Progressive Education Society's
Modern College of Arts, Science and Commerce (Autonomous),
Shivajinagar, Pune - 5

Department Of Mathematics
SYBSC (Semester IV) 19ScMatU403

Based on Vector Calculus

Subject : Mathematics Practical-IV (19ScMatU403)
Practical Incharge: Rima Ahuja
Practical 5: Surface Integral And Stoke's Theorem

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1. If $\bar{f} = 18z\hat{i} - 12\hat{j} + 3y\hat{k}$ and s is part of plane $2x + 3y + 6z = 12$ in the first octant then evaluate $\iint_S \bar{f}.\bar{n}\ ds$.
2. $'S'$ is the closed surface bounded by the planes $z = 0$ and $z = 1$ and cylinder $x^2 + y^2 = 4$ then evaluate $\iint_S x^3\ dy\ dz + x^2\ dz\ dx + x^2 z\ dx\ dy$.
3. Verify stokes theorem for $\bar{f} = (xy)\hat{i} + (xy^2)\hat{j}$ and $'C'$ is boundary of the square vertices $(1, 0), (-1, 0), (0, 1), (0, -1)$ in xoy plane.
4. Use Stokes theorem to prove that $\int_c \sin z\ dx - \cos x\ dy + \sin y\ dz = 2$ and $'c'$ is boundary of the rectangle $0 \leq x \leq \pi,\ 0 \leq y \leq 1,\ z = 3$.
5. Verify stokes theorem for $\bar{f} = (2x - y)\hat{i} - yz^2\hat{j} - y^2 z\hat{k}$ and the surface s of plane $x^2 + y^2 + z^2 = 1$ in the upper half.