Q.29 Discuss one dimensional steady state heat conduction through a Plain wall
Q.30 Explain a Scenario where forced convection is crucial in engineering.
Q.31 Discuss about boiling and evaporation.
Q.32 Explain the concept of heat transfer and its significance in chemical engineering operations.
Q.33 Discuss the role of emissivity in radiation heat transfer and its practical implications in engineering.
Q.34 Write about parallel flow and counter current flow with neat and clean diagram.
Q.35 What is the difference between steady-state and unsteady-state heat transfer?

SECTION-D

Note: Long answer type questions. Attempt any two questions out of three questions. (2x10=20)

Q.36 Explore dimensional analysis in convetive heat transfer, emphasizing the importance of various dimensional groups such as Reynolds, Prandtl, and Nusselt numbers.
Q.37 Compare and contrast conduction, convection, and radiation heat transfer mechanisms. Provide examples of each in real-world applications.
Q.38 Write short note on any three:-
a) Physical properties of insulating materials.
b) Mechanism of Conduction.
c) Dimensional groups and their significance
d) Kirchhoff's law

Roll No. .....

3rd Sem / Chem, P & P
Subject:- Heat Transfer - I

Time : 3Hrs. M.M. : 100

SECTION-A

Note: Multiple choice questions. All questions are compulsory (10x1=10)

Q.1 What is the key characteristics of steady-state heat transfer?
a) Constant temperature
b) Variable temperature
c) Unpredictable temperature
d) Changing temperature at a constant rate

Q.2 Planck's law in radiation describes the distribution of:
a) Heat flux
b) Emissivity
c) Radiant energy with respect to wavelength
d) Black body temperature

Q.3 Fourier's law of heat is applicable for_____
a) Convection
b) Radiation
c) Conduction
d) Conduction as well as convection

Q.4 The Reynolds number is significant in which aspect of convective heat transfer?
a) Natural convection b) Forced convection
c) Both A and B d) None of the above

Q.5 What does the term "Emissivity" refer to in radiation heat transfer?
a) Ability to reflect radiation
b) Ability to absorb and emit radiation
c) Ability to transmit radiation
d) Ability to block radiation

Q.6 The heat transfer has_____ modes of heat transfer
a) One b) Two
c) Three d) Four

Q.7 What type of heat transfer requires a medium (Solid, liquid, or gas) for energy transfer?
a) Conduction b) Convection
c) Radiation d) Both A and B

Q.8 What is the primary purpose of insulation in heat transfer applications?
a) To enhance conduction
b) To reduce radiation
c) To decrease convection
d) To minimize heat loss

Q.9 In radiation heat transfer, what does the term "black body" represent?
a) A perfectly reflective surface
b) A surface with low emissivity
c) An idealized emitter and absorber
d) A surface with high reflectivity

Q.10 Which law states that the total emissive power of a black body is proportional to the fourth power of its absolute temperature?
a) Planck's law
b) Wein's displacement law
c) Stefan - Boltzmann Law
d) kirchoff's law

SECTION-B

Note: Objective type questions. All questions are compulsory. (10x1=10)

Q.11 What is Convection?
Q.12 Name one example of radiation mode of heat transfer.
Q.13 Name one real-world application of heat transfer.
Q.14 Define Fourier's law?
Q.15 Provide an example of natural convection.
Q.16 Define conduction.
Q.17 Dimensional numbers are_____
Q.18 LMTD is_____
Q.19 State Planck's law.
Q.20 Define grey body?

SECTION-C

Note: Short answer type questions. Attempt any twelve questions out of fifteen questions. (12x5=60)

Q.21 Derivation of critical thickness of insulation for cylinder
Q.22 Discuss about Overall heat transfer coefficient.
Q.23 Difference between Radiation shield and view factor.
Q.24 Discuss about the Wein's displacement law, Stefan - Boltzmann Law.
Q.25 What is dimensional analysis used for in convective heat transfer?
Q.26 Explain the types of condensation with example.
Q.27 With diagram, explain about Double pipe heat exchangers
Q.28 Explore Newton's law of cooling and its application in determining heat transfer rates in convective systems.