**Home Assignment ( Set – 01 )**

Partial Differential Equations

Paper Code : MTHM – 603

B.Sc. 6th Semester (Major)

1. Form partial differential equations by eliminating arbitrary constants ‘a’

 and ‘b’ from the following relations :

 (i) $z=a\left(x+y\right)+b$

 (ii) $z=\left(x+a\right)\left(y+b\right)$

(iii) $z=ax^{3}+by^{3}$

2. Derive the partial differential equation by the elimination of arbitrary

 function $φ$ from the equation $φ\left(u,v\right)=0$, where $u$ and $v$ are functions of $x$,

 $y$ and $z$.

3. Form partial differential equations by eliminating arbitrary function $φ$ from

 the following relations :

(i) $φ\left(x+y+z,x^{2}+y^{2}-z^{2}\right)=0$

 (ii) $z=φ\left(x^{2}+y^{2}\right)$

(iii) $φ\left(x+y+z\right)=xyz$

4. Define Langrage’s equation. Derive Langrage’s method of solving

 $Pp+Qq=R$, when $P, Q$ and $R$ are functions of $x,y,z$.

5. Solve the following Partial Differential Equations :

 (i) $a\left(p+q\right)=z$

 (ii) $xp-yq=xy$

 (iii) $\left(y-zx\right)p+\left(x+yz\right)q=x^{2}+y^{2}$

 (iv) $\left(p+q\right)\left(x+y\right)=1$

6. Show that the following system of Partial Differential Equations are

 compatible and solve them :

 (i) $xp=yq$, $z\left(xp+yq\right)=2xy$

 (ii) $p=6x+3y$, $q=3x-4y$

7. Find a complete, singular and general integrals of $\left(p^{2}+q^{2}\right)y=qz$.

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