Assignment Booklet

MSCRWEE Programme

M.Sc (Renewable Energy and Environment)

First Semester	
MRW-001	Energy Conversion
MRW-002	Heat Transfer
MST-001	Foundation of Mathematics and Statistics
MED-003	Energy and Environment

SCHOOL OF ENGINEERING & TECHNOLOGY
INDIRA GANDHI NATIONAL OPEN UNIVERSITY
Maidan Garhi, New Delhi – 110 068

JANUARY 2025

Dear Student,

Please read the information on assignments in the Programme Guide that we have sent you after your enrolment. A weightage of 30%, as you are aware, has been earmarked for continuous evaluation, **which wouldconsist of one tutor-marked assignment** for this Programme. The assignment for MSCRWEE (first semester) has been given in this booklet.

Instructions for Formatting Your Assignments

Before attempting the assignment, please read the following instructions carefully:

1) On top of the first page of your answer sheet, please write the details exactly in the following format:

ENROLLMENT NO :……

NAME :……

ADDRESS :……

……

……

PROGRAMME CODE: ……..

COURSE CODE: …….

COURSE TITLE: ……

STUDY CENTRE: ……..……. DATE: …….……...

PLEASE FOLLOW THE ABOVE FORMAT STRICTLY TO FACILITATE EVALUATION ANDTO AVOID DELAY.

2) Use only foolscap size writing paper (but not of very thin variety) for writing your answers.

3) Leave 4 cm margin on the left, top and bottom of your answer sheet.

4) Your answers should be precise.

5) These assignments submitted should be hand written in your own hand writing.

We strongly suggest that you should retain a copy of your answer sheets.

6) You cannot fill the Exam Form without submission of the assignments. So solve it and **submit it at the earliest.** If you wish to appear in the **TEE, June 2025,** you should submit your TMAs by **April 30, 2025.** Similarly, if you wish to appear in the **TEE, December 2025,** you should submit your TMAs by **September 30, 2025.**

7) Assignments will be submitted at **your respective regional centre.**

We wish you good luck!

Assignment -2

(To be done **after** studying the course material)

Course Code: MRW-002
Course Title: Heat Transfer
Assignment Code: MRW-002/TMA/2025
Maximum Marks: 100

Last Date of Submission: April 30, 2025 (For June TEE), September 30, 2025 (For December TEE)

Note:

1. **For any question worth 5 marks the word limit is 200 words, for a 10 mark question it is 350 words.**
2. **All questions are compulsory. Marks for the questions are shown within brackets on the right-hand side.**

Q.1 Discuss the various modes of heat transfer in detail. 10

Q.2 Derive the expression for heat conduction through a cylinder. Assume suitable dimension of the cylinder and the temperature difference across the cylinder. 10

Q.3 Derive the expression for thermal resistance for the composite plane wall shown in Figures given below. Assume area of cross-section to be 'A' for the Fig. a. 10

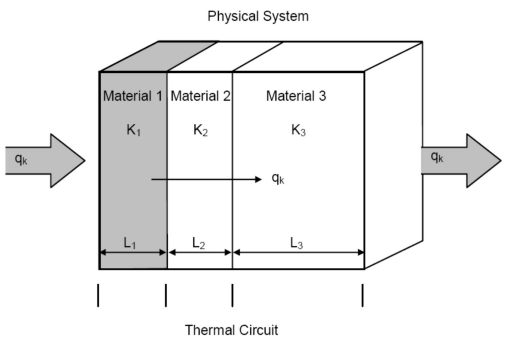

Fig. a

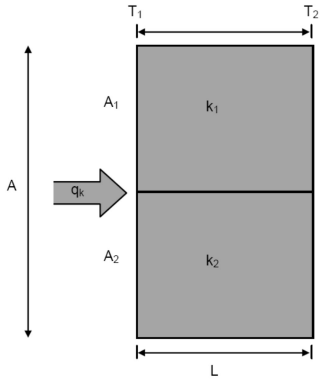

Fig. b

Q.4 Explain thermal insulation and why is it needed? Also, discuss the various types of insulating materials. 10

Q.5 Derive the expression for the time required for a solid to reach a certain temperature in case of transient conduction using lumped capacitance method. 10

Q.6 Define the following dimensionless numbers 10

a) Nusselt number
b) Biot number
c) Prandtl number
d) Grashoff Number
e) Reynolds number

Q.7 Define the following: 10

a) Specific Heat Capacity
b) Thermal diffusivity
c) Thermal Equilibrium
d) Transmissivity
e) Spectral Intensity

Q.8 Two very large parallel plates with emissivity 0.3 and 0.8 exchange radiative energy. Determine the percentage reduction in radiative energy transfer when a polished aluminium radiation shield ($\varepsilon = 0.04$) is placed between them. 10

Q.9 How are the heat exchangers classified? Describe the plate type heat exchanger in detail. 10

Q.10 Compare a straight tube and bent tube boiler with neat sketches while enlisting the advantages and disadvantages. 10