

Ex: 8.2 7 (b) Ux+Uy= (x+y)U

Solution: Given dibberential earlies

Unit Uy = (x+y)U - DLet  $U(x,y) = F(x) \cdot G(y) \cdot Obse the solution$ Disterentiating ear 10 W. r. to a and y

DU = Usi = F'G

37 - Uy = F'G

Putting Values in ear ()

Weget

F'G + FG = (2+7) F.G Dividing both Sides by FG

FG+FG - (2+x) FG
FG

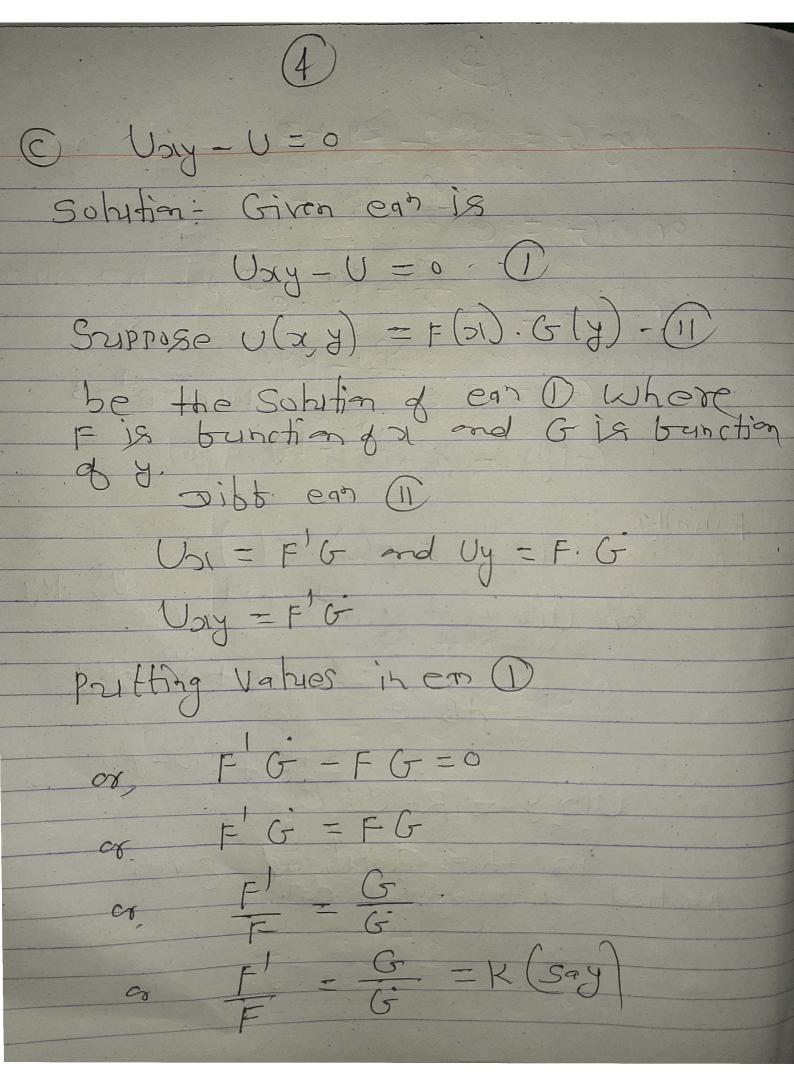
 $\frac{F'G}{FG} + \frac{FG}{FG} = 2C+Y$ 

F + G = a+y 08

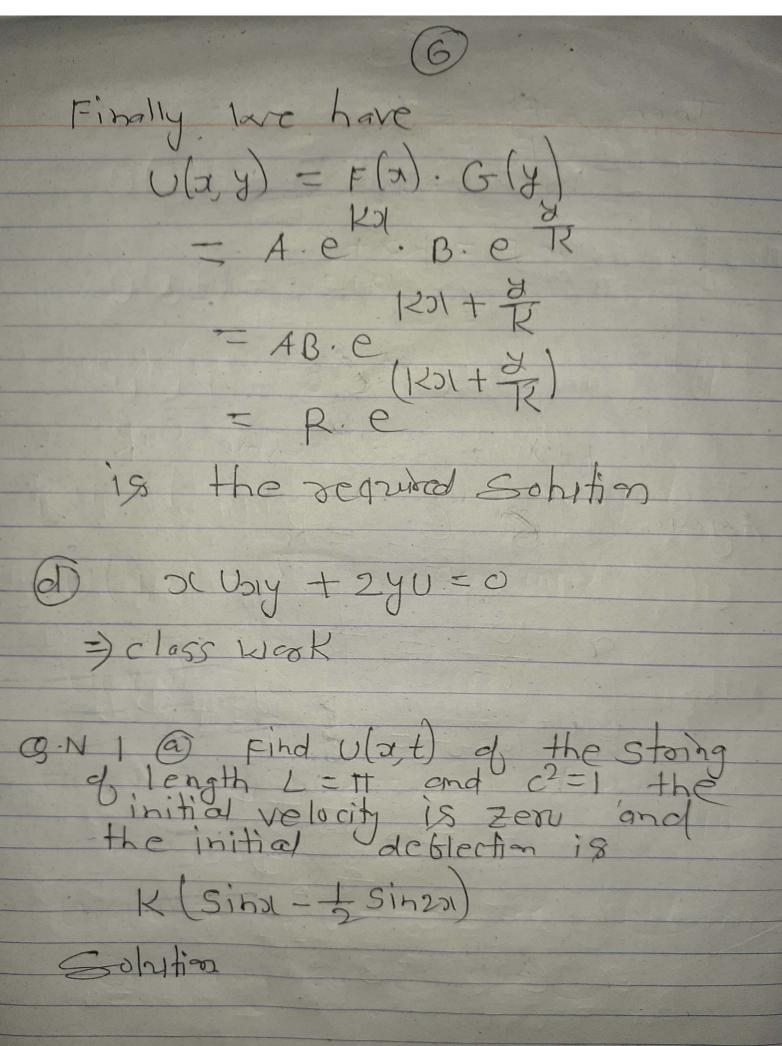
 $\frac{F'}{F} - \chi = -\frac{G}{F} + y$ 

