

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Civil Engg.) (Sem.-2)

MATHEMATICS-II

Subject Code : BTAM-201-18

M.Code : 91957

Date of Examination : 18-07-22

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

1. Write briefly :

- a) Define Linear and Non-Linear differential equation.
- b) Find the Integrating factor of differential equation : $(y^3 - 2yx^2) dx + (2xy^2 - x^3) dy = 0$.
- c) Write down Bernoulli's differential equation and reduce it into linear form.
- d) Find the particular integral of the differential equation: $(D^3 - D^2 - D - 1) y = \sin 2x$.
- e) Form the partial differential equation for the function $z = ae^{-b^2y} \sin bx$.
- f) Solve the differential equation $2p + 3q = 1$.
- g) Classify the partial differential equation : $\frac{\partial^2 z}{\partial x^2} = x^2 \frac{\partial^2 z}{\partial y^2}$, $x \neq 0$.
- h) State Laplace equation in polar form.
- i) Write down two-dimensional wave equation.
- j) What do you mean by Initial conditions?

SECTION-B

2. Solve $\frac{d^2y}{dx^2} - 2\frac{dy}{dx} + 4y = e^y \cos x$.
3. Solve $\frac{d^2y}{dx^2} - y = 0$, in power of $(x - 1)$.
4. Solve the following Lagrange's partial differential equation:
 $p + 3q = 5z - \tan(3x - y)$.
5. Solve $(p + q)(px + qy) = 1$, by Charpit's method.

SECTION-C

6. Solve $\frac{d^2z}{dxdy} = \sin x \sin y$ if $z = 0$, when $x = 0$.
7. Solve $py^3 + qx^2 = 0$ by the method of separation of variables.
8. Solve two-dimensional wave equation with boundary conditions.
9. Solve $\frac{\partial^2 u}{\partial x^2} = \frac{\partial^2 u}{\partial y^2} = 0$ subject to $u(0, y) = u(l, y) = 0$, $0 \leq y \leq m$ and $u(x, 0) = 0$,
 $u(x, m) = \sin \frac{n\pi x}{l}$.

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.