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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Sem.–2) MATHEMATICS-II Subject Code : BTAM-201-18 M.Code : 91957 Date of Examination ; 23-01-2023

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. a) What do you mean by exact differential equation?
 - b) Find the integrating factor of differential equation : $(3xy^2 y^3) dx + (2x^2y xy^2) dy = 0$.
 - c) Write down Cauchy Euler differential equation.
 - d) Find the I.F $x^2 y dx (x^3 + y^3) dy = 0$.
 - e) Form the partial differential equation for the function, $ax^2 + by^2 + z^2 = 1$.
 - f) Write down the Auxiliary equation of Charpit's method.
 - g) Write down the general linear partial differential equation of 2nd order.
 - h) Write down two-dimensional heat equation.
 - i) Write down two-dimensional Laplace equation in polar form.
 - j) Classify the differential equation: $x^2 \frac{\partial^2 z}{\partial t^2} \frac{\partial^2 z}{\partial x^2} + z = 0$.

SECTION-B

2. Solve
$$(D^2 + D + 1) y = (1 + \sin x)^2$$
.

3. Solve
$$(2x + x^3) \frac{d^2 y}{dx^2} - \frac{dy}{dx} - 6xy = 0$$
, in series.

4. Solve the following Lagrange's partial differential equation:

$$5p - 6q = 5x^4 \cos(6x + 5y).$$

5. Solve $p^2 + q^2 - 2px + 2qy = -1$, by Charpit's method

SECTION-C

6. Solve the differential equation
$$y \frac{\partial^2 z}{\partial x \partial y} - \frac{\partial z}{\partial x} = xy^2 \cos(xy), y > 0$$

7. A tightly stretched string of length *l* has its ends fastened at x = 0, x = l. The mid points of string is then taken to a height *h* and then released from rest in that position. Find the displacement of a point of the string at time *t* from the instant of release.

8. Solve
$$3\frac{\partial u}{\partial x} + 2\frac{\partial u}{\partial y} = 0$$
, where $u(x,0) = 4e^{-x}$

9. Reduce
$$\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$$
 into polar co-ordinates.

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