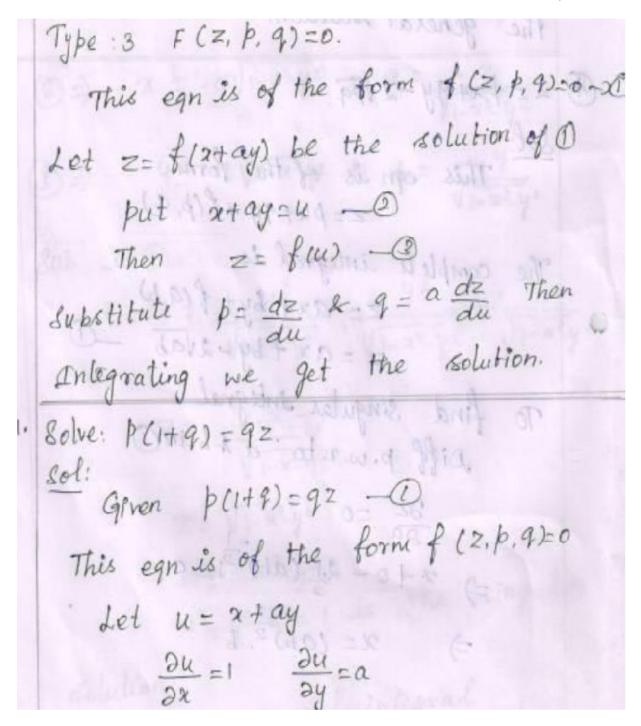




#### **TOPIC: 5 - SOLUTION OF STANDARD TYPES OF FIRST ORDER PARTIAL DIFFERENTIAL EQUATIONS**







$$P = \frac{dz}{du} = \frac{9}{a} = \frac{dz}{du}$$

$$O = \frac{dz}{du} \left(1 + a \frac{dz}{du}\right) = \frac{az}{du}$$

$$\therefore 1 + a \frac{dz}{du} = \frac{az}{az}$$

$$a \frac{dz}{du} = \frac{az}{az}$$

$$\frac{dz}{du} = \frac{az}{az}$$

$$\frac{du}{dz} = \frac{a}{az}$$

$$\frac{du}{dz} = \frac{a}{az}$$

$$\frac{du}{az} = \frac{a}{az}$$

$$2u = \frac{a}{az}$$





Sol: Given 
$$z^2 = 1+p^2+q^2 - 0$$
  
This eqn is of the form  $f(z, p, q) = 0$   
Let  $u = x + ay$   

$$\frac{\partial u}{\partial x} = 1 \quad \frac{\partial u}{\partial y} = a$$

$$p = \frac{dz}{du} \quad q = a \frac{dz}{du}$$

$$D = 2^2 = 1 + \left(\frac{dz}{du}\right)^2 + a^2 \left(\frac{dz}{du}\right)^2$$

$$(\frac{dz}{du})^{2} + (1 + a^{2}) = z^{2} - 1$$

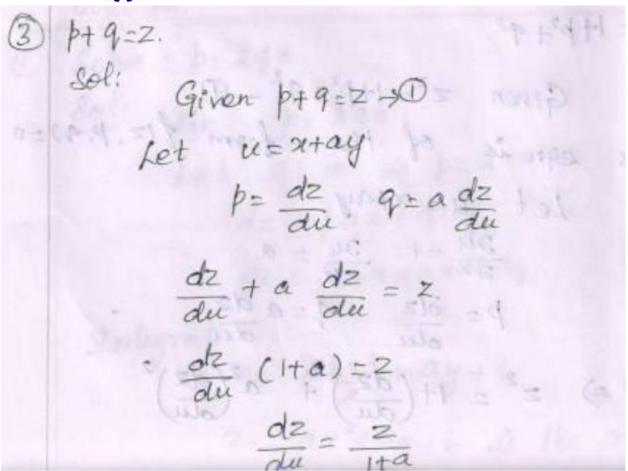
$$(\frac{dz}{du})^{2} = \frac{z^{2} - 1}{a^{2} + 1}$$

$$(\frac{dz}{du})^{2} = \frac{du}{du}$$

$$(\frac{dz}{du})^{2$$







(1+a)  $\frac{dz}{z} = du$ Integrating, (1+a)  $\int \frac{dz}{z} = \int du$ (1+a)  $\log z = u + b$ (1+a)  $\log z = x + ay + b$  is the





Solice: 
$$P(1-q^2) = q(1-2)$$

Solice:  $Q_1 = p(1-q^2) = q(1-z) - p(1-z)$ 

Let  $u = \alpha + \alpha y$ 

$$P = \frac{d^2}{du} = q = a \frac{d^2}{du}$$

$$\frac{d^2}{du} \left(1 - o^2 \left(\frac{d^2}{du}\right)^2\right) = a \frac{d^2}{du} \left(1 - z\right)$$

$$1 - a^2 \left(\frac{d^2}{du}\right)^2 = a \frac{d^2}{du} \left(1 - z\right)$$

$$= a - az$$

$$a^2 \left(\frac{d^2}{du}\right)^2 = a + az + 1$$

$$a \frac{d^2}{du} = \sqrt{1 - a + az}$$

$$\frac{a}{\sqrt{1 - a + az}}$$

$$\frac{a}{\sqrt{1 - a + az}}$$

a 
$$(1-a+az)^{\frac{1}{2}}$$
  $dz = du$ 

antegrating we get
$$\frac{a(1-a+az)^{\frac{1}{2}}}{\frac{1}{2}g} = u+b$$

$$\frac{1}{2}g$$

$$2(1-a+az)^{\frac{1}{2}} = x+ay+b \text{ is the }$$
Complete solution.





