

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-III (New) EXAMINATION – WINTER 2018****Subject Code: 2132603****Date: 12/12/2018****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	(a) State zero and first law of Thermodynamics.	03
	(b) Define the following terms: System, Heat of Reduction, Enthalpy, and Thermodynamics.	04
	(c) Write down the construction and working principle of Bombs calorimeter with diagram.	07
Q.2	(a) A man whose weight is 500 N takes 2 min. for climbing up a staircase. What is the power developed in him if the staircase is made up of 50 stairs each 0.5 m in height.	03
	(b) Give difference between Extensive properties & Intensive properties.	04
	(c) Derive any three expressions of Maxwell's thermodynamic relations.	07
OR		
Q.3	(c) Explain in detail about concept of ceiling temperature.	07
	(a) Define Carnot Engine. State Carnot's theorem.	03
	(b) Define the term 'Fuel'. Give difference between Liquid Fuel and Gaseous Fuel.	04
	(c) Prove that: $PV^\gamma = \text{constant}$ for adiabatic process.	07
OR		
Q.3	(a) Discuss the Concept of reversible process & irreversible process.	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) List the characteristics of a good fuel.	07
Q.4	(a) Write the difference between homogeneous process & heterogeneous process.	03
	(b) Define the term: "Calorific value". Explain any three units of heat.	04
	(c) Write a detailed note on Estimation of heat of polymerization.	07
OR		
Q.4	(a) Write any three limitations of first law of thermodynamics.	03
	(b) Explain the Rotation barrier of polymer chain flexibility.	04

____ P.T.O. ____

- (c) Short note on Thermodynamic investigation of polymer-polymer systems for three component systems. **07**
- Q.5** (a) Derive the Expression for relation between pressure – volume and 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) Explain the working principal, construction & calculation of Junker's gas calorimeter with sketch. **07**
- OR**
- Q.5** (a) What are the factors responsible for spontaneity of a reaction? **03**
- (b) List four important possibilities of Phase Rule. **04**
- (c) On burning 0.40gm of a solid fuel in a bomb calorimeter, the temperature of 2000gm of water increased from 20.5°C to 22.2°C . water equivalent of calorimeter and latent heat of steam are 385g and 587cal/g respectively. If the fuel contains 0.25% hydrogen, calculate its gross and net calorific value. **07**
