Ravi Maths Tuition

Introduction to Three Dimensional Geometry

11th Standard

Mathematics

Multiple Choice Question 30 x 1 = 30

1) The ratio in which the line joining (4, -3, 2) and (6, -5, -1) is divided by YZ-plane is _____.

(a) 2 : 3 (b) 2 : -3 (c) -2 : 3 (d) none of these

2) The ratio in which the line joining the points (a, b, c) and (-4, 3, -6) is divided by XY-plane is _____.

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

3) The points (3, 3, 3), (0, 6, 3), (1, 7, 7) and (4, 4, 7) are vertices of _____.

(a) a rectangle (b) a square (c) a parallelogram (d) a rhombus

4) If (3, 4, -1) and (-1, 2, 3) be the endpoints of a diameter of a sphere. Then radius of sphere is equal to _____.

(a) 2 (b) 4 (c) 5 (d) 6

5) In the three dimensional space the equation $x^2 - 7x + 12 = 0$ represents _____.

(a) pair of straight lines (b) curves (c) planes (d) none of these

6) The three numbers representing the perpendicular distances of the point from three mutually perpendicular planes are called the _____.

(a) coordinates of the point with respect to the two coordinate planes

(b) coordinates of the origin with respect to the three coordinate planes

(c) coordinates of the point with reference to the three coordinate planes (d) None of the above

7) The octants in which the points (-3, 1,2) and (-3, 1,- 2) lie, are respectively.

(a) II and VI (b) III and V (c) I and IV (d) II and V

8) A point is on the X-axis. Its y-coordinate and z-coordinate are respectively.

(a) y, z (b) y,O (c) z,O (d) 0,0

9) If a point is on the ZX-plane, then its coordinates will be _____.

(a) (x,y,O) (b) (O,y,z) (c) (x,O,z) (d) (x,y,z)

10) If a point is in XZ-plane, then its y-coordinate is _____.

(a) x (b) y (c) 0 (d) z

11) Points P(2, 4, 6), Q(-2, -2, -2) and R(6, io, 14) are _____.

(a) verticesof a triangle (b) collinear (c) non-collinear (d) Both(a)and (b)

12) Distance of the point (3, 4, 5) from the (0, 0, 0) is _____.

(a) $\sqrt{50}$ (b) 3 (c) 4 (d) 5

13) The point on Y-axiswhich is at a distance .$\sqrt{10}$ from the point (1,2, 3), is _____.

(a) (0,2,0) (b) (0,0,2) (c) (0,0,3) (d) None of these

14) The length of the foot of perpendicular drawn from the point P(3, 4, 5) on Y-axis is _____.

(a) 10 (b) $\sqrt{34}$ (c) $\sqrt{113}$ (d) $5\sqrt{2}$

15) 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

16) The coordinates of the point R, which divides the segment joining P(x_1,y_1,z_1) and Q(x_2,y_2,z_2) internally in the ratio k : 1,are _____.

(a) $\left(\frac{kx_2-x_1}{1-k}, \frac{ky_2-y_1}{1-k}, \frac{kz_2-z_1}{1-k}\right)$ (b) $\left(\frac{kx_2+x_1}{1+k}, \frac{ky_2+y_1}{1+k}, \frac{kz_2+z_1}{1+k}\right)$ (c) $\left(\frac{kx_2+x_1}{1-k}, \frac{ky_2+y_1}{1-k}, \frac{kz_2+z_1}{1-k}\right)$

(d) None of the above

17) If R is the mid-point of the segment joining P(x_1,y_1,z_1) and Q(x_2,y_2,z_2) then coordinates of R are _____.

(a) $\left(\frac{x_1-x_2}{2}, \frac{y_1-y_2}{2}, \frac{z_1-z_2}{2}\right)$ (b) $\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}, \frac{z_1+z_2}{2}\right)$ (c) $\left(\frac{x_2-x_1}{2}, \frac{y_2-y_1}{2}, \frac{z_2-z_1}{2}\right)$ (d) None of the above

18) The coordinates of the point P which is five-sixth of the way from A (-2,0, 6) to B(10 , - 6, -12), is _____.

