

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER-V (NEW) EXAMINATION – WINTER 2018****Subject Code:2152104****Date:16/11/2018****Subject Name:Fuels, Furnaces, Refractories and Pyrometry****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) What is the basic concept of temperature measurement and control? Explain with flow chart. **03**  
(b) List the types of thermocouples. **04**  
(c) Briefly explain principle, calibration and advantages of thermocouple. **07**
- Q.2** (a) What is the effect of high volatile matter on coal? **03**  
(b) Give classification and grading of coal. **04**  
(c) Explain principle, construction & working of optical pyrometer. **07**
- OR**
- (c) With figure explain in detail determination of calorific value by bomb calorimeter **07**
- Q.3** (a) What is flash point and fire point? **03**  
(b) Give the formula for determination of ash in coal and fixed carbon. **04**  
(c) Describe the proximate analysis of coal. **07**
- OR**
- Q.3** (a) Define Producer gas, Water gas, Blast furnace gas. **03**  
(b) Illustrate with figure by-product of coke oven at high temperature carbonization process. **04**  
(c) With figure give principle, construction and working of Muffle furnace. **07**
- Q.4** (a) Define and classify the furnace. **03**  
(b) Illustrate with figure heat losses in furnaces. What are the steps to minimize it? **04**  
(c) Give construction and working of induction furnace. **07**
- OR**
- Q.4** (a) Differentiate regenerator and recuperator. **03**  
(b) Explain combustion of fuel and problems based on air supplied. **04**  
(c) What is the difference between Natural draught, Induced Draught and Balanced draught? **07**
- Q.5** (a) Define and classify the refractory. **03**  
(b) What are the general requirements of a refractory material? **04**  
(c) Write a short note on any non-conventional energy resources. **07**
- OR**
- Q.5** (a) What is the full form of PCE? **03**  
(b) With flow chart give general production methods for refractory. **04**  
(c) What is refractoriness under load? Explain the method to determine refractoriness under load. **07**

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