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Total Pages : 3

Roll No.

MAT-611

Mathematics (MSCMAT/MAMT)

Geometry

Examination, 2026 (Feb.)

Time : 2:00 Hrs.

Max. Marks : 70

Note :- This paper is of Seventy (70) marks divided into Two (02) Sections 'A' and 'B'. Attempt the questions contained in these Sections according to the detailed instructions given therein. *Candidates should limit their answers to the questions on the given answer sheet. No additional (B) answer sheet will be issued.*

Section-A

Long Answer Type Questions 2×19=38

Note :- Section 'A' contains Five (05) Long-answer type questions of Nineteen (19) marks each. Learners are required to answer any *Two* (02) questions only.

1. Show that if a curve is given in terms of general parameter u , then the equation of osculating plane is
 $[R - r(u), \dot{r}(u), \ddot{r}(u)] = 0$.

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(1)

P.T.O.

2. Find the unit tangent vector to the curve in Cartesian form.
3. (i) Define Normal Curvature, find its equation.
(ii) Define Principal Curvature, find its equation.
4. State and prove serret-Frenet formulae..
5. Determine the function $f(u)$ so that the curve given by $(a \cos u, a \sin u, f(u))$ should be a plane curve.

Section–B

Short Answer Type Questions 4×8=32

Note :- Section ‘B’ contains Eight (08) Short-answer type questions of Eight (08) marks each. Learners are required to answer any *Four* (04) questions only.

1. Show that the necessary and sufficient that a curve to be a straight line is that $k = 0$ at all points.
2. Discuss the difference between Principal Normal & Bi-normal.
3. Calculate the torsion in the cubic curve, given by $\vec{r} = (u, u^2, u^3)$.
4. Find the equation of the osculating circle at a point p to the curve c .
5. Write a short note on Involute.
6. Discuss the difference between spherical & circular helix.

7. Discuss the relationship between Geodesics and Christoffel symbols.
8. Write a short note on covariant and contravariant tensors.
