



61506

V Semester B.Sc. Examination, March/April 2022

(CBCS)

MATHEMATICS

Mathematics – VI

Time : 3 Hours

Max. Marks : 70

**Instruction :** Answer **all** questions.

## PART – A

1. Answer **any five** questions : (5×2=10)a) Write the Euler's equation when  $f$  is independent of  $x$ .b) Find the differential equation of the functional  $I = \int_{x_1}^{x_2} [y^2 + (y')^2 + 2ye^x] dx$ 

c) Define geodesic on a surface.

d) Evaluate  $\int_C (5xdx + ydy)$ , where  $C$  is the curve  $y = 2x^2$ , from  $(0, 0)$  to  $(1, 2)$ .e) Evaluate  $\int_0^2 \int_0^1 (x + y) dx dy$ .f) Evaluate  $\int_0^1 \int_0^1 \int_0^1 e^{x+y+z} dx dy dz$ .

g) State Gauss' divergence theorem.

h) If  $V$  is the volume of a region bounded by a closed surface  $S$ , then show

$$\text{that } \iint_S (\nabla r^2 \cdot \hat{n}) ds = 6V.$$

## PART – B

Answer **two full** questions : (2×10=20)2. a) Find the extremal of the functional  $I = \int_0^{\frac{\pi}{2}} [y^2 - (y')^2 - 2y \sin x] dx$  under the end conditions  $y(0) = y\left(\frac{\pi}{2}\right) = 0$ .

b) Find the geodesic on a plane.

OR

P.T.O.