to Secretary

## Clarification

Clampication of linear PDE of ruend onder with two Independent variables General form -

8 8 4 8 8 4 C 8 4

+ Fu = p(ny) -- 0

where A.B.C.D.E 4 F are Constants

Equation Die

(1) Hyperbolic, if B2-4AC > 0

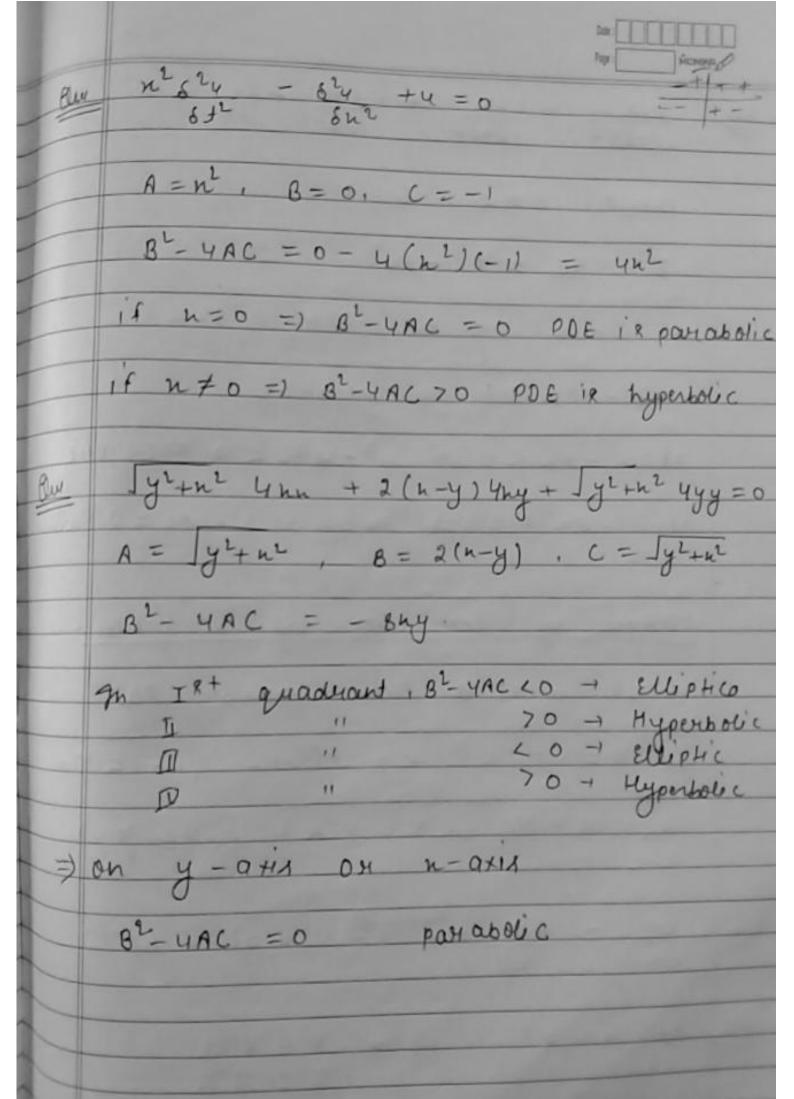
(ii) Elliptic , if B2- MAC & LO

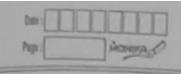
(111) Parabolic, if B2-4AC = 0

Du 624 + 824 + 814 - 0

A=1 , B=1 , C=1

B2- YAC = -3 PDE is Elliptic





Quy + 524 + 284 + 284 + 64 = 0

A= + , B=2 , C=4.

B2-4AC = 4(1-+n)

If (1-th) >0 =) 17th =) th(1

81-4AC >0 =) Hypebolic

17. 1- +n <0 =) 82-4AC < 0 =) Elliptic

if 1-tn = 0 3 th = 1 = B2-UAC = 0 Parabolic

Method of Reparation of variables -

it is used to solve linear PDE

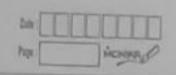
U = XT , X = X(n) , T = T(t)

u = xy , x = x(n) , y = y(y)

 $\frac{\delta y}{\delta n} = \frac{2\delta y}{\delta t} + u = \frac{1}{2} 0 u(n,0) = 6e^{-3n}$ 1 Du

Sol let u = xT, where X = x(n)

