

PARUL UNIVERSITY
FACULTY OF ENGINEERING & TECHNOLOGY
B.Tech. Summer 2022 - 23 Examination

Semester: 4
Subject Code: 203120251
Subject Name: Heat and Mass Transfer

Date: 20/03/2023
Time: 2:00pm to 4:30pm
Total Marks: 60

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 Objective Type Questions - (Fill in the blanks, one word answer, MCQ-not more than Five in case of MCQ) (All are compulsory) (Each of one mark) (15)

1. _____ law is applicable for conduction
 2. Heat transfer without medium is known as Radiation

 3. Emissivity is _____ for black body
 4. Stephen boltzman law is applicable for _____ type of heat transfer
 5. Solid has _____ thermal conductivity in comparison to liquid.
 - 6 On which of the following factors does the emissive power of a body depend?
 - a) wavelength
 - b) temperature
 - c) physical nature
 - d) All of the above

 7. The reflectance of a black body is
 - a) Zero
 - b) less than 1
 - c) one
 - d) infinity
 8. In the formulation of Stefan-Boltzmann's law, which of the following parameter does not appear
 - a) Radiation flux
 - b) Emissivity
 - c) Absorptivity
 - d) Radiating area
 9. The emissivity of a gray body is
 - a) 0.5
 - b) 1
 - c) less than 1
 - d) more than 1
 10. For a radiation shield which of the following parameters should be highest
 - a) Emissivity
 - b) Reflectivity
 - c) Absorptivity
 - d) Transmissivity
 11. Describe Conduction mode of heat transfer.
 12. write types of convection on the basis of mechanism,
 13. What do you mean by laminar flow ?
 14. Give reason of gases having low thermal conductivity.
 15. Give an example of radiation type of heat transfer
- Q.2 Answer the following questions. (Attempt any three) (15)**
- A) Write down different assumption of fourier law.

B) Write a note on Radiation type of heat transfer.

C) Write a note on fourier law.

D) Write short note on characteristics of shell and tube side fluid .

Q.3 A) What do you mean by Heat exchanger effectiveness? Write broad classification of heat exchanger (07)

B) What do you mean by diffusivity coefficient? Define fick's law (08)

OR

A) Explain any two from following (08)

1. Double pipe HE

2. Fin type HE

3. Plate type HE

Q.4 A) What do you mean by LMTD? Derive a numerical expression for LMTD for counter flow. (07)

OR

A) What do you mean by Thermal Conductivity? Derive an expression of thermal conductivity for spherical vessel. (07)

B) What is parallel and cross flow heat exchanger? Draw the diagram and write expression for LMTD for cross flow. (08)