GUJARAT TECHNOLOGICAL UNIVERSITY BE - SEMESTER-III EXAMINATION – WINTER 2015

Subject Code:131403			Date:21/12/2015		
Subject Name: Food Engineering Transport PhenomenaTotal MarTime: 2:30pm to 5:00pmTotal MarInstructions:1. Attempt all questions.				ks: 70	
	2. 3.	Make suitable assumptions wherever necessary. Figures to the right indicate full marks.			
Q.1	(a) (b)	 Write short notes on followings: (i) orifice meter (ii) venturimeter Derive an equation of velocity distribution for flow of visco circular pipe. 	ous fluid through	07 07	
Q.2	(a) (b) (c)	Describe in brief about boundary layer concept. Prove that $t=2\Pi(L/g)^{1/2}$ is dimensionally homogeneous equation L = length of pendulum and $g=$ gravity acceleration Write a short note on variable area meter OR Describe about Notebox and wairs. Derive an expression for a	on. Where t=time,	07 03	
	(D)	for the equation for flow rate.	i rectangular welr	U/	
Q.3	(a) (b)	Discuss the difference between absolute and gauge pressure. The pressure in a vacuum chamber is measured by a vacuum g pressure in the chamber is to be determined.	age. The absolute	03 03	



(c) Describe the following properties of fluids in detail: Vapor pressure, viscosity, 08 surface tension, capillary.

OR

- Q.3 (a) Oil of density 860 kg/m³ has a kinematic viscosity of 40 cSt. Calculate the critical 03 velocity when it flows in a pipe of 50 mm bore diameter.
 - (b) the patient in figure below is to receive an intravenous injection of medication must be 109 kPa at injection point. (a) if the fluid has a density of 1020 kg/m³ find the height at which the bag of fluid must be suspended above the patient. Assume that the pressure inside the bag is one atmosphere.



(c) Derive equations for total pressure force and centre of pressure for a vertical plane 07 surface immersed in liquid.

Q.4	(a)	Define following term: Fluid density; compressible flow; rate of discharge; Specific gravity; turbulent flow; Reynold's number; Kinematic viscosity	07
	(b)	Write a short note on: Diffusivity Theory and Fick's law	07
		OR	
Q.4	(a)	Define buoyancy, meta centre and the necessary condition for stability for a floating and submerged object in fluid.	07
	(b)	Derive the Euler's equation of motion of fluid flow, Explain how Bernoulli's equation is derived form Euler's equation	07
Q.5	(a)	Give the classification of devices used for pressure measurement. Derive an equation of pressure for vertical single column manometer.	07
	(b)	Velocity potential function is given by an expression $\emptyset = -(xy^3/3) - x^2 + (x^3y/3) + y^2$ (i) Find the velocity components in x and y directions (ii) Show that \emptyset represents a possible case of flow	07
		Write in brief about: Velocity potential functions.	
		OR	
Q.5	(a)	Explain Pascals's law of pressure and derive it.	07
-	(b)	Derive the continuity equation for three dimensions.	07