 $T \equiv T(t)$ 



$$T \frac{dx}{dn} = 2 \times dT + XT$$

$$T dx = 2x dT + xT$$
 $xT dx xT dt xT$ 

$$\frac{1}{x}\frac{dx}{dn} = \frac{2}{x}\frac{dT}{dt} + 1 = x \quad (8ay)$$

$$\frac{1}{x}\frac{dx}{dx} = \lambda - 2 \qquad \frac{2}{2}\frac{dt}{dt} + 1 = \lambda - 3$$

$$\int \frac{dx}{x} = \int \lambda dn$$

$$X = e^{(\ln + q)}$$

$$X = C_1 e^{\lambda n}$$
  $C_1 = e^{\alpha}$ 

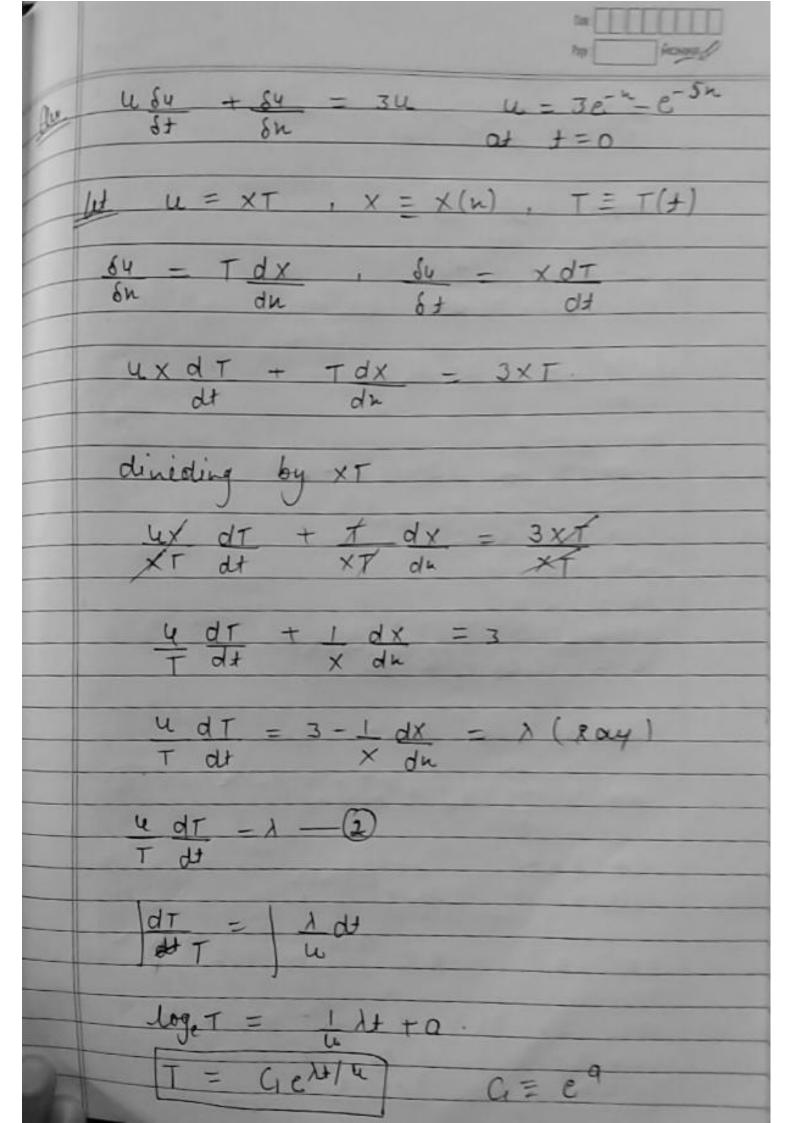
$$\int \frac{dT}{T} = \int \frac{(\lambda - 1)}{2} dt$$

$$T = C_2 e^{(\lambda-1) \frac{1}{2}}, \quad C_2 = e^b$$

General volution is

$$u = \sum_{h=1}^{\infty} a_h e^{\lambda h} + (\underline{\lambda n-1}) +$$

$$a_1 = 6$$
,  $a_2 = 0$ ,  $a_3 = a_3 = a_4 - - - = 0$ 
 $\lambda_1 = -3$ 





$$-1 = 3 - \lambda_1 \qquad 3 - \lambda_2 = -5$$

$$[\lambda_1 = 4]$$

$$[\lambda_2 = 8]$$

 $\frac{1}{x} \frac{d^2x}{dh^2} - \frac{2}{x} \frac{dy}{dh} = A$ dhe dhe dh (02-20-1)x=0 D=d logey = 1y+0 Y = e 24+9. AF = m2-2m-1=0 m = 2+ J4+4) - 2 ± 2 11+1 m= 1± 1+x CF = Ge(1+51+1) x + Cee(1-51+1) h x = 4e(1+51+1)h + cze(1-51+1)h 4= XY 1 (1e(1+11+1) h + (2e(1-11+1) h } Czeny = GC1e(1+1+x ) x + xy + GC1(1-11+x) x + xy General Solution 12. u = { an e (1+ 11+ 1 + 1 + 2 + bn e (1- 11+24) + + hay)

