Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–III • EXAMINATION – SUMMER 2013

Subject Code: 131403 **Date: 27-05-2013**

Subject Name: Food Engineering Transport Phenomenon

Time: 02.30 pm - 05.00 pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 **(a)** Define/Explain following terms. (Any Seven) **07**

Surface Tension	Capillarity
Viscosity	Energy
Pressure	Centre of pressure
Loss of head	Month piece
Vena contracta	

(b) What is pipe? Explain loss of head in pipe along with calculation formulae. **07**

Q.2 **(a)** Discuss measurement of fluid pressure. Also state Pascalôs law. **07**

(b) A simple manometer containing mercury is used to measure the pressure of water flowing in a pipeline. The mercury level in the open tube is 60mm higher than that on the left tube. If the height of water in the left tube is 50 mm, determine the pressure in the pipe in terms of head of water. **07**

OR

(b) What is orifice? State types of orifice. Explain various coefficient of orifice. **07**

Q.3 **(a)** Answer the following. (Any four) **08**

Explain Archemedes principle of floating.
What are micromanometers?
Explain continuity equation.
Explain Euler equation of motion.
Explain Ficks law of diffusion.

(b) Water is flowing through a pipe of 100mm diameter with an average velocity of 10 m/sec. Determine the the discharge of the water in litres/second. Also determine the velocity of water at the other end of pipe if the diameter of the pipe is gradully changes to 200 mm. **06**

OR

Q.3 **(a)** What is notch?Explain types of notches. Also explain discharge over rectangular and triangular notch. **07**

	(b)	The daily record of rainfall over a catchment are is 0.2 million cubic meters. It has been found that 80% of the rainwater reaches the storage reservior and then pass over a rectangular weir. What should be the length fof the weir if the water is not to rise more than 400 mm above the crest? Assume the valueof coefficient of discharge for the weir as 0.61.	**07**
Q.4	**(a)**	(i) Water flows through a pipe of 200 mm in diameter and 60 metre long with a velocity of 2.5 m/s. Find the head loss due to friction assuming ä=0.005 and using Darcyôs formula. (ii) Explain velocity of approach.	**07**
	(b)	Write short notes on the following. (Any two) (i) Dimensional analysis (ii) Mechanism of mass transfer (iii) Bernouliôs equation.	**07**
		OR	
Q.4	**(a)**	The diameter of a pipe changes from 200 mm at one section 5 meters above datum to 50 mm at another section of 3 meters above datum. The pressure of water at first section is 500 kPa. If the velocity of flow at the first section is 1m/s, determine the intensity of pressure at the second section.	**08**
	(b)	Answer the following. (Any three) (i) Explain Reynoldôs number. (ii) Explain diffusivity. (iii) Give types of weirs. (iv) What is the most economical cross section?	**06**
Q.5	**(a)**	Answer the following. (i) Explain various units of measurement. (ii) State Newtonôs laws of motion.	**06**
	(b)	Explain the following. (i) Dimensionless ratios (ii) Fluid properties.	**08**
		OR	
Q.5	**(a)**	Answer the following. (i) Explain forces on plane and curved surface. (ii) Discuss steady unifoirm flow in open channels.	**08**
	(b)	Explain the following: (i) Venturi meter and nozzle meter. (ii) Stability of floating bodies.	**06**

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