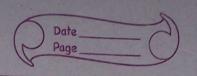
	NAME: Himonshu DIXIT
	BATCH: B10
	ENROCLNO.: 21103262
	Mathematics -2 Tutorial Sheet -2
Q-1·	i) y"+y = Secx
	for cf: characteristic eq: m2+1=0
	$m = \pm^{\circ}$
	30 Y = ACOSN+ BSINX
	part of cf: is cosn
	So, solution is $y = uv$ , $u = \cos x$ , $p = 0$ , $q = 1$
	$d^2V$ + $P+2$ = $AUV$ = $R$
	$\frac{d^2v}{dn^2} + \left(P + \frac{2}{u}\frac{du}{dn}\right)\frac{dw}{dn} = \frac{R}{u}$
	12.
	$\frac{d^2v}{dn^2} + o + 2 \left(-s_n^2 + s_n^2\right) \frac{dv}{dv} = \frac{s_n^2v}{s_n^2}$
	$\frac{d^2v + (2\tan x) dv}{dn} = see^2x$
	$I \cdot F = e^{\int \frac{1}{2} t \operatorname{conn} dN} = \cos n$
	dv x com = 1 som dx + c
	$\frac{dV \times \cos^2 x}{dx} = 36000000000000000000000000000000000000$
4.	dn
	$\frac{dv}{dx} = xsec^2x + csec^2x$
	dn
	$v = \int n sec^2 n  dn + c \int sec^2 n  dn$
The Land	v = xtanx - log  sux  + ctanx + c'
	- 0. Y = UV
	y = xsinx - CornlogIsinx1 + CSinx + C Cosx 94



## (1) $x^2y'' + xy' - y = 2x^2$

for cf: characterstic eqn is: ?

On' solving cauchy euler method; x = e2

 $(D_1(D_1-1) + D_1-1)y = 2e^{2z}$ 

 $(D_1^2-1)y = 2e^{2z}$ 

characterstic eq: m²-1=0

m=±1 : y = Ae2 + Be2

y = Ax + B

y = uv = xv y' = xv' + v y'' = xv'' + v' + v'

 $x^{2}y'' + xy' - y = x^{2}v'' + x^{2}v' + x^{2}v' + xy' - xy' = 2x^{2}$ 

 $x^3v'' + (2x^2 + x^2)v' = 2x^2$ 

 $s^{\circ} \circ I^{\circ} f = e^{\int \frac{2\pi i}{N^{\circ}} dn} = e^{\int \frac{2\pi i}{N^{\circ}} dn}$ 

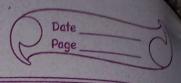
V'x x = [22e2 dx + C

 $v' x^3 = 2x^3 + C$ 

 $V' = \frac{2}{3} + \frac{C}{3}$ 

 $V = \frac{2}{3}x + \frac{-C}{3}x + \frac{C'}{3}$ 

 $y = 2x^2 - C + Cx$ 



(iii) 
$$xy'' + (1-x)y' - y = e^x$$

$$y'' + (\frac{1}{x} - 1)y' + (\frac{1}{x})y' = e^{x}$$

$$y'' = e^{x}v' + ve^{x}$$

$$y''' = e^{x}v'' + v'e^{x} + ve^{x} + e^{x}v'$$

$$ny'' + (1-x)y' - y = xe^{x}v'' + 2xe^{y}v' + ne^{y}v + 1$$

$$(1-x)e^{y}v' + (1-x)e^{y}v - y = e^{x}$$

$$= xe^{\gamma}v'' + xe^{\gamma}v' + e^{\gamma}v' + e^{\gamma}v - e^{\gamma}v = e^{\gamma}$$

$$\sqrt{11} + \left(\frac{1+1}{2}\right) \sqrt{1} = \frac{1}{24}$$

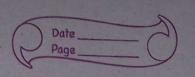
$$I \cdot f = e^{\int \frac{1}{2\pi} r \cdot dn} = e^{\log n + n} = n \cdot e^n$$

$$V'X ne^{N} = \int e^{N} dn$$

$$\int dx = \int \frac{1}{x} dx + C \int \frac{1}{x} e^{x} dx$$

if can not be further Integral

$$V = \log x + C \int dn$$



Que y"-2tanny'+ 8y = exsecx

y" + Py' + Qy = R " P = -2tanx, g=8, R=exsex

 $I = Q - 1 \frac{dP}{dx} - \frac{P^2}{4} = .8 + 1 \times sec^2x - tan^2x = 9$ 

I = const (or const)