to lesses

$$\frac{1}{x} \frac{d^{2}x}{dx^{2}} = \frac{2}{x} \frac{dy}{dx} = A = 0$$

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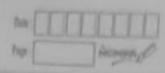
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$$\frac{1}{x} \frac{d^{2}x}{dx^{2}}$$



$$\frac{5^{2}u}{5n^{2}} = \frac{6y}{6y} + 2u$$

$$\frac{5^{2}u}{5n^{2}} - \frac{6y}{6y} - 2u = 0$$

Bul

$$u = xy$$

$$x \equiv x(h) \quad y \equiv y(y)$$

$$\frac{y}{dx^2} - \frac{x}{dy} - \frac{2}{2} \frac{xy}{dy} = 0$$

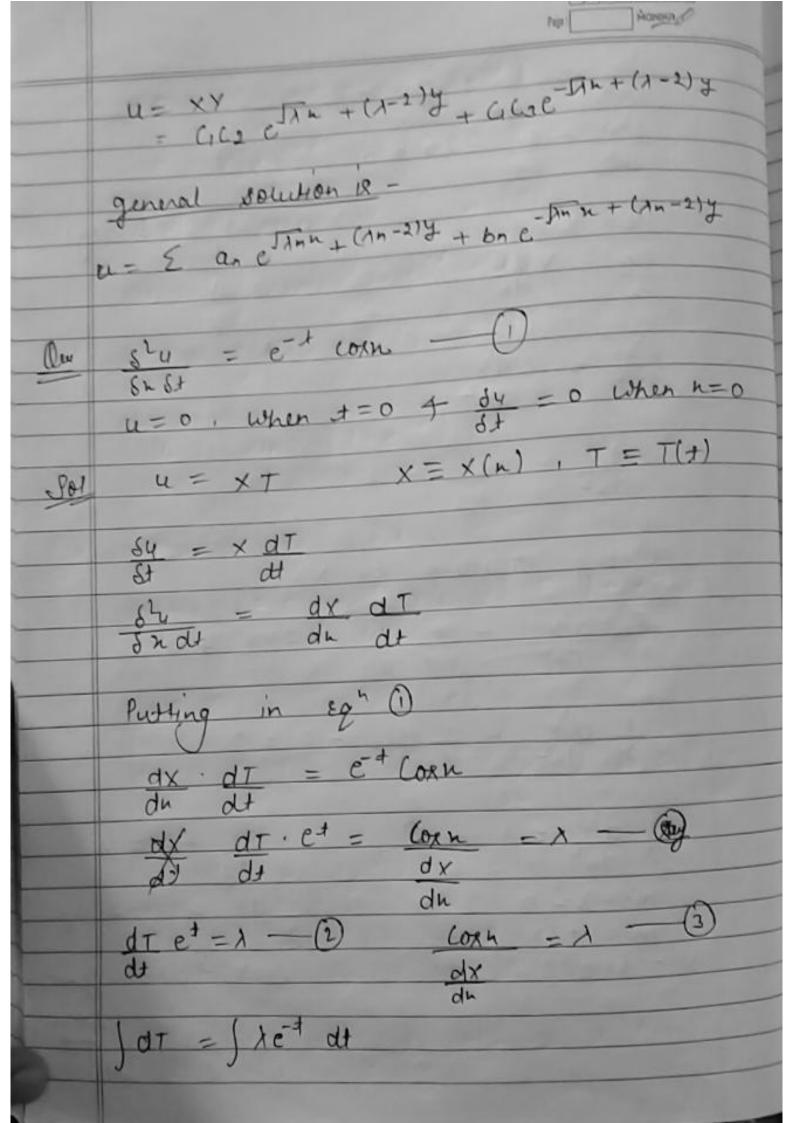
$$\frac{1}{x}\frac{d^{2}x}{dx^{2}} - \frac{1}{y}\frac{dy}{dy} - 2 = 0$$

