



SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)

Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai

Accredited by NAAC-UGC with 'A++' Grade (Cycle III) &  
Accredited by NBA (B.E - CSE, EEE, ECE, Mech & B.Tech.IT)

COIMBATORE-641 035, TAMIL NADU



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**DEPARTMENT OF MECHANICAL ENGINEERING**

Faculty Name : **Dr. C. Senthilkumar** Academic Year : **2024-2025 (Even)**  
Year & Branch : **III Mech** Semester : **VI**  
Course : **19MEB302 Heat & Mass Transfer**

**Assignment 1-**

**Date to Submit 04-03-2025**

Date to submit before 15-03-2025 (Late submission will lose marks as discussed in the class)

**Rubrics:**

- Quality of Content (4 Marks)
- Organization & Presentation (4 Marks)
- On time Submission (2 Marks) \*Considered if submitted before 04-03-2025 will be given 2 marks

**Portion Unit 1, Unit 2 (Conduction and Convection)**

1. Distinguish Semi-infinite and infinite solids and, discuss on problem solving procedure of same
2. Enumerate the numerical solving procedure of bank of tubes, with necessary steps involving in it
3. Draw and explain , Lumped analysis problems solving procedure using Heisler chart with the help of HMT Data book
4. Air at 20°C flowing over a flat plate at velocity of 3m/s. If the flat plate is maintained at 60C. Calculate the heat transfer per unit width of plate assuming length of the plate is equal to 2m. Calculate the following at x=300mm (i) Hydrodynamic Boundary layer (ii) Average friction coefficient (iii) Wall shear stress (iv) Total Drag Force
5. The outer surface of cylindrical vertical tube having 25cm diameter is exposed to saturated steam of mass flow rate 65Kg/hr at 1.7 bars for condensation. The surface temperature of the tube is maintained at 85 °C. Calculate the following (i) Length of the tube (ii) Thickness of the condensate layer to condense
6. Discuss, Industry case Elaborately on External convective flow considering Laminar and Turbulent, also deliberate the problem-solving procedure of the same with help of Heat and mass Transfer data book



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#### Assignment II-

**Date to Submit 28-04-2025**

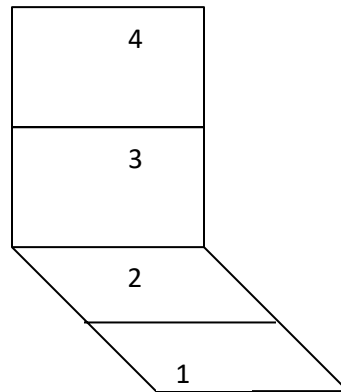
Date to submit before 15-03-2025 (Late submission will lose marks as discussed in the class)

#### Rubrics:

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1. Differentiate film wise and drop wise condensation with necessary sketch, cite few of the application of those studies in industry as - case study
2. Write a Case study on Electronic cooling and its need of the day in electronic gadgets too
3. What does mean by Fouling factor analysis in heat transfer? express with necessary sketch using HMT data book.
4. A parallel flow heat exchanger is used cool 4.2 kg/min of hot liquid of specific heat 3.5kJ/kg K at 130°C. A cooling water of specific heat 4.18 kJ/kgK is used for cooling purpose of a temperature of 15°C. The mass flow rate of cooling water 17 kg/min. calculate the following.
  - a. Outlet temperature of liquid
  - b. Outlet temperature of water
  - c. Effectiveness of heat exchanger
5. Formulate the expression of LMTD method for counter flow heat exchanger
6. Write a industry case study on Radiation shield usage in a boiler also solve the below said numerical.

The size of each square is  $1\text{ m} \times 1\text{ m}$ . Determine the view factor  $F_{1-4}$  for the figure shown



7. Two large parallel plates at temperature of  $427^\circ\text{C}$  and  $27^\circ\text{C}$  respectively. (hot plate)  $\epsilon = 0.9$  and  $\xi$  (cold plate)  $= 0.6$ . If a polished aluminum shield having emissivity of  $0.04$ . Find the percentage of reduction in the radiation of the heat transfer.
8.  $800\text{W}/\text{m}^2$  of radiant energy incident upon a surface, out of which  $300\text{W}/\text{m}^2$  absorbed,  $100\text{W}/\text{m}^2$  is reflected and the remainder is transmitted through the surface. Analyze the following  
i) Absorptivity ii) Reflectivity iii) Transmissivity
9. Discuss a case study on Heat and Mass Transfer analogy dealing with practical application, relate it with an assumed practical problem (As discussed in the class)
10. Distinguish Convective mass transfer and heat transfer, write down the problem-solving procedure alone using Heat and Mass data book.