Q25 How can preventive maintenance helps in a food processing plant to minimize downtime and maximize efficiency?

Q.26 Give the main considerations in selecting heat exchangers for food processing applications.

Q.27 Explain the construction and working principle of a shell and tube heat exchanger.

Q.28 Define the principle of mass transfer and explain its significance in food processing operations.

Q.29 Describe the working principle of a dryer used in food processing and how it removes moisture from food products.

Q.30 Describe the basic operation of an autoclave in food processing and its role in preserving food products.

Q.31 Briefly explain the operation of an evaporator in concentrating liquid food products.

Q.32 Describe the working principle of a gear pump and explain why it is suitable for handling viscous food products.

Q.33 How are size, shape, and colour important physical properties in food quality assessment?

Q.34 Name two common types of pumps used in the food industry, and briefly describe working principles of any one of them.

Q.35 Define density and specific gravity and explain how they are related.

Section-D

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

Q.36 Describe different types of heat exchangers, such as shell and tube heat exchangers, and scraped surface heat exchangers, and their respective.

Q.37 Enlist different types of boiler. Explain working principle of fire tube boiler.

Q.38 Discuss the significance of physical properties such as density, specific gravity, and porosity in food processing. Explain the methods used to measure these properties in food materials.

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4th Sem. Branch: Food Technology
Sub : Principles of Food Engineering

Time : 3 Hrs. M.M. : 100

SECTION-A

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

Q.1 The SI unit for thermal conductivity is :
- a) Joule per kilogram per Kelvin (J/Kg.K)
- b) Kelvin (K)
- c) Watts per meter per Kelvin (W/m.K)
- d) Pascal (Pa)

Q.2 Which type of flow is characterized by smooth, orderly fluid motion with layers of fluid sliding over one another?
- a) Laminar Flow b) Turbulent Flow
- c) Transitional Flow d) Steady Flow

Q.3 Which pump type is commonly used in the food industry for transferring viscous fluids like sauces and creams?
- a) Centrifugal pump b) Gear pump
- c) Diaphragm pump d) Reciprocating pump

Q.4 The principle of operation of a centrifugal pump involves:
- a) Reciprocating motion of a piston
- b) Rotating impeller creating centrifugal force
- c) Oscillating diaphragm
- d) Squeezing action of rollers against a flexible tube

Q.5 Diffusion is the process of mass transfer that occurs:
- a) Only in gases
- b) Only in liquids
- c) Only in solids
- d) Across a concentration gradient

Q.6 In a double-pipe heat exchanger, heat transfer occurs between:
a) Two fluids flowing in parallel pipes
b) Two fluids in direct contact
c) A fluid and a solid surface
d) A fluid and the surrounding environment

Q.7 Convection heat transfer is enhanced by :
a) Reducing the velocity of fluid flow
b) Increasing the thermal conductivity of the fluid
c) Increasing the surface area for heat transfer
d) Decreasing the temperature difference between the fluids

Q.8 The Reynolds number is a dimensionless quantity used to predict:
a) The velocity of fluid flow
b) The heat transfer coefficient
c) Fluid flow characteristics
d) The pressure drops in a pipe

Q.9 Which type of pasteurizer involves heating the product to a specific temperature and holding it for a predetermined time before cooling?
a) High temperature short time (HTST) pasteurizer
b) Ultra high temperature (UHT) pasteurizer
c) Batch pasteurizer
d) Tunnel pasteurizer

Q.10 Specific gravity is defined as the ratio of the density of a substance to the density of :
a) Air b) Water
c) Gold d) Mercury

Section-B

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

Q.11 Thousand grain weight/bulk density is a measure of the weight or volume occupied by a certain number of grains or seeds, typically used in agriculture. (True/False)

Q.12 _____ are used to evaporate water from liquid food products to increase their concentration. (Evaporators/ Pasteurizers)

Q.13 _____ are used to generate steam that is used in various food processing operations.)Boilers/ Pasteurizers)

Q.14 _____ are essential for removing excess moisture from fruits and vegetable to prolong their shelf life. (Driers/Boilers)

Q.15 The conversion factor from Celsius to Kelvin is 273.15. (True/False)

Q.16 Porosity is a measure of the empty spaces or voids in a material and is often expressed as a percentage (True/False)

Q.17 Rheological properties of food materials refer to their flow behaviour under applied stress or deformation and are important in food processing and product quality. (True/False)

Q.18 Colour is a physical property of food materials that can be quantified using methods such as spectrophotometry. (True/False)

Q.19 Size and shape are physical properties that can be measured using various techniques such as microscopy, sieving, or image analysis. (True/False)

Q.20 _____ are typically more compact than shell-and-tube heat exchangers. (Plate heat exchangers/Radiation)

Section-C

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

Q.21 Discuss some key factors to consider when selecting an evaporator for a food processing facility.

Q.22 Define conduction and provide an example of heat transfer through conduction in a food processing.

Q.23 Give difference between dry-bulb temperature and wet-bulb temperature in psychrometry.

Q.24 Explain the difference between natural convection and forced convection and provide an example of each in a food processing context.