

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-III • EXAMINATION – SUMMER 2013****Subject Code: 132603****Date: 29-05-2013****Subject Name: Thermodynamics of Elastomers & Polymers****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) Answer the following. (10)

- (i) Define the terms: - (i). Higher or gross calorific value (ii) Lower or net calorific value
- (ii) State the first law of thermodynamics and give mathematical expression for it.
- (iii) Give comparison between extensive properties and intensive properties.
- (iv) Define Heat of polymerization.
- (v) Write any two applications of Clapeyron-clausius equation.

(b) What do you mean by (i) Heat of reaction (ii) Heat of combustion (iii) Heat of neutralization (iv) Heat of formation ? Explain all. (04)

Q.2 (a) Give the classification of fuels. (07)

(b) Explain in detail about Junker's Gas Calorimeter with calculation. (07)

OR

(b) List the selection criteria of coal and explain all in detail. (07)

Q.3 (a) Derive an expression for Reversible Isothermal expansion of an Ideal Gas. (07)

(b) Explain in detail about flame temperature and explosion temperature. (07)

OR

Q.3 (a) Derive an expression for adiabatic expansion of an Ideal Gas. (07)

(b) State the Carnot's theorem and derive an expression for it. (07)

Q.4 (a) Derive any three expressions of Maxwell's thermodynamic relations. (07)

(b) Explain in detail about concept of ceiling temperature. (07)

OR

Q.4 (a) The efficiency of an engine is 0.42. Calculate the heat that must be withdrawn from the reservoir at higher temperature to produce 203 cal of work. (07)

(b) List the requirements for the choice of refrigerant. (07)

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Q.5 (a) State the phase rule and calculate the total number of independent variables and derive an expression for it. (07)

(b) Define chemical equilibrium and list the characteristics of a chemical equilibrium. (07)

OR

Q.5 (a) Discuss in detail about phase rule for two component alloy systems. (07)

- (b)** Explain in detail about (i)Homogeneous Equilibrium (ii)Heterogeneous Equilibrium (iii) Physical Equilibrium **(07)**