Type:civ) (192) 1 - 1 Equation containing 2,4, p.q. i) Attach a 4 p in one side ii) Attach y & q in other side iii) Let it be equal to k iv) find p kg v) dz= pdx + qdy m milamini vi) Integrate we get the complete solution. complete solution @ Solve: p+9 = x+y = d d d d d d d d sol: Gn p-2=y-9=K P-z=k, y-q=k (3) P= x+k g=y-k dz=pdx+qdy dz = (2+1) dx + (y-1) dy Integrating,  $Z = \frac{\alpha^2}{3} + K\alpha + \frac{y^2}{2} - Ky + b \text{ is the}$ complete solution Diff p.w.r. to b, 0=1 is absend There is no singular solution 2) Solve: pq=xy

Joyson 1

Sol: pq=xy









Coimbatore - 641 107

$$Z = \sqrt{k} \int \frac{\alpha}{\sqrt{1+\alpha^2}} d\alpha + k \int y dy + b$$

$$Z = \sqrt{k} \int \frac{\alpha}{\sqrt{1+\alpha^2}} d\alpha + k \int y dy + b$$

$$Z = \sqrt{k} \int \frac{\alpha}{\sqrt{1+\alpha^2}} d\alpha + k \int y dy + b$$

$$Z = \sqrt{k} \int \frac{\alpha}{\sqrt{1+\alpha^2}} d\alpha + k \int y dy + b$$

$$Z = \sqrt{k} \int \frac{\alpha}{\sqrt{1+\alpha^2}} d\alpha + k \int y dy + b$$

$$\sqrt{k} \int \frac{\alpha}{\sqrt{1+\alpha^2}} d\alpha + k \int y dy + b$$

$$\sqrt{k} \int \frac{\alpha}{\sqrt{1+\alpha^2}} d\alpha + k \int y dy + b$$

$$\sqrt{k} \int \frac{\alpha}{\sqrt{1+\alpha^2}} d\alpha + k \int y dy + b$$

$$\sqrt{k} \int \frac{\alpha}{\sqrt{1+\alpha^2}} d\alpha + k \int y dy + b$$

$$\sqrt{k} \int \frac{\alpha}{\sqrt{1+\alpha^2}} d\alpha + k \int y dy + b$$

$$\sqrt{k} \int \frac{\alpha}{\sqrt{1+\alpha^2}} d\alpha + k \int y dy + b$$

$$\sqrt{k} \int \frac{\alpha}{\sqrt{1+\alpha^2}} d\alpha + k \int y dy + b$$

$$\sqrt{k} \int \frac{\alpha}{\sqrt{1+\alpha^2}} d\alpha + k \int y dy + b$$

$$\sqrt{k} \int \frac{\alpha}{\sqrt{1+\alpha^2}} d\alpha + k \int y dy + b$$

$$\sqrt{k} \int \frac{\alpha}{\sqrt{1+\alpha^2}} d\alpha + k \int y dy + b$$

$$\sqrt{k} \int \frac{\alpha}{\sqrt{1+\alpha^2}} d\alpha + k \int y dy + b$$

$$\sqrt{k} \int \frac{\alpha}{\sqrt{1+\alpha^2}} d\alpha + k \int y dy + b$$

$$\sqrt{k} \int \frac{\alpha}{\sqrt{1+\alpha^2}} d\alpha + k \int y dy + b$$

$$\sqrt{k} \int \frac{\alpha}{\sqrt{1+\alpha^2}} d\alpha + k \int y dy + b$$

$$\sqrt{k} \int \frac{\alpha}{\sqrt{1+\alpha^2}} d\alpha + k \int y dy + b$$

$$\sqrt{k} \int \frac{\alpha}{\sqrt{1+\alpha^2}} d\alpha + k \int y dy + b$$

$$\sqrt{k} \int \frac{\alpha}{\sqrt{1+\alpha^2}} d\alpha + k \int y dy + b$$

$$\sqrt{k} \int \frac{\alpha}{\sqrt{1+\alpha^2}} d\alpha + k \int y dy + b$$

$$\sqrt{k} \int \frac{\alpha}{\sqrt{1+\alpha^2}} d\alpha + k \int y dy + b$$

$$\sqrt{k} \int \frac{\alpha}{\sqrt{1+\alpha^2}} d\alpha + k \int y dy + b$$

$$\sqrt{k} \int \frac{\alpha}{\sqrt{1+\alpha^2}} d\alpha + k \int y dy + b$$

$$\sqrt{k} \int \frac{\alpha}{\sqrt{1+\alpha^2}} d\alpha + k \int y dy + b$$

$$\sqrt{k} \int \frac{\alpha}{\sqrt{1+\alpha^2}} d\alpha + k \int y dy + b$$

$$\sqrt{k} \int \frac{\alpha}{\sqrt{1+\alpha^2}} d\alpha + k \int y dy + b$$

$$\sqrt{k} \int \frac{\alpha}{\sqrt{1+\alpha^2}} d\alpha + k \int y dy + b$$

$$\sqrt{k} \int \frac{\alpha}{\sqrt{1+\alpha^2}} d\alpha + k \int y dy + b$$

$$\sqrt{k} \int \frac{\alpha}{\sqrt{1+\alpha^2}} d\alpha + k \int y d\alpha + k$$