Course/Branch: BE/ CIVIL,EEE,MECH	**Year / Semester** : II/III	Format No.	NAC/TLP-07a.13
Subject Code :MA8353	**Subject Name** : TRANSFORMS AND PARTIAL DIFFERENTIAL EUATIONS	Rev. No.	02
Unit No : 03	**Unit Name:** Applications of partial differential Equations	Date	30-09-2020

OBJECTIVE TYPE QUESTION BANK

S.No.	Objective Questions [MCQ / True or False / Fill up with Choices)	BTL
1	Classify the partial differential equation $x^2u_{xx}+2xyu_{xy}+\left(1+y^2\right)u_{yy}-2u_x=0$, $x\neq 0$ (a).Elliptic (b). hyperbolic (c). parabolic (d). circle	L3
2	Classify $u_{xx}=u_{yy}$ (a).0 (b).2 (c).-1 (d).3	L3
3	A rod 30 cm long has its end A and B kept at 20^oC and 80^oC respectively until steady state conditions prevail. Determine the temperature at steady state (a).2 x +20 (b). $\frac{2}{3}x+40$ (c). $\frac{4}{3}x+20$ (d). 3 x +20	L3
4	In the wave equation $\frac{\partial^2 y}{\partial t^2}=c^2\frac{\partial^2 y}{\partial x^2}$, what does c^2 stand for? (a). $\frac{T}{M}$ (b). $\frac{T^2}{M}$ (c). $\frac{M}{T}$ (d). $\frac{M^2}{T}$	L3
5	If initial displacement is $10\sin\frac{3\pi x}{7}$ and intial velocity is $15\sin\frac{9\pi x}{7}$ .Find c_3 (a).9 (b).10 (c).3 (d)7	L3
6	State the Fourier law of heat conduction (a). $Q=-KA\left(\frac{\partial u}{\partial x}\right)_x$ (b). $Q=-K^2A\left(\frac{\partial u}{\partial x}\right)_x$ (c). $Q=K^2A\left(\frac{\partial^2 u}{\partial x^2}\right)_x$ (d). $Q=KA\left(\frac{\partial u}{\partial x}\right)_x$	L3
7	A tightly stretched string with fixed end points x=0 and x=l is initially in a position given $Y_0\frac{\sin^3\pi x}{l}$ .If it is released form rest in this position, write the boundary conditions. (a).y(0,t)=0 (b).y(l,t)=0 (c).y(x,0) = f(x) (d). $\left(\frac{\partial y}{\partial t}\right)_{t=0}=g(x)$	L3

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8	Write the initial conditions of the wave equation if the string has an initial displacement f(x) but no initial velocity (a).y(0,t)=0 (b).y(l,t)=0 (c).y(x,0) = f(x) (d). $\left(\frac{\partial y}{\partial t}\right)_{t=0} = g(x)$	L3
9	One dimensional wave equation is (a). hyperbolic (b).parabolic (c).ellipse (d).circle	L3
10	One dimensional heat equation is (a). parabolic (b). hyperbolic (c).ellipse (d).circle	L3
11	Classify the partial differential equation $4\frac{\partial^2 u}{\partial x^2} = \frac{\partial u}{\partial t}$ (a). parabolic (b). hyperbolic (c).ellipse (d).circle	L3
12	A tightly stretched string with fixed end points x=0 and x=l is initially in a position given $v_0 \frac{\sin^3 \pi x}{l}$ .If it is released form rest in this position, write the boundary conditions. (a).y(0,t)=0 (b).y(l,t)=0 (c).y(x,0) = f(x) (d). $\left(\frac{\partial y}{\partial t}\right)_{t=0} = g(x)$	L3
13	Write down the laplace equation of two dimensions heat flow equation (a). $\left(\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2}\right) = 0$ (b). $\left(\frac{\partial^2 u}{\partial x^2} - \frac{\partial^2 u}{\partial y^2}\right) = 0$ (c). $\left(\frac{\partial^2 y}{\partial x^2} + \frac{\partial^2 y}{\partial y^2}\right) = 0$ (d). $\left(\frac{\partial y}{\partial t}\right)_{t=0} = g(x)$	L3
14	In Two dimensional heat flow equation when K is positive (a). $u(x,y) = (c_1 e^{px} + c_2 e^{-px}).(c_3 \cos py + c_4 \sin py)$ (b). $u(x,y) = (c_5 \cos py + c_6 \sin py)\ (c_7 e^{px} + c_8 e^{-px})$ (c). $u(x,y) = (c_9 x + c_{10})(c_{11} y + c_{12})$ (d). $u(x,y) = (c_9 y + c_{10})(c_{11} x + c_{12})$	L3
15	In Two dimensional heat flow equation when K is positive	L3

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	(a). $u(x,y)=(c_1e^{px}+c_2e^{-px}).(c_3\cos py+c_4\sin py)$ (b). $u(x,y)=(c_5\cos py+c_6\sin py)\ (c_7e^{px}+c_8e^{-px})$ (c). $u(x,y)=(c_9x+c_{10})(c_{11}y+c_{12})$ (d). $u(x,y)=(c_9y+c_{10})(c_{11}x+c_{12})$	
16	In Two dimensional heat flow equation when K is negative (a). $u(x,y)=(c_1e^{px}+c_2e^{-px}).(c_3\cos py+c_4\sin py)$ (b). $u(x,y)=(c_5\cos py+c_6\sin py)\ (c_7e^{px}+c_8e^{-px})$ (c). $u(x,y)=(c_9x+c_{10})(c_{11}y+c_{12})$ (d). $u(x,y)=(c_9y+c_{10})(c_{11}x+c_{12})$	L3
17	In Two dimensional heat flow equation when K is Zero (a). $u(x,y)=(c_1e^{px}+c_2e^{-px}).(c_3\cos py+c_4\sin py)$ (b). $u(x,y)=(c_5\cos py+c_6\sin py)\ (c_7e^{px}+c_8e^{-px})$ (c). $u(x,y)=(c_9x+c_{10})(c_{11}y+c_{12})$ (d). $u(x,y)=(c_9y+c_{10})(c_{11}x+c_{12})$	L3
18	The rate of change of temperature with respect to…… is called the temperature Gradient.	L3
19	Find C_{50} by using the boundary values $\frac{\partial^2 y}{\partial t^2}=4\frac{\partial^2 y}{\partial x^2}$ (a). $\left(\frac{-1}{5\pi}\right)$ (b). $\left(\frac{1}{\pi}\right)$ (c). $\left(\frac{1}{2\pi}\right)$ (d). π	L3
20	If $u(x,t)=(A\cos px+B\sin px)e^{-\alpha^2p^2t}$ to approach zero as t tends---------- (a).infinty (b). finte (c).continuous (d).discontinuous	L3