

Roll No.

Total No. of Pages : 02

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B.Tech. (Automation & Robotics)/ (ECE) (Sem.-2)

MATHEMATICS-II

Subject Code : BTAM-202-18

M.Code : 76255

Date of Examination : 14-06-2023

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. Answer briefly :

- a) Find the integrating factor of differential equation: $(y-1)dx - xdy = 0$.
- b) Define the linear differential equation with the help of an example.
- c) Form the partial differential equation of the function $z = f(x^2 - y) + g(x^2 + y)$ by eliminating arbitrary functions.
- d) Find the general solution of the partial differential equation $(D^2 - 4DD' + D'^2)z = 0$.
- e) Evaluate $\Delta (e^x \log 2x)$.
- f) State Lagrange's interpolation formula.
- g) State Trapezoidal rule of numerical integration.
- h) State Runge-Kutta's method of second order.
- i) Classify the following equation:
$$x^2 u_{xx} + (4 - y^2) u_{yy} = 0.$$
- j) State one dimensional heat equation.

SECTION-B

2. Solve $y = xp^2 + p$.
3. Solve by the method of variation of parameter $y'' - 2y' + 2y = e^x \tan x$.
4. Solve the following Lagrange's partial differential equation:
 $(p-q)(x+y) = z$.
5. Solve the equation $(p^2 + q^2)y = qz$, by Charpit's method.

SECTION-C

6. Find a real root of equation $x^3 + x^2 + 3x + 4 = 0$ correct up to 4 decimal places using Newton-Raphson's method.
7. Given $f(0) = 3, f(1) = 12, f(2) = 81, f(3) = 200, f(4) = 100, f(5) = 8$, find $\Delta^5 f(0)$.
8. Compute $\int_0^1 \frac{x}{x^3 + 10} dx$ with 9 ordinates by Simpson's $\frac{1}{3}$ -rule.
9. Find the solution of $u_t = u_{xx}$ subject to $u(x,0) = \sin \pi x, 0 \leq x \leq 1, u(0,t) = u(1,t) = 0$, using Schmidt method, continue the selection through five time steps.

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.