MISRIMAL NAVAJEE MUNOTH JAIN ENGINEERING COLLEGE

COMMON TO ALL BRANCHES

QUESTION BANK

Subject :TPDE **Sub code : MA6351**

UNIT: III(APPLICATION OF PDE) **Year : 2016-2017**

PART-A

1. Write down all the possible solution of one dimensional heat flow equation $U_t = U_{xx}$
2. What is the steady state heat equation in two dimensional Cartesian form?
3. Write the boundary conditions for the following problem: A rectangular plate is bounded by the line x=0, y=0, x=a and y=b. Its surfaces are insulated the temperature along x=0 and y=0 are kept at $0^{\circ}c$ and the others at $100^{\circ}c$
4. Given three possible solutions of two dimensional steady state heat flow equations
5. What is meant by steady state condition in one dimensional heat flow?
6. Classify the partial differential equation $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$
7. If the ends of a string of length 'l' are fixed and the midpoint of the string is drawn aside through a height h and the string is released from rest, write the initial conditions.
8. A tightly stretched string with fixed end points $x = 0$ *and* $x = l$ is initially in a position given by $y(x,0) = y_0 sin^3\left(\frac{\pi x}{l}\right)$ If it is released from rest in the position, write the boundary conditions.
9. In the one dimensional heat equation $u_t = c^2 u_{xx}$ What is c^2
10. What is the general solution of a string of length L whose end point are fixed and which start from rest.
11. Classify the PDE $y^2 u_{xx} - 2xyu_{xy} + x^2 u_{yy} + 2u_x - 3u_y = 0$
12. What are the possible solution for Laplace equation $u_{xx} + u_{yy} = 0$
13. A rod 20 cm long with insulated sides has its ends A and B kept at 30^{o}c and 90^{o}c respectively . Find the steady state temperature distribution of rod.
14. State the governing equation for one dimensional heat equation and necessary condition to solve the problem.
15. Write all variable separable solutions of the one dimensional heat equation $u_t = \alpha^2 u_{xx}$

PART-B

1. A string is stretched and fastened at two points $x = 0$ and $x = l$ apart. Motion is started by displacing the string into the form $y = k(lx - x^2)$ from which it is released at time t=o. Find the displacement of any point on the string at a distance of λ from one end at time t.
2. A tightly stretched string of length 2l is fastened at both ends. The midpoint of the string is displaced by a distance b transversely and the string is released from rest in this position. Find an expression for the transverse displacement of the string at any time during the subsequent motion.