(a) (8,5,9) (b) (-8,5,9) (c) (8,-5,-9) (d) None of the above

19) The ratio in which the line joining (2, 4, 5) and (3,5, -4) is divided by the YZ-plane, is _____.

(a) 2:3 (b) 3:2 (c) -2:3 (d) 4:-3

20) A point on XOZ-plane divides the join of (5, -3, -2) and (1, 2, -2) at _____.

(a) $\left(\frac{13}{5}, 0-2\right)$ (b) $\left(\frac{13}{5}, 0, 2\right)$ (c) (5,0,2) (d) (5,0, -2)

21) Which of the following statements is correct?

(a) The coordinates of the origin 0 are (0, 0, 0)

(b) The coordinates of any point on the X-axis will be as (0,y',z)

(c) The coordinates of any point in the YZ-plane will be (x, 0, 0) (d) All of the above are correct

22) L is the foot of the perpendicular drawn from a point P(6, 7, 8) on the XY-plane, then the coordinates of point L are _____.

(a) (6,0,0) (b) (6,7,0) (c) (6,0,8) (d) None of these

23) L is the foot of the perpendicular drawn from a point (6,7,8) on X-axis. The coordinates of L are _____.

(a) (6,0,0) (b) (0,7,0) (c) (0,0,8) (d) None of these

24) What is the locus of a point for which y = 0 and z =0?

(a) Equation of X-axis (b) Equation of Y-axis (c) Equation of Z-axis (d) None of these

25) Which of the following statement is correct?

(a) The X-axis and Y-axistaken together determine a plane known as XY-plane

(b) The coordinates of a point in the XY-plane are of the form (0, 0, z)

(c) Coordinate planes divide the space into six octants (d) All the above are correct

26) Which of the following statements is incorrect?

(a) The equation of the plane z = 6 represents a plane perpendicular to the XY-plane, having a z-intercept of 6 units

(b) The equation of the plane x = 0 represents the YZ-plane

(c) The point on the X-axis with x-coordinate equal to x_o is written as (x_o, 0, 0)

(d) $x = x_o$ represents a plane parallel to the YZ-plane

27) The distance between the points (1, 4, 5) and (2,2,3) is _____.

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

28) The perpendicular distance of the point (6,5,8) from Y-axis is _____.

(a) 5 Units (b) 6 Units (c) 8 Units (d) 10 Units

29) If the origin is the centroid of a ΔABC having vertices A(a, 1, 3), B(-2, b, -5) and C(4, 7, c), then _____.

(a) a = -2 (b) b = 8 (c) c = -2 (d) None of these

30) The centroid of the triangle, if the mid-point of the sides of triangles are D(1, 2, -3), E(3, 0, 1) and F(-1, 1,-4), is _____.

(a) (1,2,-1) (b) (1,1,-2) (c) (0,1, -2) (d) None of these

Fill up / 1 Marks 3 x 1 = 3

31) The x-axis and y-axis taken together determine a plane known as_____.

32) The coordinates of points in the XY-plane are of the form _____.

33) Coordinate planes divide the space into _____ octants.

2 Marks 120 x 2 = 240

34) 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)

35) A point is on the x-axis. What are its y-coordinate and z-coordinates?

36) A point is in the XZ-plane. What can you say about its y-coordinate?

37) Find the equation of the set of points P, the sum of whose distances from A (4, 0, 0) and B (– 4, 0, 0) is equal to 10.

38) Find the equation of the set of points which are equidistant from the points (1, 2, 3) and (3, 2, –1).

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

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

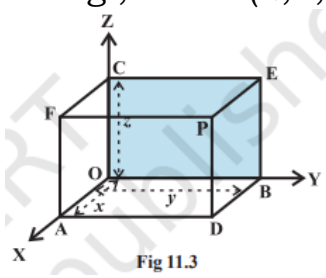


Fig 11.3

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

42) Find the octant in which the points (-3,4,2) and (-3,1,-4) lie.

