G.PULLAIAH COLLEGE OF ENGINEERING&TECHNOLOGY::KURNOOL

MATHEMATICS-II QUESTION BANK

UNIT-III

I. Eliminate the arbitrary constants and form a Partial difference equations

i)$z = ax + by + a^2 + b^2$ ii)$z = ax + by + \left({}^{a}/_{b}\right) - b$ iii)$(x-h)^2 + (y-k)^2 + z^2 = a^2$ iv) $\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1$ v) $(x-a)^2 + (y-b)^2 = z^2\, Cot^2\alpha$,where α is a parameter

vi)$z = ax^3 + by^3$ vii)$z = a \log\left[\frac{b(y-1)}{1-x}\right]$

viii)$2z = (x+a)^{1/2} + (y-a)^{1/2} + b$ ix)$2z = \sqrt{x+b} + \sqrt{y+b}$ x)$\log(az-1) = x + ay + b$

xi)$x^2 + y^2 + (z-c)^2 = a^2$ xii)$z = (x^2 + a)(y^2 + b)$

II.Eliminate the arbitrary functions and form a Partial difference equations

i)z=$f(x^2 + y^2)$ ii)$z = f(x) + e^y g(x)$ iii)$z = \emptyset_1(x + iy) + \emptyset_2(x - iy)$ iv)$\emptyset(x + y + z, x^2 + y^2 + z^2) = 0$

v)$z = f(x) + xg(y)$ vi)$\emptyset(x^2 + y^2, x^2 - z^2) = 0$ vii) $\emptyset(x^2 + y^2, z - xy) = 0$

viii)$\emptyset(x^2 + y^2 + z^2, z^2 - 2xy) = 0$ ix)f$(xy + z^2, x + y + z)$=0 x) $\emptyset(\frac{y}{x}, x^2 + y^2 + z^2) = 0$

Linear PDE : (pP+qQ=R)

1. Solve the general solution of $p + q = 1$ 2. Solve $i) px + qy = 1$ $ii)\ px - qy = z$ $iii)\ px + qy = 1$

3. Solve the PDE $p\sqrt{x} + q\sqrt{y} = \sqrt{z}$ 4. Solve $p\ Tan\ x + q\ Tan\ y = Tan\ z$

5. Solve the general solution of $y^2 z\, p + x^2 zq = y^2 x$ 6. Solve $(y-z)p + (x-y)q = z - x$

7. Solve $(y+z)p + (z+x)q = x + y$ 8. Solve $y^2 p - xyp = x(z - 2y)$

9. Solve $x(y-z)p + y(z-x)q = z(x-y)$ 10. Solve $x^2(y-z)p + y^2(z-x)q = z^2(x-y)$

11. Solve $z(y-x) = qy^2 - px^2 2$ 12. Solve $(x^2 - yz\,)p + (y^2 - zx)q = z^2 - xy$

Non- Linear PDEs of first order :

Type -1 : $f(p, q) = 0$

1. Solve $i)\ pq = 1$ $ii)\ p^2 + q^2 = 1$ $iii)\sqrt{p} + \sqrt{q} = 1$ $iv)\ pq = p + q$

$v)\ p^2 + q^2 = m^2$ $vi) p^2 + q^2 = npq$

Type -2 : $f(z,p,q)=0$

1. Solve $i)\ p^2+pq=z^2$ $ii)\ z^2=1+p^2+q^2$ $iii) z=p^2+q^2$ $iv) p^3=qz$

$v) ap+bq+cz=0$ $vi) z^2(p^2+q^2+1)=1$ $vii)\ p^3+q^3=qz$

Type -3 : $f_1(x,p)=f_2(y,q)$ [Variable separable]

1. Solve $i)\ p-q=x^2+y^2$ $ii)\sqrt{p}+\sqrt{q}=x+y$ $iii)\ p+q=\sin x+\sin y$ $iv)\ pe^y=qe^x$

$v)\ yp+xq+pq=0$ $vi)\ p^2+q^2=x^2+y^2$ $vii)\ pq+qx=y$ $viii)\ py-q^2x^2=x^2y$

$ix)\ y^3Z_x+x^2Z_y=0$ $x) py=2yx+logq$ $xi) p^2y(1+x^2)=qx^2$ $xii)\ p^2-q^2=x-y$

4.Homogeneous linear partial differential eqns with constant coefficients

1.Solve $(D^3-3D^2D'+4D'^2)z=e^{x+2y}$

2.Solve $(D^3-4D^2D'+4DD'^2)z=2Sin\,(3x+2y), Where\ D=\frac{\partial}{\partial x}, D'=\frac{\partial}{\partial y}$

3.Solve $(D^3-7DD'^2-6D'^3)z=Sin\,(x+2y)+e^{2x+y}$

4.Solve $(D^2+DD'-6D'^2)z=x+y$

5.Solve $4r+12s+9t=e^{3x-2y}$

6.Solve $r+s-5t=ycos\,x$