

# B.C.S. GOVT P.G. COLLEGE, DHAMTARI (C.G.)

ASSIGNMENT -2019-20

B.Sc. I Year (REGULAR)

MATHEMATICS

PAPER THIRD

(VECTOR ANALYSIS AND GEOMETRY)

DATE: 03-10-2020

M.M.: 50

Note: Answer any five questions. Each question carries equal marks.

1. a) Define gradient. (4 + 6=10)

b) If  $a, b, c$  are three non-coplanar vectors, then show that  $[a \times b, b \times c, c \times a] = [a \ b \ c]^2$

2. a) State Green's theorem. (4 + 6=10)

b) Use Green's theorem in plane to evaluate  $I = \oint_C [(x + 2y)dx + (y + 3x)dy]$ ,

where C is the circle  $x^2 + y^2 = 1$ .

3. a) Define confocal conics. (4 + 6=10)

b) Prove that confocal conics cut at right angles.

4. a) State Gauss divergence theorem. (4 + 6=10)

b) Find the equation of the cone whose vertex is  $(\alpha, \beta, \gamma)$  and base  $ax^2 + by^2 = 1, z = 0$ .

5. Find the condition that the plane  $lx + my + nz = p$  may touch the paraboloid (10)

$$ax^2 + by^2 = 2cz.$$

6. Trace the conic :  $21x^2 - 6x + 29y^2 + 6x - 58y - 151 = 0$ . (10)