GUJARAT TECHNOLOGICAL UNIVERSITY B. E. - SEMESTER – III • EXAMINATION – WINTER 2012

Sul Sul Tin	oject oject ne: 10	code: 132603Date: 05-01-2013Name: Thermodynamics of Elastomers & Polymers0.30 am - 01.00 pmTotal Marks: 70	
Ins	truc	tions:	
	1. 2. 3.	Attempt all questions. Make suitable assumptions wherever necessary. Figures to the right indicate full marks.	
Q.1	(a) (i) (ii) (iii) (iv) (v) (vi) (vi)	Answer the following. Define the terms: - (1) Heat of neutralization (2) Thermodynamics. Give difference between Extensive properties & Intensive Properties. State the 2 nd law of Thermodynamics. Give difference between gasoline fuel & Diesel Fuel. What percent of T1 / T2 gives heat engine an ideal efficiency of 10%? Write the statement of Le Chatlier's principle. Define heat of polymerization & write the factors affecting it.	(14)
Q.2	(a) (b)	Describe in brief about Carnot cycle & derive the expression for it. Derive the expression for relation between Cp & Cv for non ideal gas.	(07) (07)
	(b)	1 mole of an ideal gas (Cv=12.471 J/K/mol) is heated from 300 K to 600 K. Calculate entropy change when the: a) volume is kept constant & b) pressure is kept constant.	(07)
Q.3	(a) (b)	Derive the expression for Maxwell's relation for any three. The free energy change accompanying a given process is -85.77 kJ at 25°C & -83.68 at 35°C. Calculate the change in enthalpy for the process at 30°C.	(07) (07)
Q.3	(a)	The boiling point of water at 50 atm pressure is 265° C.compare the theoretical efficiencies of the system of engine operating between 45° C & the boiling point of water at: (1) 1 atm, &(2) 50 atm.	(07)
	(b)	The latent heat of vaporization of benzene at its boiling point (80°C) is 7413 cal/mol. What is vapour pressure of benzene at 27°C?	(07)
Q.4	(a) (b)	Explain the Concept of Ceiling temperature. Describe in brief about Eutectic system. OR	(07) (07)
Q.4	(a) (b)	Describe in brief about any seven properties required for choice of refrigerant. State the Phase rule & explain in detail about phases & components with example.	(07) (07)
Q.5	(a) (b)	Explain in detail about factors to be considered during selection of a Coal. Explain in detail about construction & working of Junker's Gas Calorimeter with diagram.	(07) (07)
Q.5	(a)	OK Explain in detail about construction, working & calculation of Bomb calorimeter with diagram.	(07)
	(b)	Calculate the gross & net calorific value of coal having the following compositions carbon = 85% , hydrogen = 8% , sulphur = 1% , nitrogen = 2% , ash = 4% , latent heat of steam = 587 cal/g.	(07)