or, F - or = - G + y = K(soy) F-x=K or F = 12+01 integrating wo to a Jog F = Kx + == + C F = e = + Ka+C F = e = + KI C  $F = A \cdot e^{\frac{\pi^2}{2} + K\pi}$ i.e F(x) = A.e 2+ KX we have  $-\frac{G}{G} + g = K$  $\frac{G}{G} = J - K$ Integrating W. o. to y

109 G = 42 - Ky +D or G = e = -12y + D or G = e<sup>2</sup> - ky e<sup>2</sup> or  $G = B \cdot e^{\frac{3^2}{2}} - 12y$   $G(y) = B \cdot e^{\frac{3^2}{2}} - 12y$   $G(y) = B \cdot e^{\frac{3^2}{2}} - 12y$ Finally  $U(x,y) = F(x) \cdot G(y)$ or  $U(x,y) = A \cdot e^{-\frac{x^2}{2} + kx} \cdot B \cdot e^{-\frac{x^2}{2} - ky}$ = AB e = + Kx + + - Ry U(2,3) = R. C 22+12+12(21-8) partial dibberatial ed.

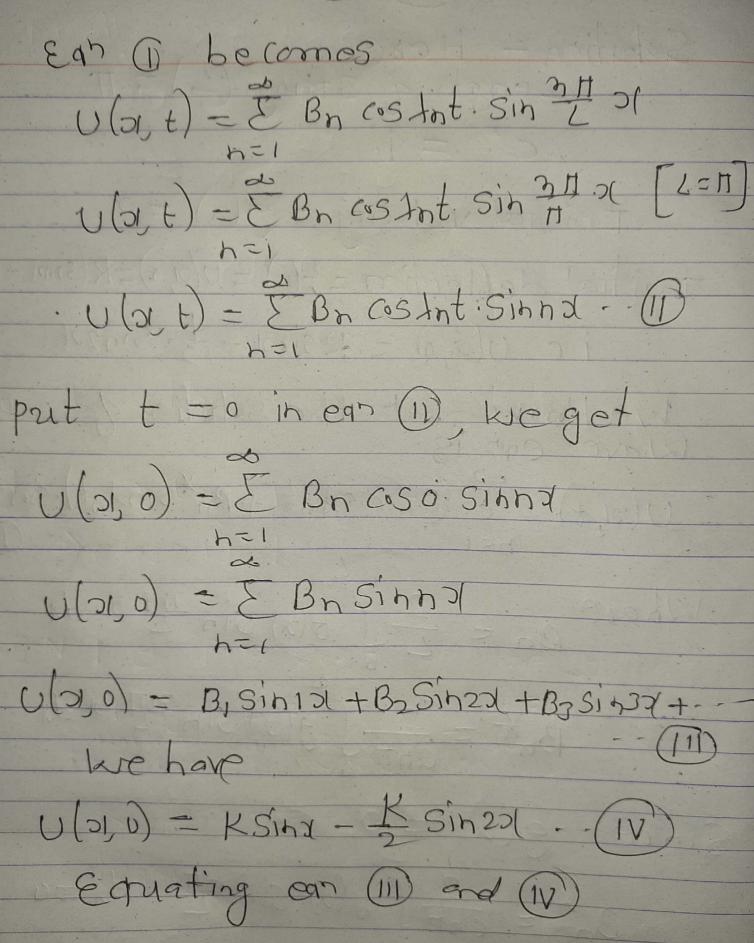


Then FI = K integrating log F = Katc FEERNT FEERNE : F(si) = A.e Kx cherce = K Again G=K or G = K 00 log G = 1 R G=ex-06, G = e R e P or G(y) = B. ex



Solution - Here stoing (L) = IT 0 = 1 Initial velocity = g(x) = 0 Tritial deflection = t(si) = U(si,0)=K(simi - 2 sinzi) i.e U(x,0) = RSinol - 12 Sin20( we know that the solution of 1-D U(si,t) = E (Bn costnt + Bn sintnt). sin II of Where Bn = 2 / 6(2) sin 21 21 day Bn = 2 ( g( )) Sin 2 of da Since g(x) = 0, 50  $B_n = \frac{2}{cn\pi} \int g(x) - \sin \frac{n\pi}{2} dx = 0$ 





Weget KSihol - K Sinzol = BISINOL + Basinax + By Sin3x + Basin 421 + ---Equating corresponding coefficients

By = K, B2 = - K, B3 = B4 = B5 = - = 0 (others all are zero) Form can (1) we have U(s,t) = EBn cosInt. SinntU(31,t) = B1 (05 A, t Sind + B2 (05 A) tsin20( + Bo cos Agt Sinon + B4 Agt Sin 401+-Pritting values of Bi Bo Pg. ---K cost, tsing - K cost t singol + 0 +0+0.-.

U(01,t) = 12 cos A, t sino1 - K cos A2t sino2) we have In = Chit An = 1.n H [6=11] An = nie di=1, d2=2, d3=3---U(s,t) = K cost sind - K cos2t Sin2x U(x,t) = K (cost. sinx - 2 cos2t. sin2) is the required solution. elasswork 2 L=11, 2=4  $b(x) = u(x, 0) = \sin 57$  g(x) = 0,  $u(x, 0) = \sin 57$