Roll No. □□□□□□□□□□□□ **Total No. of Pages : 02**

Total No. of Questions : 18

B.Tech.(CSE)/(EE)/(ME)/(Civil Engg.) (2018 & Onwards) (Sem.–2)

MATHEMATICS-II

Subject Code : BTAM-201-18

M.Code : 76254

Time : 3 Hrs. **Max. Marks : 60**

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION - B & C have FOUR questions each.**
3. **Attempt any FIVE questions from SECTION B & C carrying EIGHT marks each.**
4. **Select atleast TWO questions from SECTION - B & C.**

SECTION-A

Answer briefly :

1) Is the differential equation $e^x (\cos y dx - \sin y dy) = 0$ exact?

2) Write the Laplace equation in cylindrical coordinates.

3) Write the 1-D diffusion equation.

4) Write the Euler's equation.

5) Convert the equation $ax^2 + by^2 = 1$ into differential equation.

6) Find the integrating factor, which makes the equation $(5x^3 + 12x^2 + 6y^2)\, dx + 6xydy = 0$ exact.

7) Find the solution of the differential equation $y'' - 3y' - 2y = 0$

8) Is $xv_x + yv_y = v^2$ a non-linear PDE?

9) Check if the PDE $2r - s - t - p + q = 0$, is parabolic, elliptic or hyperbolic?

10) Define linear ODE.

SECTION-B

11) Find the power series solution about $x = 0$, of the differential equation $y'' - 4y = 0$.

12) Solve the differential equation $y' + 4xy + xy^3 = 0$.

13) Solve by method of variation of parameters $y'' - 2y' + y = e^x \tan x$.

14) Solve $(D^2 + DD' - 6D'^2)\, z = y \sin x$.

SECTION-C

15) Find the general solution of the Lagrange's equation $2yzp + zxq = 3xy$.

16) a) Find the complete integral of the PDE $p(3 + q) = 2qz$.

b) Find the general solution of the PDE $(2D^2 - DD' - D'^2 + D - D')\, z = e^{2x + 3y}$

17) a) Derive D'Alembert's solution of 1-D wave equation.

b) Solve $y^2p^2 - 3xp + y = 0$

18) a) Solve $\frac{d^2y}{dx^2} \square 5\frac{dy}{dx} \square 6y \square e^{4x}$.

b) Solve $2y\frac{dy}{dx} \square x^2 \square \sin 3x$

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.