$ (B) $\pi/4$ (C) $3\pi/8$ (D) $\pi/8$

92. If the axes be rotated through an angle $\frac{\pi}{3}$ in the clockwise direction with respect to $(0,0)$ the point $(4,2)$ in the new system was formally-

(A) $(2+\sqrt{3}, -2\sqrt{3}-1)$ (B) $(-2\sqrt{3}+1, 2+\sqrt{3})$

(C) $(2+\sqrt{3}, -2\sqrt{3}+1)$ (D) $(2-\sqrt{3}, -2\sqrt{3}-1)$

93. A point moves in the $x-y$ plane such that the sum of its distances from two mutually perpendicular lines is always equal to 3. The area enclosed by the locus of the point is- .... unit^2

(A) 18 (B) 4.5 (C) 9 (D) None of these

94. Let $A(2,3)$ and $B(-4,5)$ are two fixed points. A point P moves in such a way that $\Delta PAB=12\, sq.units$, then its locus is :-

(A) $x^2+6xy+9y^2+22x+66y-23=0$

(B) $x^2+6xy+9y^2+22x+66y+23=0$

(C) $x^2+6xy+9y^2-22x-66y-23=0$

(D) none of these

95. Area of the triangle formed by the lines $y^2-9xy+18x^2=0$ and $y=9$, is .... sq. unit

(A) 27 (B) 13.5 (C) 6.75 (D) 3.375

96. The area enclosed by the graphs of $|x+y|=2$ and $|x|=1$ is

(A) 2 (B) 4 (C) 6 (D) 8

97. If α,β,γ are the real roots of the equation $x^3-3px^2+3qx-1=0$, then the centroid of the triangle whose vertices are $(\alpha,\frac{1}{\alpha}),(\beta,\frac{1}{\beta})$ and $(\gamma,\frac{1}{\gamma})$

(A) $p,-q$ (B) $(-p,q)$ (C) (p,q) (D) $(\frac{p}{2},\frac{q}{2})$

98. The orthocentre of a ΔABC is $'B'$ and circumcentre is $S(a,b)$. If A is origin then coordinate of C is-

(A) $(2a,2b)$ (B) $\left(\frac{a}{2},\frac{b}{2}\right)$ (C) $(\sqrt{a^2+b^2},0)$ (D) None of these

99. The coordinates of the foot of the perpendiculars from the vertices of a triangle on the opposite sides are $(20,25),(8,16)$ and $(8,9)$. The orthocentre of the triangle lies at the point-

(A) $(5,10)$ (B) $(15,30)$ (C) $(10,15)$ (D) $(50,-5)$

100. If Δ_1 is the area of the triangle formed by the centroid and two vertices of a triangle, Δ_2 is the area of the triangle formed by the mid-points of the sides of the same triangle, then $\Delta_1 : \Delta_2 =$

(A) $3:4$ (B) $4:1$ (C) $4:3$ (D) $2:1$

101. Number of straight lines that can be drawn from $(2,5)$ which make a triangle of area $24sq.$ units with the coordinate axes is

(A) 1 (B) 2 (C) 3 (D) 4

102. If the line $y=\sqrt{3}x$ cuts the curve $x^4+ax^2y+bxy+cx+dy+6=0$ at A , B , C and D , then value of $OA.OB.OC.OD$ is, (where O is origin)

(A) $a+b+c$ (B) $2c^2d$ (C) 96 (D) 6

103. An insect is resting on the graph paper at a point $A(3,2)$. Now it starts moving towards west direction and covers a distance of $4\,units$ and then it turns towards south and covered a distance of $3\,units$ and reaches at point B then the polar co-ordinates of point B will be :-

(A) $\left(6\sqrt{2},\frac{\pi}{4}\right)$ (B) $\left(\sqrt{2},\frac{3\pi}{4}\right)$ (C) $\left(\sqrt{2},\frac{-3\pi}{4}\right)$ (D) None of these

*** Answer the following questions in one sentence. [1 Marks Each]** **[12]**

104. Name the octants in which the following points lie:
(1, 2, 3), (4, -2, 3), (4, -2, -5), (4, 2, -5), (-4, 2, -5), (-4, 2, 5), (-3, -1, 6), (-2, -4, -7)

105. Find the distance between (-1, 3, -4) and (1, -3, 4) pairs of points.

106. Find the distance between (2, -1, 3) and (-2, 1, 3) pairs of points.

107. Find the octant in which the points (–3, 1, 2) and (–3, 1, – 2) lie.

108. Find the coordinates of the point which divides the line segment joining the points (1, –2, 3) and (3, 4, –5) in the ratio 2 : 3 internally.

