

(b) Establish the normal property of a geodesic.

13. (a) State and prove Monge's theorem.

(b) Derive Gauss equations of surface theory.

14. (a) Find the general solution of the equation

$$x^2 y'' + 2xy' - 2y = 0.$$

(b) Find the series solution of the equation

$$2x^2 y'' + x(2x+1)y' - y = 0.$$

15. (a) Derive Rodrigue's formula giving an expression for $P_n(x)$.

(b) Define Gamma function. Show that

$$\Gamma\left(\frac{1}{2}\right) = \sqrt{\pi}.$$

Register Number :

Name of the Candidate :

1 6 3 7

M.Sc. DEGREE EXAMINATION, 2008

(MATHEMATICS)

(FIRST YEAR)

(PAPER - III)

**130. DIFFERENTIAL GEOMETRY AND
DIFFERENTIAL EQUATIONS**

(Revised Regulations)

May]

[Time : 3 Hours

Maximum : 100 Marks

SECTION - A (8 × 5 = 40)

Answer any EIGHT questions.

Each question carries FIVE marks.

1. Determine the curvature and the torsion of the cubic curve

$$\vec{r} = (u, u^2, u^3).$$

Turn over