SRM Institute of Science and Technology
College of Engineering and Technology
Department of Mathematics

SRM Nagar, Kattankulathur – 603203, Chengalpattu District, Tamilnadu

Academic Year: 2022-2023(ODD)

Course Code &Title: 18MAB201T-Transforms and Boundary Value Problems

Year &Sem: II/III

Tutorial 3

Part A

Q. No	Questions
1	What is meant by steady state condition in heat flow?
2	Write down the form of the general solution of the temperature distribution in a homogeneous bar of length l, if the ends are kept at zero temperature.
3	What is the basic difference between the solutions of the 1D wave and heat equations?
4.	Find the general solution of the temperature distribution of a rod in case of steady state situation.
5.	The ends of a rod of length 30 cm are maintained at the temperature 10^oC and 30^oC respectively until steady state prevails. Determine the steady state temperature of the rod.

Part B

6.	A uniform bar of length 10 cm through which heat flows is insulated at its sides. The ends are kept at zero temperature. If the initial temperature at the interior points of the bar is given by $3\sin\frac{\pi x}{5} + 2\sin\frac{2\pi x}{5}$, find the temperature distribution in the bar.
7.	A rod of length l has its ends A and B kept at 0℃ and T℃ respectively, until steady-state condition prevails. If the temperature at B is reduced suddenly to 0℃ and kept so, while that of A is maintained, find the temperature $u(x,t)$ at a distance x from the end A at time t.
8.	A rod of length 20 has its ends A and B kept at 30℃ and 90℃ respectively, until steady-state condition prevails. If the temperature at each end is then suddenly reduced suddenly to 0℃ and kept so, find the temperature $u(x,t)$ at a distance x from the end A at time t.
9.	A rod l cm long with insulated lateral surface is initially at the temperature 100℃ throughout. If the temperatures at the ends are suddenly reduced to 25℃ and 75℃ respectively, find the temperature distribution in the rod at any subsequent time.
10.	A rod of length 10 cm has its ends A and B kept at 0℃ and 20℃ respectively, until steady-state condition prevails. If the temperature at B is suddenly raised to 60℃ and kept so, while that of A is kept at 0℃, find the temperature $u(x,t)$ at a distance x from the end A at time t.