GUJARAT TECHNOLOGICAL UNIVERSITY BE - SEMESTER-IV EXAMINATION – SUMMER 2016

	Subj Subj	ect Code:142101 Date:30/05/2016 ect Name:Transport Phenomena In Materials Processing	
	Time Instru	:10:30 AM to 01:00 PM Total Marks: 70 ctions: 1. Attempt all questions. 2. Make suitable assumptions wherever necessary. 3. Figures to the right indicate full marks.	
Q.1	(a) (b)	Define Fluid. State Newton's Law of Viscosity and Classify fluid based on it. Describe different type of fluid flows.	07 07
Q.2	2 (a) (b)	Define/Explain terms and give their units: Density, Specific Weight, Specific Volume, Specific Gravity, Viscosity (Dynamic and kinematic) Derive Hagen-Poiseulle equation for fluid flowing through pipe.	07 07
	(b)	Derive equation of differential mass balance.	07
Q.3	8 (a) (b)	Derive general equation of heat conduction in rectangular coordinate system. Derive equation for heat conduction through composite wall.	07 07
Q.3	8 (a) (b)	What is Fourier law of heat conduction? Define thermal conductivity and thermal resistance. Derive their units. What do you mean by convection? Explain different type of convection with	07 07
		suitable example. State Newton's law of cooling and derive unit for coefficient of convection (h).	
Q.4	4 (a) (b)	Derive equation of viscosity measurement by Stoke' method. State Fick's laws of diffusion and define diffusivity. Explain terms: Molar concentration, Molar Fraction, Mass Fraction	07 07
Q.4	4 (a) (b)	Derive Bernoulli's equation from Euler's equation. Derive differential momentum balance equation.	07 07
Q.5	5 (a) (b)	What are different modes of mass transfer? Explain them. Derive generalized equation of mass transfer? OR	07 07
Q.5	5 (a)	How radiative heat transfer is different than conduction and convection? Explain Emissivity, Emissive power, Black body, gray body and white body.	07
	(b)	Write note on plank's law, wein's law and lambart's law.	07

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