QUESTION BANK FOR IA - II (APPLIED MATHS-I)

Q.1 If $z(x + y) = (x - y)$ find $\left(\dfrac{\partial z}{\partial x} - \dfrac{\partial z}{\partial y}\right)^2$

Q.2 Show that stationary values of $z = x^3 + 3xy^2 - 3x$ is (-1, 0)

Q.3 If u = $tan^{-1}\left[\dfrac{x^3 - y^3}{x - y}\right]$, Prove that $x^2\dfrac{\partial^2 u}{\partial x^2} + 2xy\dfrac{\partial^2 u}{\partial x \partial y} + y^2\dfrac{\partial^2 u}{\partial y^2} =$

2sinu cos3u

Q.4 If y= a Cos(logx)+b Sin(logx) then show that

$$x^2 y_{n+2} + (2n + 1)xy_{n+1} + (n^2 + 1)y_n = 0$$

Q.5 Find the nth derivative of $\dfrac{x}{(x-1)(x-2)(x-3)}$

Q.6 If $x = \sqrt{vw} \quad y = \sqrt{wu} \quad z = \sqrt{uv}$, Prove that

$$x\frac{\partial\varnothing}{\partial x} + y\frac{\partial\varnothing}{\partial y} + z\frac{\partial\varnothing}{\partial z} = u\frac{\partial\varnothing}{\partial u} + v\frac{\partial\varnothing}{\partial v} + w\frac{\partial\varnothing}{\partial w}$$

Q.7 If $u = f(\dfrac{x-y}{xy}, \dfrac{z-x}{zx})$, Prove that $x^2\dfrac{\partial u}{\partial x} + y^2\dfrac{\partial u}{\partial y} + z^2\dfrac{\partial u}{\partial z} = 0$

Q.8 Reduce the following matrix to normal dorm and find its rank

$$A = \begin{bmatrix} 1 & 1 & 0 \\ 2 & 2 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

Q.9 Investigate for what value of λ and μ the equations

$$x + y + z = 6$$

$$x + 2y + 3z = 10$$

$$x + 2y + \lambda z = \mu$$

have i) No Solution   ii) Unique Solution   iii) Infinitely many Solution

Q.10 Find non-Singular matrics P and Q , such that

$$A = \begin{bmatrix} 1 & 2 & 3 & 2 \\ 2 & 3 & 5 & 1 \\ 1 & 3 & 4 & 5 \end{bmatrix}$$ is reduced to normal form. Find its rank.