Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE SEM-V Examination-Nov/Dec.-2011

Subject code: 152104 **Date: 29/11/2011**

Subject Name: Fuels, Furnaces and Refractory **Time: 2.30 pm -5.00 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 & production . List out uses of coal. CLASSIFICATION LIKE NUCLEAR , FOSSIL, CHEMICAL FUELS , PRIMARY & SECONDARY , SOLID ….	**07**
	(b)	Give merits & demerits of Solid, Liquid & Gaseous fuels ? ADVANTAGES & DISADVANTAGES	**07**
Q.2	**(a)**	Define carbonization and differentiate between Low Temperature carbonisation(LTC) & High Temperature carbonization (HTC) . COMPARISON OF DIFFERENT PROPERTIES …	**07**
	(b)	Describe manufacture of producer gas and list out factors affecting its composition.	**07**
		OR	
	(b)	Write short Notes (Any Two) i) Natural Gas ii) Blast Furnace Gas iii) Nuclear Fuels	**07**
Q.3	**(a)**	Define refractory and describe properties of refractories. What are the requirements of a good refractory for metallurgical application ? PROPERTIES LIKE SLAG RESISTANCE , REFRACTORINESS …	**07**
	(b)	What is pyrometric cone equivalent (PCE). Describe PCE test. TO DESCRIBE ABOUT SOFTENING POINT OF REFRACTORY MATERIAL AND HOW TEST IS CONDUCTED	**07**
		OR	
Q.3	**(a)**	Describe different refractory materials based on chemical nature with examples. LIKE ACID,BASIC, ….	**07**
	(b)	Draw flowsheet for silica brick manufacture.	**07**

SHOWING RAW MATERIAL PREPARATION , DRYING ……

Q.4 **(a)** Explain Ice point and Steam point used in temperature scale. **07**

EQUILIBRIUM AT ZERO & 100 DEGREES….

(b) Explain working of Optical Pyrometer with a Diagram. **07**

OR

Q.4 **(a)** Explain principle of working of Thermocouple and give examples of thermocouples. **07**

EMF GENERATION ….

(b) Explain working of Radiation Pyrometer with a Diagram. **07**

SKETCH & WORKING

Q.5 **(a)** Explain working of a Cupola Furnace with sketch. **07**

SKETCH & WORKING

(b) Write a brief note on combustion of fuels. **07**

BURNING OF SOLID, LIQUID & GASEOUS FUELS ….

OR

Q.5 **(a)** Explain working of an Induction Furnace with sketch. **07**

SKETCH & WORKING

(b) How waste Heat can be recovered from flue gases? **07**

PRE HEATING , REGENERATION …

****