Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V • EXAMINATION – SUMMER • 2014

Subject Code: 152206 Date: 24-06-2014

Subject Name: Fuel Technology

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)** Explain the procedure of Ultimate analysis. **07**
Also list out two difference between proximate analysis and ultimate analysis.

(b) Write brief procedure to fine out calorific value of gaseous fuel by Junker's Gas calorimeter. **07**

Q-2 **(a)** Explain various physical properties of Metallurgical coke. **07**

(b) (i)A coal has following proximate analysis on ait dried basis: M=moisture-1.5%, A=ash=15.5, Vm=volatile matter = 28%, FC=Fixed carbon=55%. Calculate its ash % on dry basis and volatile matter on d.a.f (Dry ash free) andd.m.m.f (dry mineral matter free) basis.
(ii)Define following terms: 1)Caking coal 2) Caking index **07**

OR

(b) (i)The following results were obtained when a sample of fuel Oil was tested by Bomb Calorimeter. Mass of water =1200gm, temperature rise of cooling water=3.23℃, mass of oil=0.9gm, cooling correction factor=0.06^{e} c, mass of fuse wire=0.03gm, calorific value of fuse wire=1500kj/kg, specific heat of water = 4.19kj/kg^{e} k (Cw), water equivalent of calorimeter=2.5kj/kg. Determine the calorific value of the fuel.
(ii) Define following terms: **07**
1) Hydrogenation 2) Charcoal 3) Carbonization

Q-3 **(a)** List out various uses of coal. **07**

(b) List out and explain various factors affecting composition of coke oven gas. Also list out various characteristics of coke oven gas. **07**

OR

Q-3 **(a)** Write short note on: 1)Beehive Method of coke production 2) Peat and Bituminous coal 3) Hard-grove grind-ability Index **07**

(b) Explain about various Reaction zones presents in producer gas production. **07**

Q-4 **(a)** Write short on: **07**
1) Lurgi gasification process 2) Winkler gasification process

(b) List out various uses of Natural gas. Also give various disadvantages of C.N.G. **07**

OR

Q-4 **(a)** Give descriptive introduction about Liquefied petroleum gas(L.P.G) **07**

(b) Explain KopperTotzek gasification process with its advantages and dis advantages. **07**

Q-5 **(a)** Explain following properties of petroleum. **07**
1)Viscosity 2)Octane number 3) Anti knocking value 4)Cloud point

(b) Give brief idea about Water gas with its uses. **07**

OR

Q-5 **(a)** Explain Acid, Alkali and clay treatment of petroleum products. **07**

(b) Give idea about solid fuel used for producer gas manufacture. **07**
Also write uses of produces gas.

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