43) L is the foot of the perpendicular drawn from a point P(5,4,6) on the XY-plane.Find the coordinates of point L

44) Name the octant in which the point lies (4,-2,3)

45) Name the octant in which the point lies (4,-2,-5)

46) Name the octant in which the point lies (4,2,-5)

47) Name the octant in which the point lies (-3,-1,6)

48) Find the octant in which the points (-3,1,2),(3,-1,2) and (-3,1,-2) lie.

49) L is the foot of the perpendicular drawn from a point P(6,7,8) on the XY-plane.What are the coordinates of point L?

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

51) Find the distance from the origin to (6,6,7).

52) How far apart are the points (2,0,0) and (-3,0,0)?

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

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

55) Find the point on Y-axis which is at a distance $\sqrt{10}$ from the point (1,2,3)

56) Find the distance of a point P(3,4,5) from XY-plane.

57) Let L,M,N be the feet of the perpendiculars drawn from a point P(3,4,5) on the X,Y and Z-axes respectively.Find the coordinates of L, M and N.

58) If A,B,C are the feet of perpendiculars from a point P on the XY, YZ and ZX-planes respectively, then find the distance of A,B and C, where the point P is (3,4,2)

59) If A,B,C are the feet of perpendiculars from a point P on the XY, YZ and ZX-planes respectively, then find the distance of A, B and C, where the point P is (-5,3,7)

60) Find the coordinates of the point which divides the join of P(2, -1, 4) and Q(4,3,2) in the ratio 2:3 (i) internally (ii) externally

61) If A, B and C are the feet of perpendiculars from a point P on XY, YZ and ZX-planes respectively, then find the coordinates of A, B and C, where the point P is (-5,3,7)

62) If A, B and C are the feet of perpendiculars from a point P on XY, YZ and ZX-planes respectively, then find the coordinates of A, B and C, where the point P is (4,-3,-5)

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

64) What is the length of foot of perpendicular drawn from the point P(3, 4, 5) on Y-axis by using distance formula?

65) If the origin is the centroid 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.

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

67) Find the ratio in which the line segment joining the points (2, 4, 5) and (3, -5, 4) is divided by the YZ-plane

68) Find the ratio in which the line segment joining the points (2, 4, -3) and (3, -5, 4) divided the XY-plane

69) Find the distance between the points A(2,3,1) and B(1,-2,0)

70) Find the centroid of a triangle, the mid-point of whose sides are D(1, 2, -3), E (3, 0, 1) and F(-1, 1, -4).

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

72) Find the values of x, if the distance between two points (x,-8,4) and (3,-5,4) is 5

73) Find the point on X-axis which is equidistant from the points A(3,2,2) and B(5,5,4)

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

75) Determine the point in YZ- plane which is equidistant from three points A(2,0,3) B(0,3,2) and C(0,0,1)

76) 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

77) Verify that A(-1, 2, 1) B(1, -2, 5), C(4, -7, 8) and D(2, -3, 4) are the verticles of a parallelofram

78) Find the ratio in which the line segment joining the points (4, 4, -10) and (-2, 2, 4) is divided by the YZ-plane.

79) Find the distance of point P(3,6,9) from the YZ-plane using distance formula.

80) Using distance formula, show that the following points are collinear.
Points P(2,4,6), Q(-2,-2,-2) and R(6,10,14)

81) Using distance formula, show that the following points are collinear.
Points A(1,-1,3), B(2,-4,5) and C(5,-13,11)

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

83) Show that D(-1,4,-3) is the circumcentre of ΔABC with vertices A(3,2,-5), B(-3,8,-5) and C(-3,2,1).

