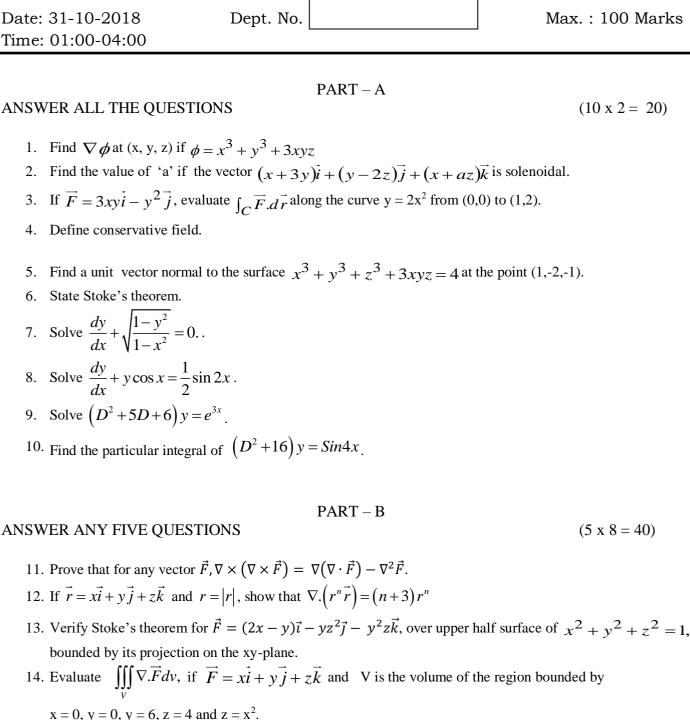
LOYOLA COLLEGE (AUTONOMOUS), CHENNAI - 600 034

B.Sc.DEGREE EXAMINATION – **MATHEMATICS**

THIRD SEMESTER - NOVEMBER 2018

16/17UMT3MC02- VECTOR ANALYSIS AND ORDINARY DIFF. EQUATIONS



15. Solve $y = xp + x(1+p^2)^{\frac{1}{2}}$. 16. Solve $xp^2 - 2vp + x = 0$. 17. Solve $3x^2 \frac{d^2 y}{dx^2} + x \frac{dy}{dx} + y = x$. 18. Solve $\frac{d^2 y}{dx^2} - 4\frac{dy}{dx} + 3y = e^x \cos 2x$

ANSWER ANY TWO QUESTIONS

19. (a) Evaluate $\iint_{S} \vec{F} \cdot n \, dS$ where $\vec{F} = z\vec{i} + x\vec{j} + 3y^2z\vec{k}$ and S is the surface of the cylinder

 $x^2 + y^2 = 16$ included in the first octant between z = 0 and z = 5.

- (b) Evaluate $\iint_{S} \vec{F} \cdot n \, dS$ where $\vec{F} = 4xz\vec{i} y^2\vec{j} + yz\vec{k}$ and S is the surface of the cube bounded by the planes x = 0, x = 1, y = 0, y = 1, z = 0, z = 1.
- 20. Verify divergence theorem for $\vec{A} = (x + y)\vec{i} + x\vec{j} + z\vec{k}$ taken over region V of the cube bounded by the planes x = 0, x = 1, y = 0, y = 1, z = 0, z = 1.
- 21. (a) Solve $(1-x^2)\frac{dy}{dx} + 2xy = x\sqrt{1-x^2}$ given that y = 0 when x = 0.
 - (b) Solve $y(xy+2x^2y^2)dx+x(xy-x^2y^2)dy=0$.
- 22. Solve $\frac{d^2y}{dx^2} + y = \sec x$, using variation of parameters.
