

Roll No. [REDACTED]

Exam Code : M-24

Subject Code—61381

B.Sc. EXAMINATION

(Main/Re-appear) (Batch 2019 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) | Define Central Conicoid. | 2 |
| (b) | Define Director Sphere. | 2 |

- (c) Define Generating Line. 2
 (d) Define Diametral Plane. 2
 (e) What is the type of the conic of the form $2x^2 + 3y^2 + 4z^2 = 1$? 2

Section I

2. (a) Show that the plane $x + 2y + 3z = 2$ touches the conicoid $x^2 - 2y^2 + 3z^2 = 2$ and find the point of contact. 10
 (b) Prove that there are six normals from a point to an ellipsoid lie on a curve of second degree. 10
- 3 (a) Find the equations of polar of the line $\frac{x-1}{5} = \frac{y-3}{7} = \frac{z+5}{2}$ w.r.t. the conicoid $x^2 + 3y^2 - 7z^2 = 21$ in symmetrical form. 10
 (b) Find the equation of the enveloping cone from the point (x_1, y_1, z_1) to the conicoid $ax^2 + by^2 + cz^2 = 1$. 10

Section II

4. (a) Show that the section of the ellipsoid $9x^2 + 6y^2 + 14z^2 = 3$ by the plane $x + y + z = 0$ is an ellipse with semi-axes $\frac{1}{2}$ and $\frac{3}{\sqrt{22}}$. 10
 (b) The equations to the generating lines of the hyperboloid $\frac{x^2}{4} + \frac{y^2}{9} - \frac{z^2}{16} = 1$, which pass through the points $(2, 3, -4)$ and $(2, -1, \frac{1}{2})$. 10
5. Reduce the equation : $11x^2 + 10y^2 + 6z^2 - 8yz + 4zx - 12xy + 72x - 72y + 36z + 150 = 0$ to the standard form and show that it represents an ellipsoid and find the equations of axes. 20