

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 3: Divergence and Curl

1. Find $\text{div} (r^5 \bar{r})$.
2. Prove that $\nabla^2 \log r = \frac{1}{r^2}$.
3. Prove that $\text{grad} \left(\frac{\bar{r}}{r} \right) = -2r^{-3} \bar{r}$.
4. If $\bar{f} = (xyz)^p (x^q \hat{i} + y^q \hat{j} + z^q \hat{k})$ is irrotational and $p \neq 0$ then find q .
5. If $\bar{f} = (2xz^3 + 6y)\hat{i} + (6x - 2yz)\hat{j} + (3x^2z^2 - y^2)\hat{k}$ is conservative. Find corresponding scalar potential.