Roll No.												

PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING

SUMMER TERM / MAKE-UP END TERM EXAMINATION

Semester: Summer Term 2019
Course Code: MATH A 105
Course Name: Calculus
Program & Sem: B.Tech & I Sem (2016 Batch)

Date: 23 July 2019
Time: 3 Hours
Max Marks: 100
Weightage: 50%

Instructions:

(i) Read the question properly and answer accordingly.
(ii) Question paper consists of 3 parts.
(iii) Scientific and Non-programmable calculators are permitted.

Part A

Answer **all** the Questions. **Each** question carries **eight** marks. (3Qx8M=24)

1. Find the unit normal of the given function $x^2y + 2xz = 4$ at (2,-2,3).
2. Given $\vec{A} = x^2yzi + y^2xzj + z^2xyk$ find div $\vec{A}$ and curl $\vec{A}$.
3. Evaluate $\int_0^a \int_0^b (x+y)dydx$.

Part B

Answer **all** the Questions. **Each** question carries **twelve** marks. (3Qx12M=36)

4. Prove that $\Gamma\left(\frac{1}{2}\right) = \sqrt{\pi}$.
5. Find the direction derivative of the function $\phi = 4xz^3 - 3x^2y^2z$ at (2, -1, 2) along 2i-3j+6k.
6. Evaluate $\iint_R ydxdy$ where R is the region bounded by the 1st quadrant of ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$.

Part C

Answer **both** the Question. **Each** question carries **twenty** marks. (2Qx20M=40)

7. Evaluate $\int_0^{4a} \int_{\frac{x^2}{4a}}^{2\sqrt{ax}} xydydx$ by changing the order of integration.
8. Define Solenoidal and irrotational. Show that $\vec{F} = \frac{xi + yj}{x^2 + y^2}$ is both Solenoidal and irrotational.