Seat No.: _____ *Enrolment No._____*

GUJARAT TECHNOLOGICAL UNIVERSITY

BE SEM-III Examination May 2012

Subject code: 130405

Subject Name: Thermodynamics

Date: 08/05/2012 **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 and discuss the First law of Thermodynamics.	**07**
	(b)	Define pressure. Write three different units of pressure and show their relationship amongst them. The pressure of gas in pipe line is measured with a mercury manometer having one end open to the atmosphere and one end connected to the pipe. If the difference in the height of mercury in two ends is 562mm, calculate the gas pressure. The barometer reads 761 mm Hg, the acceleration due to gravity is 9.79 m/s^2, and the density of mercury is 13640 kg/m^3.	**07**
Q.2	**(a)**	What is steady flow process? Explain mass balance and energy balance in open system.	**07**
	(b)	Explain system and surroundings. Also discuss the scope of thermodynamics.	**07**
		OR	
	(b)	Define and discuss thermodynamics. Describe its importance in your engineering field.	**07**
Q.3	**(a)**	What is pure substance? Explain PVT behavior of water and pure substance other than water whose volume increases on melting.	**07**
	(b)	Define ideal and non-ideal gases. How they get differ with each other in their behavior? Explain the entropy change of an ideal gas.	**07**
		OR	
Q.3	**(a)**	What do you mean by equation of state? Discuss the Van der Waals equation.	**07**
	(b)	Write note on third law of thermodynamics.	**07**
Q.4	**(a)**	State and discuss the Kelvin-Plank and Clausius statements of second law of thermodynamics.	**07**
	(b)	Define Entropy and irreversibility. Discuss their relationships.	**07**
		OR	
Q.4	**(a)**	Write four Maxwell's equation and drive the equation for enthalpy and entropy as functions of temperature and pressure.	**07**
	(b)	Discuss the latent heat of pure substances, standard heat of reaction and standard heat of formation.	**07**
Q.5	**(a)**	With neat sketch explain the Vapor compression cycle.	**07**
	(b)	Write note on reaction equilibrium.	**07**
		OR	
Q.5	**(a)**	Discuss the Carnote refrigerator.	**07**

(b) Explain Vapor/Liquid equilibrium (VLE). State Raoult's law and write down the two major assumptions made for it. **07**

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