Total No. of printed pages = 4

ELEMENTS OF FOOD ENGINEERING - II

Full Marks – 70

Time – Three hours

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

Q.No.1 is compulsory. Attempt any three from
Q.Nos. 2-5.

1. (a) Answer the following :   1×15=15

    (i) What is density ?

    (ii) What is kinematic viscosity ?

    (iii) Define rotational flow.

    (iv) State Bernoulli's equation.

    (v) What is Fluid ?

    (vi) Write down the Euler's equation.

    (vii) What is the main difference between a
    centrifugal pump and a reciprocating
    pump ?

[Turn over

(viii) State some advantages of food preservation.

(ix) What is Psychrometry ?

(x) Define humidity.

(xi) What is wet bulb temperature ?

(xii) Define continuity equation.

(xiii) Write down the Navier-Stokes equation of motion.

(xiv) Define SFEE.

(xv) What is steady flow ?

(b) Fill up the blanks :   1×10=10

(i) Specific volume is defined as the ——— per unit mass of the liquid.

(ii) The unit of pressure is ———.

(iii) The unit of surface tension is ———.

(iv) In Bernoulli's equation, it is assumed that the fluid is ———.

(v) A flow, in which the quantity of liquid flowing per second is not constant, is called ———.

(vi) According to Darcy's formula,

$$h_f = \frac{.............}{.............}.$$

(vii) Water is ——— liquid.

(viii) A manometer is used to measure ———.

(ix) Low lifting centrifugal pumps work against heads upto ——— m.

(x) The cost of reciprocating pump is ——— than centrifugal pump.

2. (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 300 mm and length 70m through which water is flowing at a velocity of 3 m/s using Darcy formula.

Take $v = 0.01$ stoke.   6+4+5=15

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

   (b) Explain Fick's law of diffusion.

   (c) Explain the classification of pumps.

   4+5+6

4. (a) State the various methods of food preservation. $4+5+(1.5\times4)=15$

   (b) Explain the application of refrigeration for food preservation.

   (c) Define :

      (i) Saturated air

      (ii) Humidity

      (iii) Relative humidity

      (iv) Dry bulb temperature.

5. (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 m/s and requires a force of 2 N/m² to maintain this speed. Determine the fluid viscosity between the plates.

   $3+5+7=15$