

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-V • EXAMINATION – SUMMER 2013****Subject Code: 152104****Date: 20-05-2013****Subject Name: Fuels, Furnaces and Refractory****Time: 10.30 am - 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.

Q.1 (a) Describe different types of fuels based on occurrence, chemical nature, usage and production. List out uses of coal. **07**

(b) Give advantages and disadvantages of Solid, Liquid and Gaseous fuels? **07**

Q.2 (a) Define carbonization and differentiate between Low Temperature carbonization (LTC) and High Temperature carbonization (HTC) **07**

(b) Describe manufacture of water gas with the help of simplified sketch and relevant chemical reactions. **07**

OR

(b) Write short Notes (Any Two) **07**

i) Coke Oven gas ii) Blast Furnace Gas iii) Nuclear Fuels

Q.3 (a) Define refractory and elaborately classify them. What is the importance of pyrometric cone equivalent? **07**

(b) Define the following terms – (i) RUL (ii) Spalling Resistance **07**

OR

Q.3 (a) Draw flow sheet for wet or dry process of Magnesium bricks manufacture. **07**

(b) What are the factors for selection of a refractory? What is crucible? What are the advantages of Castable Refractories? **07**

Q.4 (a) Define Stefan-Boltzmann's Law and what is emissivity? What is the value of emissivity in case of a Black body? How many types of Radiation Pyrometers are there? **07**

(b) Explain with diagram the working principle of temperature measurement by optical pyrometer **07**

OR

Q.4 (a) How waste heat can be recovered from furnace flue gases? **07**

(b) Explain with diagram the construction and working principle of a Radiation Pyrometer. **07**

Q.5 (a) Define combustion? What are the combustion parameters? Briefly describe the natural forced draft. Compare between natural draft and induced draft. **07**

(b) Explain Flame. Describe various modes of heat losses from a furnace. What are the methods used for furnace performances? **07**

OR

Q.5 (a) Explain with a neat sketch the construction and working principle of a Blast Furnace used in a steel industry. **07**

(b) Short Notes (any two) **07**
i) Cupola ii) Muffle Furnace iii) Uses of Laser
iv) Induction Furnace