84) Three students are standing in a park with signboards "SAVE ENVIRONMENT". "DONT'T LITTER", "KEEP YOUR PLACE CLEAN". Their positions are marked by the points A(0, 7, 10), B(-1, 6, 6) and C(-4, 9, 6). The three students are holding GREEN coloured ribbon together. Does the ribbons form sides of a right angled triangle? Do you feel the need to promote? What message is given from this question to the society?

85) Find the equation of the curve formed by the set of all points whose distances from the points (3,4,-5) and (-2,1,4) are equal.

86) Find the equation of set of point P such that $PA^2 + PB^2 = 2k^2$, where A and B are the points (3,4,5) and (-1,3,-7), respectively.

87) Find the locus of a point which moves such that the sum of its distance from points $A(0, 0, -\propto)$ and $B(0, 0, \propto)$ is constant.

88) Show that the points (0,4,1), (2,3,-1), (4,5,0) and (2,6,2) are the vertices of a square.

89) Prove that the points (5,3,2), (3,2,5) and (2,5,3) are the vertices of an equilateral triangle.

90) By using section formula, show that the points (1,0,2), (2,2,3) and (-1,-1,2) are collinear.

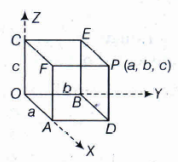
91) By using distance formula, show that the points (2,-1,0), (-2,3,-2) and (0,3,0) are collinear

92) Find the coordinates of a point equidistant from the four points O(0,0,0), A(l,0,0), B(0,m,0), and C(0,0,n)

93) If origin is the centroid of a ΔABC with vertices $A(\alpha, 1, 3)\ B(-2, \beta, -5)\ and\ C(4, 7, \gamma)$, then find the values of $\alpha, \beta\ and\ \gamma$.

94) Show that the points (a,b,c), (b,c,a) and (c,a,b) are the vertices of an equilateral triangle.

95) In the given figure, if the coordinates of point P are (a,b,c), then write the coordinates of A,D,B,C and E.

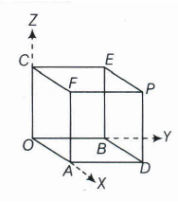


96) What are the conditions of the vertices of a cube whose edge is 5 units, one of whose vertices coincides with the origin and threee edges passing through the origin coincides with the positive direction of the axes through the origin?

97) Let L,M,N be the feet of the perpendicules drawn from the point P (3,4,5) on the XY,YZ and ZX-planes, respectively. Find the distance of these points L,M,N from the point P.

98) Locate the point (2,3,4) in space.

99) In the given figure, if the coordinates of the point P are (3,4,6), then write the coordinates of A,D,B,C and E.



100) Locate the point (-2,-3,4) in space.

101) Locate the point (6,7,9) in space.

102) 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 edges and diagonal of the parallelpiped by using distance formula.

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

104) Show that the points (-2,6,-2), (0,4,-1),(-2,3,1) and (-4,5,0) are the vertices of a squre.

105) A point is on the XZ-plane. What can you say about its y-coordinate?

106) Find the distance between the points A(3, 5, 2) and B(-1, 2, 7).

107) Prove by using distance formula that the point A(1, 2, 3), B(-1, -1, -1) and C(3, 5, 7) are collinear.

108) Show that the points A(0, 1, 2), B(2, -1, 3) and C(1, - 3, 1) are vertices of an isosceles right-angled triangle.

109) Find the distance between the following pairs of points: (-3, 7, 2) and (2, 4, -1)

110) Find the distance between the following pairs of points: (-1, 3, -4) and (1, - 3, 4)

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

112) Verify the following: (0, 7, 10), (-1, 6, 6) and (-4, 9, 6) are the vertices of a right-angled triangle.

113) Verify the following: (-1, 2, 1), (1, -2, 5), (4, -7, 8) and (2, -3, 4) are the vertices of a parallelogram.

114) Find the distance between the following pairs of points: (5, 6, 7) and (2, 3, 4)

115) Find the distance between the following pairs of points: (- 4, 6, 8) and (2, - 3, - 5)

116) Find the distance between the following pairs of points: (1, -1, 0) and (2, 1, 2)

117) Find the distance between the following pairs of points: (- 1, 2, 1) and (1, - 2, 5)

118) Find the equation of the set of points which are equidistant from the points A(1, 3, -1) and B(4, - 1, 7).

