Roll No. | | | | | | | | | | | | | **Total No. of Pages : 03**

Total No. of Questions : 09

M.Sc. (FT) (Sem.–1)

PRINCIPLES OF FOOD ENGINEERING

Subject Code : UC-MSFT-512-19

M.Code : 77272

Date of Examination : 17-01-23

Time : 3 Hrs. **Max. Marks : 70**

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A contains SEVEN questions carrying TWO marks each and students has to attempt ALL questions.**
2. **SECTION-B consists of FOUR Subsections : Units-I, II, III & IV. Each Subsection contains TWO questions each carrying FOURTEEN marks each and student has to attempt any ONE question from each Subsection.**

SECTION-A

1. Write briefly :

a) What is the significance of food engineering in the profile of food technologist?

b) List the ranges of Renault's number.

c) What is the application of non-Return value?

d) What is the Co-current flow system?

e) Define wet bulb temperature.

f) Define pneumatic conveying system.

g) Define F value.

SECTION-B

UNIT-I

2. a) Explain mass balance and energy balance with their examples.

b) Draw block diagram of solvent extraction process clearly specifying inputs and outputs.

c) Explain working and construction of gear type pump.

3. a) Explain various accessories of pipeline system and their application in food industry.

   b) Explain working principle and construction of Venturi Meter.

   c) Explain each type of fluid flow. Specify the ranges of Reynolds number for each types of fluid flow.

UNIT-II

4. a) The maximum tolerable heat loss through a furnace wall is 1.3 KW/m^2. Its brick wall is constructed next to the furnace wall to insulate the heat loss. Temperature on either side of wall is 200 °C and 40 °C respectively. What should be the thickness of the brick wall if thermal conductivity of the brick is 0.72 W/m °C?

   b) Explain conductive heat transfer in a rectangular slab?

5. a) Explain F, D and Z-value in microbial inactivation during food processing.

   b) Find the heat transfer rate per one meter length of circular copper pipe of 10 cm inside diameter and 12.5 outside diameter. The inside temperature of the pipe is 100 °C and the outside temperature of the pipe is 40 °C. Also calculate the percentage error involved by using average radius in place of log mean radius. The thermal conductivity of the metal is 850 W/m °C.

UNIT-III

6. a) Explain construction of the psychometric chart specifying each horizontal, vertical and inclined lines.

   b) An air vapour mixture is at 60 °C dry bulb temperature and 35 °C wet bulb temperature. Using the psychometric chart determine the following :

      i. Relative Humidity,

      ii. Humidity Ratio,

      iii. Specific Volume,

      iv. Enthalpy

      v. Dew Point Temperature.

7. a) Explain the humidification and de humidification process.

   b) Explain the application of humidification in food processing industry. Also list each application.

   c) The relative humidity of air at 30 °C is 70%. Find its absolute humidity using the psychometric chart.

UNIT-IV

8. a) Explain the working and construction of screw type conveyer by a neat diagram.

   b) Explain methods of sorting of fruits and vegetables and other food products with their advantages and limitations.

9. a) Explain working and construction of Pneumatic conveyer by neat diagram.

   b) Explain methods of grading of fruits vegetables and other food products with their advantages and limitations.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.