Total No. of printed pages = 4

FPT-401/EoFE-II/4th Sem/2017/M

ELEMENTS OF FOOD ENGINEERING – II

Full Marks – 70

Pass Marks – 28

Time – Three hours

The figures in the margin indicate full marks for the questions.

Answer any *five* questions.

1. (a) What is Fluid ? Explain the classification of fluid.

   (b) Define :

   (i) Weight density

   (ii) Mass density

   (iii) Specific weight

   (iv) Specific volume. [2+6+(1.5×4)]=14

2. (a) What is rate of flow (discharge) ?

(b) Derive the Continuity Equation.

(c) The diameters of a pipe at the section 1 and 2 are 10 cm and 15 cm respectively. Find the discharge through the pipe if the velocity of water flowing through the pipe at section 1 in 5m/s Determine also the velocity at section 2. 2+5+7=14

3. (a) What are the assumptions that are made during the analysis of Bernoulli's equation ?

(b) State the Bernoulli's Equation.

(c) Water is flowing through a pipe of 5cm diameter under a pressure of 29.43 Nlcm^2 (gauge) and with mean velocity of 2m/s. Find the total head or total energy per unit weight of the water at a cross-section, which is 5m above the datum line. 4+2+8=14

4. (a) Explain the Reynold's experiment with neat sketch.

(b) What are the different types of losses of energy in pipes ?

(c) Find the head lost due to friction in a pipe of diameter 300mm and length 70m through which water is flowing at a velocity of 3 m/s using Darcy formula. Take V for water = 0.01 stoke. 6+3+5=14

5. (a) Define mass transfer co-efficient.

(b) Explain Fick's law of diffusion.

(c) Explain the classification of pump. 3+5+6=14

6. (a) Define :

(i) Saturated air

(ii) Humidity

(iii) Relative humidity

(iv) Dry bulb temperature.

(b) State the various methods of food preservation.

(c) Explain the application of refrigeration for food preservation. (1.5×4)+3+5=14

7. (a) State Newton's law of viscosity. Explain how viscosity varies with temperature.

(b) A plate, 0.025 mm distant from a fixed plate, moves at 60 cm/s and requires a force of 2 N/m^2 to maintain this speed. Determine the fluid viscosity between the plates.

2+5+7=14