

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER-III(New) EXAMINATION – SUMMER 2016

Subject Code:2132603**Date:31/05/2016****Subject Name:Thermodynamics of Elastomers & Polymers****Time:10:30 AM to 01:00 PM****Total Marks: 70****Instructions:**

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

		MARKS
Q.1	Answer the following:	14
	1 Define the term: "Calorific Value".	
	2 What do you mean by Fuel?	
	3 Give the difference between Petrol and Diesel.	
	4 State the Phase Rule.	
	5 State the First Law of Thermodynamics.	
	6 Write any two characteristics of good fuel.	
	7 What percent of T_1/T_2 gives heat engine an ideal efficiency of 10%?	
	8 Give the basic types of Heat Capacity.	
	9 Write the applications of thermodynamics in engineering.	
	10 Give units of energy.	
	11 Write the Full form of B.T.H.U.	
	12 Give the equation to calculate the degree of freedom.	
	13 Give One example of state and path functions.	
	14 List the applications of Diesel.	
Q.2	(a) Explain the form of energy possessed by the body.	03
	(b) Differentiate Heat engine and Carnot engine.	04
	(c) Derive the expression of CARNOT'S THEOREM.	07
	OR	
	(c) Derive any three expression of Maxwell's Thermodynamic Relation.	07
Q.3	(a) The efficiency of an engine is 0.42.calculate the heat that must be withdrawn from the reservoir at higher temperature to produce 203 cal of work.	03
	(b) A man circling the earth in a spaceship weighed 300 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
	(c) 1 mole of an ideal gas ($C_v = 13.471 \text{ JK}^{-1} \text{ mol}^{-1}$) is heated from 200 K to 500 K. Calculate entropy change when the: (i) volume is kept constant, and (ii) pressure is kept constant.	07
	OR	
Q.3	(a) Define the terms: - (1) Coal (2) Heat (3) Combustion.	03
	(b) A coal has the following composition by weight: C=90%; O=3.0%; S=0.5%; N=0.5% and ash=2.5% .Net calorific value of the coal was found to be 8,490.5kcal/kg. Calculate the percentage of hydrogen and higher calorific value of coal.	04
	(c) The latent heat of vaporization of Benzene at its boiling point 80°C is 8400 cal/mol. What is vapor pressure of benzene at 27°C ?	07
P.T.O.....	

Q.4	(a)	Explain the concept of ceiling temperature.	03
	(b)	Explain the working principle of Boy's calorimeter with figure.	04
	(c)	Write a detailed note on Estimation of heat of polymerization.	07
OR			
Q.4	(a)	Explain in brief about the effect of cross linking on solubility.	03
	(b)	Explain the working principle of Bomb's calorimeter with figure.	04
	(c)	Derive the Flory–Huggins Equation with respect to Entropy of mixing and thermal solution.	07
Q.5	(a)	List the basic types of equilibrium & Explain it.	03
	(b)	Write down the advantages of Phase rule.	04
	(c)	Short note on enthalpy of mixing of two polymers & free energy of mixing of polymers for binary polymer-polymer systems.	07
OR			
Q.5	(a)	Explain the term chemical equilibrium & write its characteristics.	03
	(b)	Write down the disadvantages of Solid Fuel.	04
	(c)	Explain in detail about Thermodynamic investigation of polymer-polymer systems for three component systems.	07
