ROILINO						

Total No. of Pages : 03

Total No. of Questions : 15

M.Sc. (Food Technology) (2019 Batch PIT) (Sem.–1) PRINCIPLES OF FOOD ENGINEERING Subject Code : UC-MSFT-512-19 M.Code : 77272

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. SECTIONS-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

Answer in brief :

- Q1. Differentiate between kinematic and dynamic viscosity.
- Q2. Differentiate between streamline and turbulent flow. Draw their velocity profiles.
- Q3. Differentiate between natural and forced convection.
- Q4. Define specific heat. Mention any predictive equation to calculate specific heat of food material.
- Q5. Define Gibbs-Dalton law.
- Q6. Differentiate between dew point and dew point depression.
- Q7. Differentiate between sorting and grading.

SECTION-B

UNIT-I

- Q8. a) Determine the weight reduction that would result when 100 kg potatoes are dried from 85% to 5% moisture. The moisture content is on wet weight basis.
 - b) Explain the principle, construction, working and applications of a centrifugal pump with the help of a neat line sketch.

- Q9. a) Calculate the enthalpy change when 3 kg of egg white (mean heat capacity 3.81 kJ kg-1 K-1) is heated from 10° to 30°C.
 - b) Water discharges at a flow rate of 0.004 m3s–1 through an opening 50 mm in diameter. Calculate the velocity of discharge.
 - c) Explain with the help of line sketches the principle, construction, working and applications of the following fluid flow measuring devices:

i) Manometer ii) Pitot tube

UNIT-II

Q10. a) Classify heat exchangers. Describe the construction, working and applications of plate heat exchanger.

b) The rate of heat transfer per unit area from a metal plate is 1000 W/m2. The surface temperature of the plate is 120°C, and ambient temperature is 20°C. Estimate the convective heat transfer coefficient.

c) The reaction rate constant (k) for the degradation of vitamin C at 121 °C is 0.0015 min–1 as determined experimentally. Determine the D value for the degradation reaction.

Q11. a) One face of the stainless-steel plate 2 cm thick is maintained at 220°C, while the other face is at 90°C. Calculate the heat flux through the plate. The thermal conductivity of stainless steel is 17 W/m °C. Assume steady-state conditions.

b) Discuss the concept of commercial sterility of food products.

UNIT-III

Q12. a) Write a brief note on the following :

i) Composition of air

- ii) Specific heat of moist air
- iii) Absolute humidity
- iv) Relative humidity

b) Air at a DBT of 30°C and relative humidity of 20% is humidified to attain a relative humidity of 50%. Determine the amount of moisture added in the humidifier per kg of dry air.

- Q13. a) Explain the various lines of a psychrometric chart. On the outlined sketch of a psychrometric chart explain the following processes :
 - i) Heating
 - ii) Drying
 - iii) Dehumidification

b) Moist air at 35°C and 55% relative humidity is heated using a common furnace to 70°C. From the psychrometric chart, determine the amount heat added per m3 of initial moist air and final dew-point temperature.

UNIT-IV

- Q14. a) What is material handling? Discuss the criteria for the selection of a material handling equipment.
 - b) Differentiate between fixed and variable path conveyors. Write a detailed note on the working and uses of a variable path conveyor.
- Q15. a) Write a detailed note on the construction, working and applications of a bucket elevator with suitable sketches.
 - b) Write a brief note on the various methods of sorting of food materials along with their advantages

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.