119) Find the equation of the locus of a point P so that $PA^2 - PB^2 = 20$ where A(-2, 0, 4) and B(3, 2, -1) are two points.

120) Using section formula, show that the three points A(-2, 3, 5), B(1, 2, 3) and C(7, 0, -1) are collinear.

121) Find the coordinates of the points which trisect the line segment AB where A (2, 1, -3) and B (5, -8, 3)

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

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

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

125) Find the coordinates of the point which divides the line segment joining the points (-2, 3, 5) and (1, -4, 6) in the ratio. 2 : 3 internally.

126) Find the coordinates of the point which divides the line segment joining the points (-2, 3, 5) and (1, -4, 6) in the ratio. 2 : 3 externally.

127) 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.

128) Find the ratio in which the YZ-plane divides the line segment formed by joining the points (-2, 4, 7) and (3, -5, 8).

129) Using section formula, show that the points A(2, - 3, 4) B(-1, 2, 1) and C $(0, \frac{1}{3}, 2)$ are collinear.

130) Find the distance between the following pairs of points:
(5, 6, 7) and (2, 3, 4)

131) Find the distance between the following pairs of points:
(- 4, 6, 8) and (2, - 3, - 5)

132) Find the distance between the following pairs of points:
(1, -1, 0) and (2, 1, 2)

133) Find the distance between the following pairs of points:
(- 1, 2, 1) and (1, - 2, 5)

134) Find the equation of the set of points which are equidistant from the points A(l, 3, -1) and B(4, - 1, 7).

135) Find the equation of locus of a point P so that PA2 - PB2 = 20 where A(-2, 0, 4) and B(3, 2, -1) are two points.

136) Find the coordinates of the point which divides the line segment joining the points (1, -2, -1) and (1,5, -8) in the ratio
(i) 3:4 internally (ii) 3:4 externally

137) Using section formula, show that the points A(3, 2, - 4), B(5, 4, -6) and C(9, 8, -10) are collinear

138) Find the ratio in which XY-plane divides the line segment formed by joining the points (2, 1, -1) and (3, 2, 4).

139) A point Awith x coordinates 5 lies on the line joining the points B(2, -3,4) and C(8, 0, 10).
Find the coordinates of point A.

140) Find the coordinates of the points of trisection of the line segment joining the points (3, 2, -1) and (1, 2, 5).

141) Find the coordinates of the points which trisect the line segment joining the points P(4, 2, -6) and Q(10, -16, 6).

142) Find the equation of locus of a point which moves so that its distance front point (-2, 1, 3) is twice its distance from the XY plane.

143) Find the ratio in which the line joining points (-3, 4, 5) and (5, 1, -1) divided by YZ-plane

144) If (3, -1, -1), (5, -4, 0), (2, 3, -2) are three vertices of a parallelogram. Find the coordinates of fourth vertex

145) If (2,6, -4) and (4, -2,3) are two vertices of a triangle whose centroid is (7, -2,5). Find the coordinates of the third vertex.

146) Find the coordinates of the point which divides the line segment joining the points (1, -2, -1) and (1,5, -8) in the ratio
(i) 3 : 4 internally
(ii) 3 : 4 externally

147) Find the ratio in which XY-plane divides the line segment formed by joining the points (2, 1, -1) and (3, 2, 4).

148) A point Awith x coordinates 5 lies on the line joining the points B(2, -3,4) and C(8, 0, 10). Find the coordinates of point A.

149) Find the coordinates of the points of trisection of the line segment joining the points (3, 2, -1) and (1, 2, 5).

150) Fill in the blanks:
(i) The x-axis and y-axis taken together determine a plane known as_____.
(ii) The coordinates of points in the XY-plane are of the form _____.
(iii) Coordinate planes divide the space into _____ octants.

