Q.29 A food product undergoes a temperature increase of 30°C while absorbing 2000 Kj of heat. Calculate its mass if its specific heat is 4.2KJ/kg °C.

Q.30 Explain the application of the Reynolds number in determining flow characteristics in pipes and tubes.

Q.31 Compare and contrast positive displacement pumps and centrifugal pumps in terms of advantages, disadvantages and typical applications in the food industry.

Q.32 Discuss the role of convection heat transfer in food processing and provide examples of its practical applications.

Q.33 Explain the principle of mass transfer during food processing and its significance in preservation and flavor enhancement.

Q.34 Describe the key factors to consider when selecting as appropriate heat exchanger for a specific food processing application.

Q.35 Enumerate the steps involved in the operation and maintenance of a boiler used in food production.

SECTION-D

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

Q.36 Discuss the importance of standard units of measurement in scientific research and engineering, providing examples from the food industry.

Q.37 Explain how the rheological properties of food materials influence the quality and processing of food products. Provide examples.

Q.38 Describe the significance of thermal conductivity and specific heat in food processing. Provide real-world examples.

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4th Sem / Food Tech.

Subject:- Principles of Food Engineering

Time : 3Hrs. M.M. : 100

SECTION-A

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

Q.1 Which of the following is not a physical property of food materials?

a) Temperature b) Color
c) Taste d) Density

Q.2 What is the unit of thermal conductivity?

a) Joules
b) Watts per meter per kelvin (W/mk)
c) Newtons
d) Pascals

Q.3 What is the principle of material balance based on ?

a) Energy conservation b) Mass conservation
c) Thermal equilibrium d) Entropy

Q.4 Entahlpy is a measure of

a) Heat content b) Mass flow rate
c) Pressure d) Velocity

Q.5 The Reynolds number is used to characterize

a) Electrical conductivity
b) Fluid flow characteristics
c) Thermal conductivity
d) Mass flow rate

Q6 Which of the following is not a common type of pump used in the food industry?

a) Centrifugal pump

b) Gear pump
c) Magnetic resonance pump
d) Positive displacement pump

Q.7 Which of the following is a mode of heat transfer through a solid material?
a) Conduction b) Convection
c) Radiation d) None of these

Q8 What is the principle of mass transfer based on?
a) Heat transfer
b) Energy balance
c) Concentration gradient
d) Density

Q.9 Which of the following is used in the food industry for sterilization?
a) Pasteurizers b) Evaporators
c) Autoclaves d) Driers

Q.10 What type of equipment is commonly used to remove moisture from foods?
a) Boilers b) Heat exchangers
c) Driers d) Pasteurizers

SECTION-B

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

Q.11 Describe the process of convection heat transfer in food processing.

Q.12 What is the primary function of a heat exchanger in food processing?

Q.13 Briefly explain the purpose of an autoclave in food processing.

Q.14 What equipment is commonly used for evaporative cooling in food processing?

Q.15 Define psychrometry.

Q.16 How is the dew point temperature related to psychrometry?

Q.17 What is the SI unit of pressure?

Q.18 Convert 1 litre(L) to cubic centimeters (cc) or milliliters(mL).

Q.19 Explain the significance of rheological properties in the food industry.

Q.20 How is color measured in food science, and why is it important?

SECTION-C

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

Q.21 Calculate the dew point temperature when the dry bulb temperature is 25°C, and the relative humidity is 60%.

Q.22 Discuss the significance of using the international System of Units(SI) in scientific and engineering disciplines.

Q.23 Convert 1 kilometer (km) to meters (m) and centimeters(cm).

Q.24 How can rheological properties influence the texture and sensory characteristics of food products? Provide example.

Q.25 Calculate the specific gravity of a substance that has a density of 800kg/m^3 when compared to water (density = 1000 kg/m^3)

Q.26 Explain how the knowledge of thermal conductivity is crucial in designing food processing equipment.

Q.27 Calculate the thermal diffusivity of a material if its thermal conductivity is 0.3 W/mK and its specific heat is 1200 j/kg°C.

Q.28 Describe the concept of energy balance in food processing and its role in optimizing processes.