$$\frac{1}{x}\frac{d^{1}x}{du^{1}} = \lambda - D$$

$$\frac{1}{x}\frac{dy}{dy} + 2 = \lambda$$

$$\frac{1}{x}\frac{dy}{dy} = \lambda$$

$$\frac{1}$$



T= - 1 e-x +ci) Joan dn = 18 dx 1x = I sinh + Cr = (1 rinn + (2) (-1e-+ + (1) - (4) t=0, from 1 u(n,0) = ( \_ sinn + (2) (-x+(1) = ( 1 sinn + (2) (-1+(1) - /+(1=0 =) [(=) Putting value of (, in (+). |u = (-1 minn + (2) (-xe-+ x)diff Egh (5) W.r. + + 84 = ( I sinn + Co) ( ret)

$$0 = (1 \times 0 + 6) (1 e^{-t})$$

$$0 = (2 \times 0 + 6) (1 e^{-t})$$

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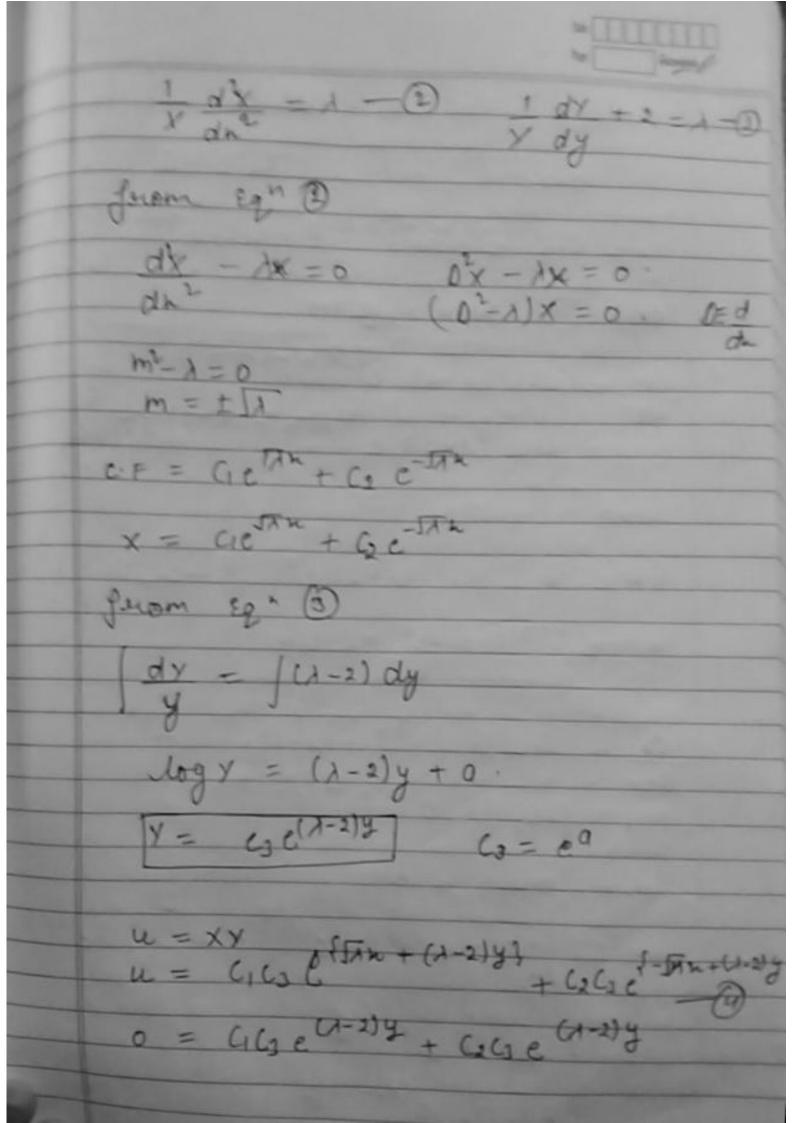
$$0 = (2 \times 0 + 6) (3 e^{-t})$$

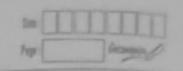
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$$0 = (2 \times 0 + 6$$





$$\frac{dy}{dy} = \frac{d(3(x-2))}{(x-2)} = \frac{\sqrt{3}}{\sqrt{3}} + (x-2) + \frac{1}{\sqrt{3}} = \frac{1}{\sqrt{3}}$$

