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SUBJECT CODE NO:- B-2170
FACULTY OF SCIENCE AND TECHNOLOGY
B.Sc S.Y(Sem. -IV) Examination Oct/Nov 2019
Mathematics - MAT- 402
Partial Differential Equations

[Time: 1:30 Hours] **[Max. Marks: 50]**

Please check whether you have got the right question paper.

N.B
1. All questions are compulsory.
2. Figures to the right indicate full marks.

Q.1 A) Attempt any one: 08

a) Obtain subsidiary equations for the Lagrange's linear partial differential equations.

b) Discuss the method for solving linear homogeneous partial differential equation with constant coefficients

$$F(D, D')z = f(x, y)$$

B) Attempt any one: 07

c) Solve
$x^2(y-z)p + (z-x)y^2q = z^2(x-y)]$

d) Find the complete integral of $\sqrt{p} + \sqrt{q} = 1$

Q.2 A) Attempt any one: 08

a) Explain Jacobi's method of solving partial differential equations.

b) Discuss Monge's method to solve

$$Rr + Ss + Tt = V$$

B) Attempt any one: 07

c) Solve

$$x^2\frac{\partial^2 z}{\partial x^2} - y^2\frac{\partial^2 z}{\partial y^2} = xy$$

d) Solve
$(D^2 + D'^2) = z = cosmx\ cosny$

Q.3 A) Attempt any one: 05

a) Discuss the method of general solution of the equation $F(D, D')z = e^{ax+by}$

b) Explain the method of solution of $Rr + Ss + Tt + f(x, y, z, p, q) = 0$ when $S^2 = 4RT$

B) Attempt any one: 05

c) Solve $\frac{\partial^2 z}{\partial x \partial y} = \frac{1}{xy}$

d) Solve $(D^2 - D' - 1)z = x^2 y$

Q.4 Choose the correct alternative and rewrite the sentence: 10

i) The general solution of the equation $(A_0 D^n + A_1 D^{n-1} D' + - - - + A_n D'^A)z = 0$ is ----

a) $z = \phi_1(y + m_1 x)$
b) $z = \phi_1(y + m_1 x) + \phi_2(y + m_2 x)$
c) $z = \phi_1(y + m_1 x) + \phi_2(y + m_2 x) + - - - - + \phi_n(y + m_n x)$
d) $z = \phi_1(y + x) + \phi_2(y + x) + - - - - + \phi_n(y + x)$

ii) The auxiliary equations for the equations $xp + yq = z$ are ----------

a) $dx = dy = dz$
b) $\frac{dx}{p} = \frac{dy}{q} = \frac{dz}{z}$
c) $dx = dy = \frac{dz}{z}$
d) $\frac{dx}{x} = \frac{dy}{y} = \frac{dz}{z}$

iii) The complete integral of the equation of the form $f_1(x, p) = f_2(y, q)$ is

a) $z = \int \phi_1(x, c_1)dx + \int \phi_2(y, c_1)dy + b$
b) $z = \int \phi_1(x, p)dx + \int \phi_2(y, q)dy + b$
c) $z = \int \phi_1(x, c_1)dx + b$
d) $z = \int \phi_2(y, c_1)dy + b$

iv) The solution of the equation $s = 2x + 2y$ is --------

a) $z = x^2 + 2xy + \phi(y)$
b) $z = x^2 y + xy^2 + f(f) + f(x)$
c) $z = xy^2 + 2xy + f(x)$
d) $z = 2xy + f(y)$

v) The function $z = e^{-\gamma x}\, \phi(\beta x - \alpha y)$ is a solution of equation -------

a) $(D - mD' - k)z = 0$
b) $(D + mD' + k)z = 0$
c) $(\alpha D + \beta D' + \gamma)z = 0$
d) $(\alpha D - \beta D'\gamma)z = 0$