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II Mid-Term Examination, 2013-14

Mathematics – II **Paper Code - AHM 102**

Time: - 90 Minutes **Max. Marks:-20**

Section – A

Note: Attempt All Questions. **(5 × 1 = 05)**

Q1. Solve the differential equation $\left(D-D^{'2}\right)z=0$

Q2. Classify the differential equation

$(u_{xx}+yu_{xy}+xu_{yy}+2u_x+u_y+6u)=0$ in III quadrant

Q3. Solve the differential equation $DD^{'}\left(D+2D^{'}+3\right)z=0$

Q4. In wave equation $\frac{\partial^2 y}{\partial t^2}=c^2\frac{\partial^2 y}{\partial x^2}$ write the value of c^2

Q5. Find the P.I. of $\left(D-D^{'}\right)^2 z=\phi(x+y)$

Section – B

Note: Attempt Any Three Questions. **(3 × 2 = 06)**

Q1. Solve the differential equation $(y+ux)u_x-(x+yu)u_y=x^2-y^2$

Q2. Find the complete solution of

$\left(4D^2-4DD^{'}+D^{'2}\right)z=16\log(x+2y)$

Q3. Solve the differential equation

$\left(D-3D^{'}-2\right)^2 z=2e^{2x}\tan(y+3x)$

Q4.Solve by the method of separation of variables $\frac{\partial u}{\partial x}+u=\frac{\partial u}{\partial t}$,

If u = $4e^{-3x}$ when t = 0

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Section – C

Note: Attempt Any Three Questions. **(3 × 3 = 09)**

Q1. Find the complete solution of

$$\left(D^3+2D^2D'-DD'^2-2D'^3\right)z=(y+2)e^x$$

Q2. Solve the differential equation

$$r-4s+4t+p-2q=e^{x+y}+\sin(2y+3x)$$

Q3. Solve the differential equation

$$x(y^2+z)\frac{\partial z}{\partial x}-y(x^2+z)\frac{\partial z}{\partial y}=z(x^2-y^2)$$

Q4. A tightly stretched string with fixed end points x = 0 and $x=l$ is initially in a position given by $y=y_0\sin^3\frac{\pi x}{l}$. If it is released from the rest from this position, find displacement $y(x,t)$.