o part of c.f. u = e 1/2 Pdx = -1/2x / tomada = Secx

y = uv = seenv

 $\frac{d^2V + TV = R}{dn^2}$ 

 $\frac{d^2v}{dx^2} + 9v = e^{x} \sin x$ 

 $(D^2+9)v=e^{2c}$ 

 $A \cdot 6 : m^2 + 9 = 0$ 

 $m^2+9=0$   $m=\pm 3^{\circ} \qquad \gamma=A\cos 3x+B\sin 3x$ 

 $PI: V = e^{\chi} = e^{\chi}$ 

D2+9

V = CF + PI

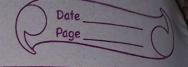
 $= A\cos 3x + B\sin 3x + e^{x}$ 

 $y = uv = Secn \left[ Acos3x + Bsin3x + e^{x} \right]$ 

 $93. xy'' - y' - 4x^3y = 8x^3 sinx^2$ 

y'' + Py' + Qy = R

(honging independent variable x to z by Relation z = f(x)



$$\frac{d^2y}{dz^2} + \frac{P_1}{dz} \frac{dy}{dz} + \frac{Q_1y}{dz} = \frac{R_1}{dz}$$

$$P_{1} = \frac{d^{2}z}{dx^{2}} + P \frac{dz}{dx} \qquad Q_{1} = Q_{2} \qquad Q_{1} = R$$

$$\frac{dx^{2}}{dx} + P \frac{dz}{dx} \qquad Q_{2} \qquad Q_{3} \qquad Q_{4} = R$$

$$\frac{dz}{dx} \qquad Q_{4} \qquad Q_{5} \qquad$$

$$P = -\frac{1}{2}$$
,  $Q = -4x^{\frac{3}{2}}$ ,  $R = 8x^{\frac{3}{2}} \sin x^{\frac{3}{2}}$ 

let 
$$Q_1 = Q_2 = -4$$
 (constant of  $Q_1$ )

$$-4x^2 = -4\left(\frac{dz}{dn}\right)^2$$

$$z = \frac{\chi^2}{2}$$

$$P_{1} = 1 + (\frac{1}{x})(\frac{1}{x}) = 0, Q_{1} = -4, R_{1} = \frac{2\pi r_{simil}^{2}}{4}$$

$$\frac{y_{1}x_{2}}{y_{1}}$$

$$R_{1} = 8 \sin x^{2}$$

NOW; 
$$\frac{d^2y}{dz^2} + P_1 \frac{dy}{dz} + Q_1 \frac{y}{dz} = R_1$$

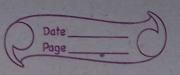
$$\frac{d^2y}{dz^2} + 0 = 8\sin 2z$$

$$(D^2-4)y = 8sin2z$$

$$(D^2-4)y = 8\sin 2z$$
  
 $CF: m^2-4 = 0 : m = \pm 2$ 

$$y = Ae^{2z} + Be^{-2z}$$
$$= Ae^{x^2} + Be^{-x^2}$$

$$P_{1}$$
:  $y = 8\sin 2z = -\sin 2z$   
 $(D^{2}-y)$ 



$$\frac{g^{14} - gy' + gy}{2} = \frac{e^{5x}}{2}$$

$$\frac{g'' + py' + gy}{2} = R$$

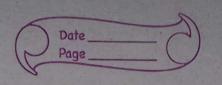
$$\frac{G^{2} - g^{2} + gy}{2} = R$$

Q.5: 
$$(x^2+1) y'' - 2xy' + 2y = 6(x^2+1)^2$$

$$y'' - 2x y' + 2 y = 6(x^2+1)$$

$$p = -2x Q = 2 R = 6(x^2+1)$$

$$x^2+1 x^2+1 x$$



$$\int dv = \int a + a dx$$

$$v = a(x-1) + b$$

$$y = a(x^2-1) + bx$$

hence, two linearly independent Solution of y"-2x y'+

axe & & 4 :

 $\frac{2}{x^2+1}y=0$ 

$$\emptyset = \chi^2 - 1, \quad \psi = \chi \quad \not A_{\parallel}$$