109. Find the coordinates of a point equidistant from the origin and points A(a, 0, 0), B(0, b, 0) and C(0, 0, c).

110. Find the image of:
(- 2, 3, 4) in the yz-plane.

111. If the origin is the centroid of a triangle ABC having vertices A(a, 1, 3), B(-2, b -5) and C(4, 7, c) find the values of a, b, c.

112. Determine the point on yz-plane which is equidistant from points A(2, 0, 3), B(0, 3, 2) and C(0, 0, 1).

113. Find the image of:
(-5, 4, -3) in the xz-plane.

114. Find the ratio in which the line segment joining the points (2, 4, 5) and (3, −5, 4) is divided by the yz-plane.

115. Write the coordinates of third vertex of a triangle having centroid at the origin and two vertices at (3, -5, 7) and (3, 0, 1).

*** Given section consists of questions of 2 marks each.** **[22]**

116. Show that the points (-2, 3, 5), (1, 2, 3) and (7, 0, -1) are collinear.

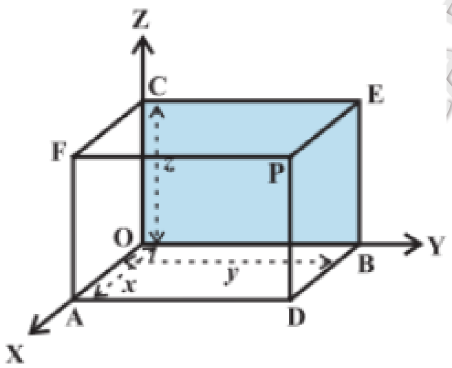
117. Find the equation of the set of points which are equidistance from the points (1, 2, 3) and (3, 2, -1).

118. If the origin is the centriod of the triangle PQR with vertices P(2a, 2, 6), Q(-4, 3b, -10) and R(8, 14, 2c), then find the values of a, b and c.

119. Find the coordinates of a point on y-axis which are at a distance of $5\sqrt{2}$ from the point P(3, -2, 5).

120. A point R with x-coordinate 4 lies on the line segment joining the points P(2, -3, 4) and Q (8, 0, 10). Find the coordinates of the point R.
[Hint Suppose R divides PQ in the ratio k : 1. The coordinates of the point R are given by $\left(\frac{8k+2}{k+1}, \frac{-3}{k+1}, \frac{10k+4}{k+1}\right)$].

121. In Fig, if P is (2,4,5), find the coordinates of F.



122. The centroid of a triangle ABC is at the point (1, 1, 1). If the coordinates of A and B are (3, –5, 7) and (–1, 7, – 6), respectively, find the coordinates of the point C.

123. The coordinates of a point are (3, -2, 5). Write down the coordinates of seven points such that the absolute values of their coordinates are the same as those of the coordinates of the given point.

124. Given that P(3, 2, -4), Q(5, 4, -6) and R(9, 8, -10) are collinear. Find the ratio in which Q divides PR.

125. Find the third vertex of triangle whose centroid is origin and two vertices are (2, 4, 6) and (0, -2, -5).

126. Show that if $x^2 + y^2 = 1$, then the point $\left(x, y, \sqrt{1 - x^2 - y^2}\right)$ is at a distance 1 unit from the origin.

*** Given section consists of questions of 3 marks each.** **[69]**

127. If A and B be the points (3, 4, 5) and (-1, 3, -7), respectively, find the equation of the set of points P such that $PA^2 + PB^2 = k^2$, where k is a constant.

128. Are the points A(3, 6, 9), B(10, 20, 30) and C(25, -41, 5), the vertices of a right-angled triangle?

129. Find the ratio in which the line segment joining the points (4, 8, 10) and (6, 10, -8) is divided by the YZ-plane.

130. The mid-points of the sides of a triangle ABC are given by (-2, 3, 5), (4, -1, 7) and (6, 5, 3). Find the coordinates of A, B and C.

