

Total No. of Printed Pages: 03

**SUBJECT CODE NO: - Y-2055**  
**FACULTY OF SCIENCE AND TECHNOLOGY**  
**B.Sc. F.Y (Sem-II)**  
**Examination March / April - 2023**  
**Mathematics MAT - 202 (Geometry)**

[Time: 1:30 Hours]

[Max. Marks: 50]

Please check whether you have got the right question paper.

N. B

- 1) Attempt all questions.
- 2) Figure to the right indicate full marks.

Q1 A) Attempt any one.

08

- a) Prove that every equation of the first degree in  $x, y, z$  represents a plane.
- b) Find the equations of the line passing through a given point  $A(x_1, y_1, z_1)$  and having direction cosines  $l, m, n$ .

07

B) Attempt any one.

- c) Find the equation of the plane through the points  $(2, 2, 1)$  and  $(9, 3, 6)$  and perpendicular to the plane  $2x + 6y + 6z = 9$
- d) Find two points on the line  $\frac{x-2}{1} = \frac{y+3}{-2} = \frac{z-5}{2}$  on either side of  $(2, -3, -5)$  and at a distance 3 from it.

Q2 A) Attempt any one.

08

- a) Find the length of the perpendicular from a given point  $P(x_1, y_1, z_1)$  to a given line  $\frac{x-\alpha}{l} = \frac{y-\beta}{m} = \frac{z-\gamma}{n}$

- b) Prove that a plane section of a sphere is a circle.

B) Attempt any one.

07

- c) Find the image of the point  $P(1, 3, 4)$  in the plane  $2x - y + z + 3 = 0$
- d) Find the equation of the sphere passing through the origin and the points  $(1, 0, 0)$ ,  $(0, 2, 0)$  and  $(0, 0, 3)$

Q3 A) Attempt any one.

05

a) Find the equation of the right circular cylinder whose axis is the line

$$\frac{x-\alpha}{l} = \frac{y-\beta}{m} = \frac{z-r}{n} \text{ and whose radius is } r.$$

b) Find the points of intersection of the line  $\frac{x-\alpha}{l} = \frac{y-\beta}{m} = \frac{z-r}{n}$  with the central conicoid  $ax^2 + by^2 + cz^2 = 1$

B) Attempt any one.

c) Show that the distances between the parallel planes  $2x - 2y + 2z + 3 = 0$  and  $4x - 4y + 2z + 5 = 0$  is  $\frac{1}{6}$  05

d) Find the equation of the right circular cylinder whose radius is 2 and axis is the line  $\frac{x-1}{2} = \frac{y-2}{1} = \frac{z-3}{2}$

Q4 Choose the correct alternatives and fill in the blanks.

10

1) Two planes  $a_1x + b_1y + c_1z + d_1 = 0$  and  $a_2x + b_2y + c_2z + d_2 = 0$  are parallel if \_\_\_\_\_.

a)  $a_1 a_2 + b_1 b_2 + c_1 c_2 = 0$

b)  $\frac{a_1}{a_2} + \frac{b_1}{b_2} + \frac{c_1}{c_2} = 0$

c)  $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$

d) *None of these*

2) The equations to the x-axis are \_\_\_\_\_

a)  $\frac{x}{0} = \frac{y}{1} = \frac{z}{1}$

b)  $\frac{x}{2} = \frac{y}{0} = \frac{z}{1}$

c)  $\frac{x}{1} = \frac{y}{1} = \frac{z}{0}$

d)  $\frac{x}{1} = \frac{y}{0} = \frac{z}{0}$

3) The line  $\frac{x+3}{3} = \frac{y-2}{-2} = \frac{z+1}{1}$  and the plane  $4x + 5y + 3z - 5 = 0$  intersect at a point \_\_\_\_\_

a) (3, 1, -2)

b) (3, -2, 1)

c) (2, -1, 3)

d) (-1, -2, -3)

- 4) The radius of the sphere  $x^2 + y^2 + z^2 - 2x + 4y - 6z + 7 = 0$  is \_\_\_\_\_
- a) 49
  - b) 5
  - c) -7
  - d)  $\sqrt{7}$
- 5) The locus of the points of intersection of two spheres is a \_\_\_\_\_
- a) Circle
  - b) Plane
  - c) Conicoid
  - d) Cylinder