Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER– III EXAMINATION – SUMMER- 2015

Subject code: 132603 **Date: 02/06/2015**

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 Thermodynamics.
(ii) Give difference between intensive and extensive property with example.
(iii) State zeroth law of thermodynamics.
(iv) What is meant by isobaric and isochoric process?
(v) List the applications of thermodynamics in engineering.
(vi) Explain the term flame temperature.
(vii) Write the Claussius Clepeyron Equation.

Q. 2 (a) Derive the expression for entropy change of an ideal gas. **(07)**

Q. 2 (b) Derive expression for Adiabatic expansion of an ideal gas. **(07)**

OR

(b) The latent heat of vaporization of benzene at its boiling point (80^0C) is 7400 cal/mol. What is vapour pressure of benzene at 27^0C? **(07)**

Q. 3 (a) Write merits & demerits of Solid fuels over Liquid & Gaseous fuels. **(07)**

(b) Write down the characteristics of a good fuel. **(07)**

OR

Q. 3 (a) Explain the working principle, construction & calculation of Bomb calorimeter with sketch. **(07)**

(b) On burning 0.83gm of a solid fuel in a bomb calorimeter, the temperature of 3500gm of water increased from 26.50C to 29.20C.water equivalent of calorimeter and latent heat of steam are 385g and 587cal/g respectively. if the fuel contains 0.7% hydrogen ,calculate its gross and net calorific value. **(07)**

Q. 4 (a) Discuss the brief about types and characteristics of chemical equilibrium. **(07)**

(b) Derive the expression for Helmholtz or work function & prove that Net or useful work = Decrease in free energy. **(07)**

OR

Q. 4 (a) 1 mole of an Ideal gas(Cv = 12.471J/K*mol) is heated from 300 K to 600 K. Calculate entropy change when the:(a) volume is kept constant, and (b) pressure is kept constant. **(07)**

(b) Explain in detail about Ideal & Non ideal solutions. **(07)**

Q. 5 (a) Define the term Heat of polymerization. Write in brief about the methods of estimation of heat of polymerization. **(07)**

(b) Derive expression of phase rule. **(07)**

OR

Q. 5 (a) Explain the conditions of polymerization reaction with the help of concept of ceiling temperature and spontaneity. **(07)**

(b) Short note on Polymorphism. **(07)**

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