ADITYA DEGREE COLLEGES – ANDHRA PRADESH

MID-I II BSC, Major- Mathematics- Integral transforms

Time:2 hrs. Marks:60

SECTION-A **5x4=20**

I.Answer any "FIVE" of the following:

1. Solve $(D^2+9)y = \cos 2t$ if $y(0)=1$, $y\left(\frac{\Pi}{2}\right) = -1$.

2. Solve $(D^2-D-6)\ y=2$, if $y=1$, $Dy=0$ when $t=0$.

3. Solve $ty^{11}+ y^1+4ty=0$, if $y(0)= 3$, $y^1(0)=0$.

4. Solve $\frac{dy}{dt}$ $+y=1$ given $y=2$ when $t=0$.

5. Solve $(D+2)\ x-y= -6t$

$-2x+ (D+1)y= -30t$ if $x(0)=2$, $y(0)=3$.

6. Solve $\frac{\partial y}{\partial x} - \frac{\partial y}{\partial t} = 1 - e^{-t}$, o<x>1, t>0, given that $y(x,0)=x$.

7. Solve $\frac{\partial^2 y}{\partial x^2} = \frac{\partial y}{\partial t}$, $y\left(\frac{\Pi}{2},t\right)=0, \left(\frac{\partial y}{\partial x}\right)_{x=0}$ and $y(x,0)= \cos 3x$.

8. XXXX

SECTION-B **4x10=40**

II. Answer ALL questions:

9.(a)Solve $(D+2)^2\ y= 4\ e^{-2t}$ with $y(0) = -1$, $y^1(0)=4$

(or)

(b)Solve $(D^2+1)= t \cos 2t$, $y=0 = \frac{dy}{dt}$ when $t=0$.

10. (a)Solve $t\ \frac{d^2y}{dt^2}$ $+ (1-2t)\ \frac{dy}{dt}$ $-2\ y=0$, $y(0)= 1$, $y^1(0)=2$.

(or)

(b) Solve $y^{11}-ty^1+y=1$, $y(0)=1$, $Y^1(0)=2$

11. (a) Solve $(D-2)x- (D-2)y= 1-2t$

$(D^2+1)x+ 2Dy=0$ if $x(0)= 0$,$Y(0)=0$, $x^1(0)=0$.

(or)

(b) Solve $(D-2)x- (D+1)y= 6\ e^{3t}$

$(2D-3)x+ (D-3)y= 6\ e^{3t}$

If $x=3$, $y=0$ when $t =0$.

12. (a) Solve $\frac{\partial y}{\partial x} = \frac{2\partial y}{\partial t} + y, y(x,0) = 6e^{-3x}$ which is bounded for x>0, t>0.

(or)

(b) Find the bounded solution of $\frac{\partial y}{\partial t} = \frac{\partial^2 y}{\partial x^2}$ x>0, t>0, $y(0,t)=1$, $y(x,0)=0$.