Q.24 Discuss the role of dimensional analysis and Pi theorem in understanding convective heat transfer.

Q25 Differentiate between natural convection and forced convection. Provide examples of each.

Q.26 Describe the construction and working principle of a shell and tube heat exchanger.

Q.27 Explain L.M.T.D. for parallel.

Q.28 Differentiate between Absorptivity, reflectivity and transmissivity.

Q.29 Discuss the purpose of insulation in heat transfer systems and its importance in reducing heat loss.

Q.30 Describe about evaporator.

Q.31 Discuss the methods used for scale formulation and cleaning in heat ex-changers.

Q.32 Explain the concept of overall heat transfer coefficient.

Q.33 WRite about Wein's displacement law, Kirchhoff's law, Stefen Boltman law.

Q.34 Discuss the factors affecting the optimum thickness of insulation in heat transfer systems.

Q.35 Describe about each mode of heat transfer with example.

Section-D

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

Q.36 Explain the different feeding arrangement used in evaporator with diagram.

Q.37 Discuss the significance of Seider and Tate's equation and Dittus Boelter's equation in cinvective heat transfer analysis.

Q.38 Write short note on any three:-

1. Emissivity
2. Boiling
3. Physical properties of insulating materials
4. Open pan evaporator

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4th Sem.

Branch: P & P, Chem Engg. (Slp. Paint Tech.), Chem Engg. (Spl. Polymer Engg.)

Sub : Heat Transfer

Time : 3 Hrs. M.M. : 100

SECTION-A

Note: Multiple type Questions. All Questions are compulsory. (10x1=10)

Q.1 Which law governs the rate of heat conduction through a material?

a) Ohm's law
b) Fourier's law
c) Newton's law of cooling
d) Boyle's law

Q.2 Which law describes the relationship between the wavelength of peak emission and the temperature of a black body?

a) Wien's displacement law
b) Stefan-Boltzmann law
c) Kirchhoff's law
d) Newton's law of cooling

Q.3 The Logarithmic Mean Temperature Difference (LMTD) is used to determine:

a) Overall heat transfer coefficient
b) Heat capacity ratio
c) Heat flux
d) Temperature profile across a heat exchanger

Q.4 Foam formation in evaporators can be minimized by:
a) Increasing the temperature
b) Increasing the pressure
c) Agitation of the liquid
d) Decreasing the surface area

Q.5 Common insulating materials include:
a) Aluminum & copper
b) Glass and ceramics
c) Concrete & steel
d) Fiberglass & foam plastics

Q.6 What is the primary mode of heat tranfer in a vcauum?
a) Conduction b) Convection
c) Radiation d) Advection

Q.7 Heat loss form a pipe can be reduced by :
a) Increasing the pipe diameter
b) Decreasing the pipe length
c) Adding insulation
d) Increasing the fluid flow rate

Q.8 Forward, backward, parallel and mixed feed are methods of:
a) Fluid circulation in evaporators
b) Controlling evaporation rate
c) Heat transfer enhancement
d) Surface fouling prevention

Q.9 Finned tube heat ex-changers are commonly used for:
a) High pressure applications
b) Heat recovery from flue gases
c) Cooling of electronic components
d) Cryogenic applications

Q.10 Convection involves heat transfer due to :
a) Movement of charged particles
b) Electromagnetic waves
c) Fluid motion
d) Direct contact between materials

Section-B

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

Q.11 What is grey body?
Q.12 Define dimensions number?
Q.13 Define thermal conductivity.
Q.14 Write name of any one heat exchange which is used in industry?
Q.15 What is Planck's law?
Q.16 What is radiation?
Q.17 Name a common insulating material.
Q.18 Give an example heat exchanger.
Q.19 Write newton's law of cooling.
Q.20 What is heat transfer.

Section-C

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

Q.21 Explain Fourier's law of heat conduction and discuss its implications for understanding heat transfer through solid materials.
Q.22 Explain the fundamental principles of radiative heat transfer.
Q.23 What is convective heat transfer coefficient and discuss the factors influencing its value. Provide examples where the convective heat transfer coefficient plays a crucial role.