



R20 Regulation

Subject code:3P6CB

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech VI Semester Supplementary Examinations, December 2024

Heat Transfer (ME)

Maximum Marks: 70

Date:30.12.2024

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 which carries 10M.
 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		CO	Bloom Tx
1	What is mean by conduction heat transfer?	1	L1
2	Give examples for initial' & boundary conditions?	1	L1
3	What is the function of insulating materials?	2	L1
4	Give examples for Transient heat transfer.	2	L1
5	What is meant by periodic heat transfer?	3	L1
6	Differentiate between laminar and turbulent flow.	3	L1
7	What is mean by drop wise condensation?	4	L1
8	What is the function of insulating materials?	4	L1
9	Define regenerator.	5	L1
10	What is the range of values for the emissivity of a surface?	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		CO	Bloom Tx
11	Explain the respective rate equations governing conduction, convection and radiation? [10M]	1	L2
OR			
12	Derive the general conduction equation for Cartesian co-ordinate system? [10M]	1	L2
13	Derive the heat conduction through composite cylinder? [10M]	2	L2
OR			
14	A steel cylinder of diameter 0.25 m and length 0.8 m initially at 35 ⁰ C is placed in a furnace where the temperature is 900 ⁰ C. Determine the temperature at the centre and on the surface of the cylinder after a lapse of 1 hr. (Assume thermal conductivity = 35 W/mk, density = 7800 kg/m ³ , specific heat = 0.83 kJ/kg k, heat transfer coefficient = 233 W/m ² k). [10M]	2	L2
15	The resistance R experienced by a partially submerged body depends upon the velocity V, length of the body l, viscosity of the fluid μ , density of the fluid ρ and gravitational acceleration g. Obtain a dimensionless expression for R by using Buckingham π -method? [10M]	3	L2

	OR		
16	Derive the heat dissipation from an infinitely long fin? [10M]	3	L2
17	A vertical cylinder 5 cm diameter and 1 m high is maintained at a temperature of 65° C in atmosphere of air at 15° C. Calculate the rate of heat loss by free convection from the cylinder to air. [10M]	4	L2
	OR		
18	In a counter flow double pipe heat exchanger, water is heated from 25°C to 65°C by oil with a specific heat of 1.45kJ/kg-K and mass flow rate of 0.9kg/s. the oil is cooled from 230°C to 160°C. If overall heat transfer coefficient is 420W/m ² -K. Calculate the rate of heat transfer, mass flow rate of water and surface area of heat exchanger? [10M]	4	L2
19	Define shape factor. Derive the expression for shape factor between two black bodies? [10M]	5	L2
	OR		
20	What is Stefan Boltzmann Law? Explain the concept of total emissive power of a surface? [10M]	5	L2