

252718

Roll No. ...263112300064

Exam Code : M-23

Subject Code—59297

B.Sc. EXAMINATION

(Main/Reappear)

(Batch 2018 Onwards)

(Sixth Semester)

MATHEMATICS

CMS-608(i)

Skills Enhancement Course-IV-Solid Geometry

Time : 3 Hours

Maximum Marks : 50

Note : Attempt *Three* questions in all, selecting *one* question from each Section. Q. No. 1 is compulsory.

(Compulsory Question)

1. (a) Write the equation of tangent to a conicoid 2

- (b) Write the equation of polar plane of a point. 2
- (c) Define Generating Line. Find the coordinates of centre of the conic $2x^2 - 7y^2 + 2z^2 - 10yz - 8zx - 10xy + 6x + 12y - 6z + 5 = 0$. 2
- (d) Define Diametral Plane. 2
- (e) What is the type of the conic of the form $x^2 - 3y^2 + 4z^2 = 1$ 2

Section I

2. (a) Find the equations of the tangent planes to the surfaces $4x^2 - 5y^2 + 7z^2 + 13 = 0$ which are parallel to the plane $4x + 20y - 21z = 0$ 10
- (b) Find the equation of the normal at the point (x_1, y_1, z_1) of the ellipsoid $\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1$. 10

3. (a) Find the equations of polar of the line

$$\frac{x-1}{2} = \frac{y-2}{3} = \frac{z-3}{4} \text{ w.r.t. the conicoid}$$

$$x^2 - 2y^2 + 3z^2 = 4 \text{ in symmetrical form.}$$

10

- (b) Find the equation of the enveloping cylinder of the conicoid $ax^2 + by^2 + cz^2 = 1$ whose generators are parallel to the lines

$$\frac{x}{l} = \frac{y}{m} = \frac{z}{n}.$$

10

Section II

4. (a) Find the equation of the normal at the point (x_1, y_1, z_1) of the paraboloid

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 2z.$$

10

- (b) The equations to the generating lines of the hyperboloid $yz + 2zx + 3xy + 6 = 0$, which pass through the point $(-1, 0, 3)$.

10

5. (a) Show that the surface represented by the equation $2x^2 + 5y^2 + 2z^2 - 2yz + 4zx - 2xy + 14x - 16y + 14z + 26 = 0$ is an elliptic cylinder. 10
- (b) Determine the nature of the surface given by the equation $(3x - 4y + z)^2 + 9x - 12y + 3z - 10 = 0$. 10