Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–III (NEW) • EXAMINATION – SUMMER 2015

Subject code: 2132603 **Date: 29/05/2015**

Subject Name: Thermodynamics of Elastomers & polymers

Time: 02.30pm-05.00pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q. 1 Answer the following. **(14)**

(i) Define the term:- (1) Heat of formation (2) Heat of Combustion

(ii) State First law of thermodynamics.

(iii) Give units of energy.

(iv) Give standard state conventions for solid, liquid, gas & solution.

(v) Write any two applications of thermodynamics in Rubber Industry.

(vi) Give comparison between reversible and irreversible processes.

(vii) Write the difference between petrol & diesel.

Q. 2 (a) Derive the relationship between C_p and C_v. **(07)**

Q. 2 (b) Explain the concept of entropy and Second law of thermodynamics. **(07)**

OR

(b) Answer the following.

(i) The efficiency of an engine is 0.42.calculate the heat that must be withdrawn from the reservoir at higher temperature to produce 203 cal of work. **(03)**

(ii) A man circling the earth in a spaceship weighed 200 N at location there the local gravitational acceleration was 4.4 m/s^2.calculate the mass of the man and his weight on the earth. **(04)**

Q. 3 (a) Calculate the gross and net calorific value of coal having the following compositions:- **(07)**

Carbon-75%
Hydrogen- 15%
Sulphur- 2%
Nitrogen- 2%
Ash- 6%
Latent heat of steam=587cal/g.

(b) What is fuel? Write down the characteristics of good fuel. **(07)**

OR

Q. 3 (a) Explain the working principal, construction & calculation of Junker's gas calorimeter with sketch. **(07)**

(b) Define the term: "Calorific value". Explain types of it in detail. **(07)**

Q. 4 (a) Derive Gibb's Helmhotz equation. **(07)**

(b) 1 mole of an ideal gas expands isothermally and reversibly from $5dm^3$ to $10dm^3$ at 300 K. Calculate q, w, ΔU, ΔH, ΔG and ΔA. **(07)**

OR

Q. 4 (a) Derive Claussius Clepeyron Equation. **(07)**

(b) Derive Maxwell Thermodynamic relations. **(07)**

Q. 5	(a)	Explain the factors affecting Heat of polymerization.	**(07)**
	(b)	Discuss the criteria for selection of refrigerant.	**(07)**

OR

Q. 5	(a)	Short note on ceiling temperature.	**(07)**
	(b)	List out the merits & demerits of phase rule.	**(07)**

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