

RAGHUNATHPUR COLLEGE
SEM-III INTERNAL EXAMINATION-2020
COURSE CODE:-BMTMCCHT303
SUB:-MATHEMATICS (H)
COURSE TITLE:-GEOMETRY 3D AND VECTOR ANALYSIS

Answer any one question

- a) i) Find the nature of the conicoid represented by the equation
 $2y^2 - 2yz + 2zx - 2xy - x - 2y + 3z = 0$
- ii) Find the equation of the right circular cylinder which passes through the point (3,-1,1) and has the line $\frac{x-1}{2} = \frac{y+3}{-1} = \frac{z-2}{1}$ as its axis.
- lii) Verify Stokes theorem for $\vec{F} = (2x - y)\mathbf{i} - yz^2\mathbf{j} - y^2zk\mathbf{k}$ where S is the upper half surface of the sphere $x^2 + y^2 + z^2 = 1$ and c is its boundary.
- b) i) A sphere of constant radius r passes through the origin o and cuts the axes at A,B,C, respectively. Prove that the locus of the plane ABC is given by
 $(x^2 + y^2 + z^2) \left(\frac{1}{x^2} + \frac{1}{y^2} + \frac{1}{z^2} \right) = 4r^2$
- ii) Verify Green's theorem for $\int_c [(3x - 8y^2)dx + (4y - 6xy)dy]$ where C is a boundary of the region bounded by $x=0, y=0$ and $x+y=1$