151) 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.

152) What is the length of foot of perpendicular drawn from the point P (3, 5,6) on Y-axis by using distance formula?

153) Describe the vertices and edges of the rectangular parallelopiped with vertex (3, 5,6) placed in the first octant with one vertex at origin and edges of parallelopiped lie along X, Y and Z-axes.

3 Marks 29 x 3 = 87

154) Find the distance between the points P(1, –3, 4) and Q (– 4, 1, 2).

155) Show that the points P (–2, 3, 5), Q (1, 2, 3) and R (7, 0, –1) are collinear.

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

157) Find the equation of set of points P such that $PA^2 + PB^2 = 2k^2$, where A and B are the points (3, 4, 5) and (–1, 3, –7), respectively.

158) Show that the points A (1, 2, 3), B (–1, –2, –1), C (2, 3, 2) and D (4, 7, 6) are the vertices of a parallelogram ABCD, but it is not a rectangle.

159) Find the equation of the set of the points P such that its distances from the points A (3, 4, –5) and B (– 2, 1, 4) are equal.

160) 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.

161) 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.

162) The vertices of the triangles are A(5, 4, 6), B(1, -1, 3) and C(4, 3, 2). The internal bisector of $\angle A$ meets BC at D. Find the coordinates of D and the length AD.

163) The mid-point of the sides of a triangle are (1, 5, -1), (0, 4, -2) and (2, 3, 4) find its vertices and also find the centroid of the triangle.

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

165) Show that ΔABC with vertices A(0,4,1), B(2,3,-1), and C(4,5,0) is right angled.

166) Show that the points P(0,7,10), Q(-1,6,6)and R(-4,9,6) form a right angled isosceles triangle.

167) Three points A(1,2,3), B(0,4,1) and C(-1,-1,-3) are the vertices of ΔABC. Find the point in which the bisector of $\angle BAC$ meets BC.

168) Show that the points (-1,-6,10), (1,-3,4) (-5,-1,1) and (-7,-4,7) are the vertices of a rhombus.

169) Two vertices of a triangle are A(3,4,2) and B(1,3,2). The medians of the triangle intersect at (2,4,3). Find the remaining vertex C of the triangle.

170) The mid-points of the sides of a triangle are (1,5,-1), (0,4,-2) and (2,3,4). Find its vertices

171) Find the coordinates of centroid of ΔABC , where vertices are A(x_1, y_1, z_1), B(x_2, y_2, z_2) and C(x_3, y_3, z_3).

172) Verify that (-1, 2, 1), (1, -2, 5), (4, -7, 8) and (2, -3, 4) are the vertices of a parallelogram.
Tp prove a quadrilateral is a parallelogram, we have to prove that its diagonal bisect each other

173) Prove that the coordinates of the points which divide the lines joining the vertices of a tetrahedron to the centroid of the opposite faces in the ration 3:1 are same.

174) Using the section formula, show that the points, (2, -3, 4), (-1, 2, 1) and (0, $\frac{1}{3}$, 2) are collinear.

175) Three points A(3, 2, 0), B(5, 3, 2) and C(-9, 6, -3) are forming a triangle . The bisector Ad of

176) 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 (i) internally, and (ii) externally

177) Using section formula, prove that the three points (– 4, 6, 10), (2, 4, 6) and (14, 0, –2) are collinear.

178) Find the coordinates of the centroid of the triangle whose vertices are (x_1, y_1, z_1) , (x_2, y_2, z_2) and (x_3, y_3, z_3) .

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

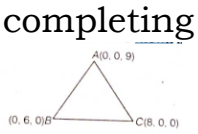
180) Find the ratio in which the join of the points P(2, -1, 3) and Q(4, 3, 1) is divided by the point R $\left(\frac{20}{7}, \frac{5}{7}, \frac{15}{7}\right)$

181) The mid-points of the sides of a triangle are (5, 7, 11), (0,8, 5) and (2, 3, -1). Find its vertices.

