COURSE CODE-2030504
PG DEGREE EXAMINATION - JAN 2009
M.SC (MATHS)
DIFFERENTIAL GEOMETRY
(For the Candidates Admitted from Calendar 2007 onwards)

Time: 3 hours **Max. Marks: 75**

Section-A

Answer all the Questions: **15 X 1 = 15**

1. Define Space Curve
2. Write Cartesian form of Tangent.
3. Define Torsion.
4. Write equation of osculating plane.
5. Define Tangent surface.
6. Define Helices.
7. Define Regular points.
8. Define Anchor Ring.
9. Write second fundamental form.
10. State Existence theorem.
11. Define Geodesic Mapping.
12. Write equation of Ruled surface.
13. Define Edge of Regression.
14. Define Minimal Surface.
15. Define Complete Surface.

Section-B

Answer any Five Questions: **5 X 6 =30**

16. a) Find the length of compete turn of arc.

    (Or)

    b) Find equation of circular helix at any point.

17. a) Show that the osculating plane has three point of contact with curve.

    (Or)

    b) Prove that the curve either lies on a sphere or has constant curvature, if the radius of spherical Curvature is constant.

18. a) For the anchor ring r = ((b +a cos u) cos v, (b +a cosu) sin v, Show that the surface Area is $4\pi^2 ab$

    (Or)

    b) Find surface area for Sphere r = a (sin u cos v, sin u sinv,cos v).

19. a) Show that the orthogonal trajectories of the sections by the planes z equal to Constant on the parabolic x^2 -y= z.

    (Or)

    b) Show that on right helicoids, the family of curves to the curves u cos v is equal to constant.

20. a) A particle is constrained to move on a smooth surface under no force except the Normal reaction. Prove that its path is geodesic.

    (Or)

    b) Prove that every helix on a cylinder is geodesic.

Section-C

Answer any Two Questions: **2 X 15=30**

21. State and Prove Fundamental Existence Theorem for Space Curve.
22. State and Prove Mennier’s Theorem.
23. State and Prove Minding’s Theorem.
24. State and Prove Bonnet Theorem.
25. State and Prove Hilbert’s Lemma.