Experience certainty



Subject :	Name-Shubhan	N Date
	Envall - 1910212'	3
	Batch - A5	The Company of the Company
		· · · · · · · · · · · · · · · · · · ·
MATHS	ASSIGNMENT(2)	Partial differential
,—		equations
	(0,b) M(N,b) = f	-2 (7)
Ques +1 -	A 32 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
Mlo,y]=g,(y)	$M(9,4) = g_2(y)$
		(9,0)
	(0,0) M(x)4)=fi	(X)
		190
	Mxx + ly	y = b
Be	undaly conditi	
	1117,0) = filx) - A The state of
	· M(a,y) = gx	(y)
La Service	M(x,b) = f	(1)
9740	u(0,4) = gic	y)
U=	11 + 112 + 113 -	. *
The Delivery		124 1 1 Q 2 2 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3
For	W1 ?-	For 112?-
	y)~0	u (30,4) = g1(4)
	10) = 0	M(M)0)=0
ulu	, () = 0	M (9,4)=0
	= 924	M(n,b)=0
0	0 0	
For 1	13 ?-	Fol My?-
M(n,0)		$\mathcal{L}(\mathcal{H},b) = f_2(\mathcal{H})$
u (ó,y)=0	M(0,y) =0
MINIM		M(n,y) = 0
м (а, у		M(a,y) = 0
, ()		U

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Subject: solution for 1110
          Vnx + Vyy =0, (7,y) ∈ D
          ) V(n,0)=0
    BCS
               V(X,b)=0
                V(a,y)= g2(y)
            V(n,y)=x(n)y(y) + D
n"(n) y(y)+ y"(y)·n(n)=0
            n''(x) = -y''(y) = 1(left)
n(x) y(y)
          n"(n) - 1(n) = 0
           y11(y) + 14(y) =0
         using boundary conditions:

(1) V(x,0) = n(x)y(0) = 0 = 0 y(0) = 0

(2) V(x,b) = n(x)y(b) = 0 = 0 y(b) = 0

(3) V(a,y) = n(a)y(y) = 0 = 0 y(a) = 0

(4) V(a,y) = n(a)y(y) = 0 = 0 y(a) = 0
          (1,y))' + o \cdot y = 1,1,y,

y(0) = 0 = y(b)

1 is real
                                               DKYKb
                  1= 42 and 1=0
                            02
             1 = - M2 mith M>0
# Case-I o- 1 = 112
                    y" - 42 y =0
y(0)=0=)
y(y)= c1emy + c2e-my
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y(0) = 0 = $C_1 = -C_2$ Date Subject: ____ y(y) = 2e, sin h, uy y(b) =0 =) 2c, sin huy=0 =) C=0 =) y(y) = 0, $\forall y \in (D,b)$ $A = M^2$ is mot eigen value Case 2: y''' = 0 y'' = 0 y'' = 0 y'' = 0 y'' = 0 y''' = 0 y'' =Case 3:- 1 = - 12 $y''' + U^2y' = 0$ $y''y' = C_1 \cos uy' + C_2 \sin uy'$ y'(y') = 0 = 0 y''(b) = 0 = 0aigen value: 1 m = -n2 12, n=1,2,3yory1= sin n TCX, n=1,2,3 $n^{11} - n^2 \pi^2 n(n)(n) = 0$ =) nn(x) = Ane b + Bne b V(M,y) = (Ame b+ Bme - mt). sin ntr

