R18 Regulation *Subject code:2P6CB*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

B.Tech VI Semester Supplementary Examinations, May 2025

HEAT TRANSFER

(ME)

Maximum Marks: 70 Date: 20.06.2025 Duration: 3 hours

Note: **1.This question paper contains two parts A and B.**
2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (10X2M=20 Marks)		Marks	CO	BTL
1	Define temperature gradient.	2M	1	L1
2	What are the different modes heat transfer?	2M	1	L1
3	Define heat flux.	2M	2	L1
4	Give examples for Transient heat transfer.	2M	2	L1
5	What is meant by periodic heat transfer?	2M	3	L1
6	Differentiate between laminar and turbulent flow.	2M	3	L1
7	What are the types of condensation processes?	2M	4	L1
8	What is the range of effectiveness of a heat exchanger?	2M	4	L1
9	Define Stefan Boltzmann constant.	2M	5	L1
10	What is the range of values for the emissivity of a surface?	2M	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
11	Derive the general conduction equation for Cartesian co-ordinate system.	10M	1	L2
	OR			
12	Derive the general conduction equation for Cylindrical co-ordinate system.	10M	1	L2
13	Briefly describe about lumped heat capacity system. Give its examples.	10M	2	L2
	OR			
14	Derive the heat conduction through composite sphere.	10M	2	L2
15	Derive the heat dissipation from a fin insulated at the tip.	10M	3	L2
	OR			
16	Explain the procedure to form dimensionless groups by using Buckingham-pi theorem.	10M	3	L2
17	A vertical cylinder 5 cm diameter and 1 m high is maintained at a temperature of 65^0 C in atmosphere of air at 15^0 C. Calculate the rate of heat loss by free convection from the cylinder to air.	10M	4	L2
	OR			

18	Derive the equation for parallel flow heat exchanger using NTU method.	10M	4	L2
19	Define shape factor. Derive the expression for shape factor between two black bodies.	10M	5	L2
	OR			
20	a) Define absorptivity, reflectivity and transmissivity. b) Two large parallel plates of emissivities 0.95 and 0.65 are at temperatures 327^0 C and 27^0 C respectively. A radiation shield of aluminum sheet of emissivity 0.4 is placed between two plates. Determine the shield temperature and the heat transfer rate per unit area. With the presence of the shield.	5M 5M	5	L2