182) If A(2, 2, - 3), B(5, 6, 9), c(2, 7, 9) are the vertices of a triangle. The internal bisector of ∠A meets BC at the point D, then find the coordinates of D.

Case Study Questions 2 x 4 = 8

183) Three friends Arvind, Lokesh and Pradeep are studying in class XI of Rawat Public School, Jaipur. After completing the study, they relocated to different states which are shown in figure.



Here, points A, Band C show the positions of Pradeep, Arvind and Lokesh respectively, then answer the following questions which are based On it.

(i) Which of the following is the correct formula to find the distance between two points?

(a) $\sqrt{(x_2+x_1)^2+(y_2+y_1)^2+(z_2+z_1)^2}$ **(b)** $\sqrt{(x_2-x_1)^2+(y_2-y_1)^2+(z_2-z_1)^2}$ **(c)** $\sqrt{(x_2-x_1)^2-(y_2-y_1$

(ii) Which of the following is the distance between Pradeep and Arvind?

(a) $\sqrt{107}$ **Units(b)** $\sqrt{117}$ **Units(c)** $\sqrt{127}$ **Units(d)** $\sqrt{137}$ **Units**

(ii) Which of the following is the distance between Arvind and Lokesh?

(a) $\sqrt{90}$ **Units(b) 100 Units(c) 10 Units(d) 90 Units**

(iv) Which of the following is the distance between Lokesh and Pradeep?

(a) $\sqrt{135}$ **Units(b)** $\sqrt{145}$ **Units(c)** $\sqrt{125}$ **Units(d)** $\sqrt{105}$ **Units**

184) Mr. Mahendra Kumar is a Mathematics teacher of class XI in Delhi Public School, Pawta. One day, he Writes some points on the board to check the knowledge about the basic concepts of three dimensional geometry.

(i) (8, 3, 5)	(ii) (-7,5, 3)
(iii) (5, -2, 7)	(iv) (9, 5, -6)
(v) (-7,-6, 8)	(vi) (-2, 3, 4)
(vii) (-4, 0, 0)	(viii) (-5, 0, 3)

Then, answer the following questions which are based on it.

(i)) Octant in which the point (8, 3, 5) lies is

(a) XOYZ (b) X'OYZ (c) XOY'Z (d) XOYZ'

(ii) Image of (-2, 3, 4) in YZ-plane is

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

(iii) Octant in which the point (-7, -6, 8) lies is

(a) XOYZ' (b) X'OYZ (c) X'OY'Z (d) XOY'Z

(iv) Image of (-5, 0, 3) in XZ-plane is

(a) (5, 0, 3) (b) (5, 0, -3) (c) (-5, 0, 3) (d) (-5, 0, -3)

(v) Octant in which the point (5, -2, 7) lies is

(a) X'OYZ (b) XOY'Z (c) XOYZ' (d) X'OY'Z

5 Marks 6 x 5 = 30

185) Find the distance between the following pairs of points:

(i) (2, 3, 5) and (4, 3, 1)

(ii) (–3, 7, 2) and (2, 4, –1)

(iii) (–1, 3, – 4) and (1, –3, 4)

(iv) (2, –1, 3) and (–2, 1, 3)

186) Verify the following:

(i) (0, 7, –10), (1, 6, – 6) and (4, 9, – 6) are the vertices of an isosceles triangle.

(ii) (0, 7, 10), (–1, 6, 6) and (– 4, 9, 6) are the vertices of a right angled triangle.

(iii) (–1, 2, 1), (1, –2, 5), (4, –7, 8) and (2, –3, 4) are the vertices of a parallelogram.

187) Three vertices of a parallelogram ABCD are A(3, – 1, 2), B (1, 2, – 4) and C (– 1, 1, 2). Find the coordinates of the fourth vertex.

188) Find the lengths of the medians of the triangle with vertices A (0, 0, 6), B (0,4, 0) and (6, 0, 0).

189) If the origin is the centroid 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.

190) 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.

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