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GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-V (NEW) - EXAMINATION - SUMMER 2017

Subject Code:2152104 Date: 01/05/2017 Subject Name: FUELS, FURNACES, REFRACTORIES & PYROMETRY Time: 02:30 PM to 05:00 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 Short Questions 14 Temperature measuring equipment works on _____ law of 1 thermodynamics. Petrol is _____ type of fuel. 2 a. Solid b. Liquid c. Gaseous d. Nuclear 3 Coke is coal. True/False 4 Give full form of PCE test. 5 Volatile matter content of fuel is determined with _____ analysis. Blast furnace is used for production of _____. 6 7 Give example of neutral refractory material. 8 _____ is used to determine calorific value of coal. 9 Give full form of RUL test. Hot metal is collected in _____ part of blast furnace. 10 Calorific value of bituminous coal is _____ kcal/kg. 11 **12** Silica _____ type of refractory. Solar energy is conventional source of energy. True/False 13 Coal that softens and fuses on heating is ______. 14 (a) Explain principle of thermocouple and give its advantages. **Q.2** 03 **(b)** Discuss non conventional sources of energy & their importance. 04 (c) Compare solid, liquid and gaseous fuels with merits and demerits **07** (c) Explain any two refractory tests. 07 (a) Explain principle of induction furnace. **Q.3** 03 **(b)** Classify refractory and briefly discuss them. 04 (c) Explain classification and grading of coal. **07** (a) Discuss effect of excess air on combustion product. Q.3 03 **(b)** Define refractory & discuss the properties of refractory materials 04 (c) Explain method of calorific value determination. 07 (a) Discuss need of waste heat recovery in furnace briefly. 03 **Q.4 (b)** Draw and label neat sketch of blast furnace. 04 (c) Discuss proximate analysis of fuel. 07 OR 0.4 (a) Define and classify furnace. 03 **(b)** Discuss heat losses in furnace. 04 (c) Write note on producer gas. 07 (a) Discuss any three storage requirements for fuels. Q.5 03 **(b)** Write note on optical pyrometer. 04 (c) Discuss carbonization of coal. 07

OR

Q.5	(a)	Define or explain for fuels: Flash point, fire point and viscosity	03
	(b)	Write note on radiation pyrometer.	04
	(c)	Explain construction and working of Cupola furnace.	07
