Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.Tech/CHE(OLD)/SEM-4/CHE-404/2013

2013

ENERGY SOURCES AND THEIR UTILIZATION

Time Allotted : 3 Hours *Full Marks :* 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following : $10 \times 1 = 10$

i) Blue gas is nothing but

a) Producer Gas b) Blast Furnace gas

c) Water gas d) Hydrogen.

ii) The variation of rank of coal with depth can be explained by

a) Temperature gradient b) Pressure gradient

c) Hilt's law d) None of these.

iii) Octane number is a measure of anti-knocking property of

a) Gasoline b) Diesel oil

c) Kerosene d) Fuel oil.

iv) A renewable source of energy is

a) Coal b) Petroleum

c) Solar energy d) None of these.

v) The aerial oxidation of coal during its storage is called

a) Carbonization b) Spontaneous ignition

c) Weathering d) None of these.

vi) Nuclear fuels are used in a nuclear reactor as

a) Control rod b) Fuel rod

c) Dust d) Lump.

vii) The principal component of coke oven gas is

a) Methane b) Carbon Monoxide

c) Hydrogen d) Nitrogen.

viii) Catalyst used in catalytic cracking

a) Vanadium pentoxide b) Silica alumina

c) Silica gel d) None of these.

ix) In Orsat apparatus, CO_2 in flue gas determined by absorbing in

a) Alkalyne Pyrogalol solution

b) KOH solution

c) Ammoniacal Cuprous chloride solution

d) Bromine water.

x) The process used for direct hydrogenation of coal is called

a) Bergius process

b) Fischer-Tropsch Process

c) Koppers-Totzek Process

d) Lurgi Process.

xi) Biogas is chemically known as

a) ethane b) methane

c) propane d) hexane.

xii) Methanogenesis for production of biogas is an ..... process of decomposition of organic waste

a) aerobic b) anaerobic

c) both (a) and (b) d) none of these.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. 3 × 5 = 15

2. Why simple washing cannot separate inherent mineral water from coal ?

3. Why is cloud point of a particular oil sample always greater than pour point ?

4. What are the difference between carbonization and combustion of coal ?

5. What do you mean by ignition delay ?

6. What are the objectives of reforming process ?

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

7. a) What are the advantages of fluidized bed catalytic cracking process over fixed bed catalytic cracking process ? 5

   b) Define wobbe index and its importance ? 5

   c) How is water gas differing from carbureted water gas ? 5

8. a) Why is the diameter of atmospheric distillation column uniform but the diameter of vacuum distillation column is not uniform ?

   b) What is the basic principle of photovoltaic cell ?

   c) What is the basic principle of a solar cell ?

9. a) Why is gaseous fuel better than liquid fuel with respect to pollution ? $7\frac{1}{2}$

   b) How can the nuclear fission reaction be controlled in a nuclear reactor ? $7\frac{1}{2}$

10. a) What do you mean by stand alone and building integrated system for the use of photovoltaic cell ? $7\frac{1}{2}$

    b) Which type of geothermal power plant is best ? $7\frac{1}{2}$