Seat No.: _____ *Enrolment No._____*

GUJARAT TECHNOLOGICAL UNIVERSITY

B. E. Sem. – IV - Examination –June- 2011

Subject code: 142101

Subject Name: Transport Phenomena In Materials Processing

Date:06/06/2011 **Time: 10.30 am – 01.00 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)**	What do you mean by mass transfer? Explain different modes of mass transfer.	**07**
	(b)	What is heat conduction? Describe Fourier's law of conduction.	**07**
Q.2	**(a)**	Differentiate between free and forced convection.	**03**
	(b)	Two liter of petrol weighs 16N. Calculate density, specific gravity, specific volume and specific weight of petrol.	**04**
	(c)	What is fluid? Classify it. Explain different types of fluid flow.	**07**
		OR	
	(c)	Define viscosity. Differentiate between kinematic & dynamic viscosity. Derive the equation of viscosity measurement.	**07**
Q.3	**(a)**	Explain flow through fluidized bed with required equation.	**07**
	(b)	Derive Bernoulli's equation by using Euler's equation.	**07**
		OR	
Q.3	**(a)**	Derive Navier Stokes equation by using momentum balance equation.	**07**
	(b)	Derive general heat conduction equation in rectangular coordinates. Give its application with proper examples.	**07**
Q.4	**(a)**	What do you mean by convective heat transfer? Explain mechanism of convective heat transfer.	**07**
	(b)	State and describe both Wein's distribution law and Lambert's law.	**07**
		OR	
Q.4	**(a)**	What do you mean by heat transfer? Discuss different modes of heat transfer with examples of their applications.	**07**
	(b)	What do you mean by Black body radiation? Explain. State and explain Planck's Law.	**07**
Q.5	**(a)**	Discuss different methods for determination of diffusivity in solids.	**07**
	(b)	Explain Convective mass transfer- Mass transfer in fluid at solid-fluid interface.	**07**
		OR	
Q.5	**(a)**	Explain absorptivity, reflectivity, emissivity and transmissivity.	**06**
	(b)	A metallic ball heated to a surface temperature 745^{o}C behaves as grey body with emissivity 0.75. Calculate the emissive power.	**02**
	(c)	What do you mean by Pseudo-steady diffusion? Explain.	**06**

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