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Total No. of Pages : 02

Total No. of Questions : 09

B.Sc. (Non Medical) (2018 Batch) (Sem.-3)

DIFFERENTIAL EQUATIONS

Subject Code : BSNM-306-18

M.Code : 76905

Time : 3 Hrs.

Max. Marks : 50

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying ONE mark each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A**1. Write briefly :**

- a) Define exact differential equation.
- b) What is Clairaut's equation.
- c) Define Cauchy's linear equation.
- d) Define linear differential equation with variable coefficients.
- e) Define Partial Differential equation.
- f) Form Partial differential equation by eliminating arbitrary constants from the relation $3z = ax^3 + by^3$.
- g) Find general solution of $9r - 12s + 4t = 0$.
- h) Write Charpit's Auxiliary equation.
- i) Find general solution of $(D^3 - 2D^2D')z = 0$.
- j) Solve $(y - xp)(p - 1) = p$.

SECTION-B

2. Solve $\left(y + \frac{y^3}{3} + \frac{x^2}{2}\right)dx + \frac{1}{4}(x + xy^2)dy = 0, x > 0$.
3. Solve the equation $y'' + a^2y = \sec ax$ by the method of reduction of order.
4. Find the equation of integral surfaces of $(y - z)p + (z - x)q = x - y$, which passes through $y = 2x, z = 0$
5. Solve by Charpit's method $q = px + q^2$
6. $\left(\frac{dy}{dx}\right)^3(x + 2y) + 3\left(\frac{dy}{dx}\right)^2(x + y) + (y + 2x)\frac{dy}{dx} = 0$

SECTION-C

7. a) Find the orthogonal trajectories of the semi cubical parabolas $ay^2 = x^3$, a being the parameter.
b) Solve $(D^2 - 1)y = 2(1 - e^{-2x})^{-\frac{1}{2}}$ by method of variation of parameter.
8. a) Find the equation of surfaces orthogonal to $F(z(x + y)^2, x^2 - y^2) = 0$
b) Find the general solution of $(D_x^3 - 3D_x^2 D_y + 4D_y^3)z = e^{x + 2y}$
9. a) Solve $(D^2 - 2D + 4)y = e^x \cos x$.
b) Solve the system of equations $\frac{dx}{dt} = y, \frac{dy}{dt} = -2x + 3y$.

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.