131. The vertices of the triangle are A(5, 4, 6), B(1, -1, 3) and C(4, 3, 2).The intenal bisector of angle A meets BC at D. Find the coordinates of D and the length AD.

132. Find the ratio in which the line joining (2, 4, 5) and (3, 5, 4) is divided by the yz-plane.

133. Determine the point on z-axis which is equidistant from the points (1, 5, 7) and (5, 1, -4).

134. A cube of side 5 has one vertex at the point(1, 0, -1) and the three edge from this vertex are, respectively, parallel to the negative x and y axes and positive z-axis. Find the coordinates of the other vertices of the cube.

135. If the points A(3, 2, -4), B(9, 8, -10) and C(5, 4, -6) are collinear, find the ratio in which C divides AB.

136. Find the distances of the point P(-4, 3, 5) from the coordinate axes.

137. A point C with z-coordinate 8 lies on the line segment joining the points A(2, -3, 4) and B(8, 0, 10). Find its coordinates.

138. Prove that the triangle formed by joining the three points whose coordinates are (1, 2, 3), (2, 3, 1) and (3, 1, 2) is an equilateral triangle.

139. Find the point on y-axis which is equidistant from the points (3, 1, 2) and (5, 5, 2).

140. Find the centroid of a triangle, mid-points of whose sides are (1, 2, -3), (3, 0, 1) and (-1, 1, -4).

141. Show that the three points A(2, 3, 4), B(-1, 2, -3) and C(-4, 1, -10) are collinear and find the ratio in which C divides AB.

142. Find the points on z-axis which are at a distance $\sqrt{21}$ from the point (1, 2, 3).

143. The centroid of a triangle ABC is at the point (1, 1, 1). If the coordinates of A and B are (3, -5, 7) and (-1, 7, -6) respectively, find the coordinates of the point C.

144. A(1, 2, 3), B(0, 4, 1), C(-1, -1, -3) are the vertices of a triangle ABC. Find the point in which the bisector of the angle $\angle BAC$ meets BC.

145. Find the ratio in which the sphere $x^2 + y^2 + z^2 = 504$ divides the line joining the points (12, -4, 8) and (21, -9, 18).

146. Planes are drawn parallel to the coordinate planes through the points (3, 0, -1) and (-2, 5, 4).
Find the lengths of the edges of the parallelopiped so formed.

147. Find the ratio in which the line Segment joining the points (2, -1, 3) and (-1, 2, 1) is divided by the plane x + y + z =5.

148. Let A(2, 2, -3), B(5, 6, 9) and C(2, 7, 9) be the vertices of a triangle. The internal bisector of the angle A meets BC at the point D. Find the coordinates of D.

149. Prove that the points (0, -1, -7), (2, 1, -9) and (6, 5, -13) are collinear. Find the ratio in which the first point divides the join of the other two.

*** Given section consists of questions of 5 marks each.** **[35]**

150. Determine the points zx-plane equidistant from the points A(1, -1, 0), B(2, 1, 2) and C(3, 2, -1).

151. Determine the points yz-plane equidistant from the points A(1, -1, 0), B(2, 1, 2) and C(3, 2, -1).

152. If A(-2, 2, 3) and B(13, -3, 13) are two points. Find the locus of a point P which moves in such a way that 3PA = 2PB.

153. Prove that the point A(1, 3, 0), B(-5, 5, 2), C(-9, -1, 2) and D(-3, -3, 0) taken in order are the vertices of a parallelogram. Also, show that ABCD is not a rectangle.

154. Using distance formula prove that the following points are collinear:
P(0, 7, -7), Q(1, 4, -5) and R(-1, 10, -9)

155. Show that the points (0, 7, 10), (-1, 6, 6) and (-4, 9, 6) are the vertices of an isosceles right-angled triangle.

156. Using distance formula prove that the following points are collinear:
A(3, -5, 1), B(-1, 0, 8) and C(7, -10, -6)

----- हर कोशिश में शायद सफलता नहीं मिल पाती,लेकिन हर सफलता का कारण कोशिश ही होती है| -----