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Subject: Nent- V(0,4)=0=) & (Ant Bme) sinte ny =0
, the t
Am + Bm = 0 $m = 1, 2, 3 =$
An = -Bn q
V(Q, Y)=p -) > 2 Am ginh n T. A. Alin n Tyr = 9
$V(q,y)=0=$ Σ 2 Ansinh $m\pi a$, $\sin m\pi y = q$
2Ansinbyra = po gcy) sin mry ay
So sin 3 n Te y dy
An = 1 bacy cin mily du
An = 1 Sogry sin nrey dy
Ь
Creneral solution?
u(n,y) = E Ansin un 2 Sinknuy
m=1
Also it $Am = 2$ $(f(x))(x) m \pi x$, dx
Also if An = 2 1 Sf(n) cos not x dn
a
LUL Praise C- HIMIL) = Ant > Amilem Try Coltabril
me have ?- MIN,y) = AO + \(\S \) AMCOSMILA COSTATIY
An=2 sinh(ntb) (an(n-a) cos ntox.
$\frac{An=2}{n\pi}\frac{\sinh\left(\frac{n\pi b}{a}\right)}{\int_{0}^{a}n(n-a)\frac{\cos n\pi x}{a}}$
^
(n(1-a) asnun da =
$\int_0^a n(x-a) \cos n\pi n dx =$
$=) \frac{2a^3\cos n\pi - a^3\cos n\pi}{n^2\pi^2}$
0 3 COS MIT - N3 - 11 + M
$\frac{a^3 \cos n\pi}{m^2\pi^2} \Rightarrow \frac{a^3 (-1)^2 n}{m^2\pi^2}$
(1)-(C- 17)-10-



Subject: n is wen ?-

$$An = a3$$
 $A_2 = a3$ $A_4 = a3$ $A_{7} = a3$

n is odd ?-

$$Am = -a3$$
 $A_1 = -a3$, $A_3 = -a3$ $9\pi^2$

 $Ao = 2 \int n(n-a) da$

$$= \frac{2}{\alpha} \left[\frac{n3}{3} - \frac{\alpha}{2} \right]^{\alpha} = \frac{2n - \alpha 3}{6} = \frac{-\alpha^{2}}{3}$$

 $u(x,y) = -\alpha^2 + \begin{bmatrix} -\alpha^3 \cos \pi x \cos h \tau y + \alpha^3 & 2\cos \tau cx \\ \hline 3 & \begin{bmatrix} \pi^2 & \alpha & \alpha & u\pi^2 & \alpha \end{bmatrix}$

= Ans.

Quest27 T(n)t)= e-dx2t (A COSAx + B simia)

an = e-a12t (-Adsin An + Bacos An)

using (I) Boundary Condition
i.e. dt | =0

e- «12t (-Adsinda +Bdcosta)=0 sind=0 >0

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 $\lambda = m\pi c$, m=0,1,2,3--now using principle of superposition; $T(n,t) = \sum Ane^{-\alpha/2}t \cos Ax$ $= \sum Ane^{-\alpha}(nr)^2t \cos n\pi x$ n=0using T(n,0) - n(q-n) 2 $O< n<\alpha$ $T(n,0) = n(q-n) = Ao + \sum_{n=1}^{\infty} Ane^{-\alpha} (\frac{n\pi}{\alpha})^{2+}$ $Ao = 2 \int_{\Omega} u(\alpha - u) du$ $= 2 = \begin{bmatrix} a^3 - a^3 \end{bmatrix} = 2 \times a^3$ $A_0 = a^3$ $An = 2 \int_{\alpha}^{\alpha} n(\alpha - n) \cos(n\pi n) dn$ $= \frac{2}{a} \left[\int_{0}^{a} n \cos \left(\frac{n \pi n}{a} \right) dn - \int_{0}^{a} \frac{n^{2} \cos \left(\frac{n \pi n}{a} \right)}{a} \right]$ $= -2a^{2} \left[1 + \cos n\pi \right] = -2a^{2} \left[1 + (+)^{n} \right]$ $m^{2}\pi^{2}$ $m^{2}\pi^{2}$ If n us even: - An = -4a2

m272 If n is odd: - An=0 $T(n,t) = \frac{a^2 - 4a^2}{3} \sum_{\pi=2,4,6--}^{\pi_1} \frac{1}{2} \cos(\frac{n\pi x}{a}) e^{-x} (\frac{n\pi}{a})^2 t$