



Name :

Roll No. :

Invigilator's Signature :

CS/B.Tech/CHE(N)/SEM-3/ES-302/2012-13

2012

ENERGY TECHNOLOGY

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) Washing of coal is done to
 - a) remove the inherent impurities
 - b) remove the adhering impurities
 - c) reduce the ash content
 - d) both (a) and (c).
- ii) Caking index of coal is a measure of its
 - a) abrasability
 - b) reactivity
 - c) agglutinating (binding) properties
 - d) porosity.



- x) LPG contain
- propane and pentane
 - butane and propane
 - butane and methane
 - none of these.
- xi) Control rods are used in nuclear reactor to
- protect the moderator
 - control the pressure vessel
 - slow down the fast fission neutron
 - absorb extra neutron in the reactor.
- xii) Which of the following is a moderating material used in nuclear reactor ?
- Graphite
 - Cadmium
 - Zircalloy (an alloy of zirconium and aluminium)
 - stainless steel.

GROUP - B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

- Explain with the help of a flowsheet how you can utilize the waste heat during the production of coke from coke oven process.
- "Coke produced by low temperature carbonization of coal are more reactive". Justify the statement.
- What are the advantages of fluidized bed catalytic cracking process over fixed bed catalytic cracking process ?
- Why is reforming done in petroleum refinery ? Discuss various reforming reactions with the help of chemical formula.
- What do you mean by stand alone and building integrated system for the use of photovoltaic cell ?



GROUP - C
(Long Answer Type Questions)

Answer any *three* of the following.

$3 \times 15 = 45$

7. a) An Indian washery uses a coal of 21.0% ash content. If the clean product has an ash content of 18.7%, the sinks have an ash content of 41.2% and theoretical recovery is 91.6%, compute the performance of the washery.
- b) What is the working principle of Baum jig washer ?
- c) What is by-product of slot type coke oven ? How recovery of by-product from coke oven gas is being performed ? $3 + 6 + 6$
8. a) Briefly describe the classification & composition of Petroleum.
- b) Discuss the steps of crude oil distillation along with a process flow sheet and also the common fractions from crude petroleum with their boiling point range. $5 + 10$
9. Discuss the steps of crude oil distillation along with a process flow sheet.
10. a) Define the following properties of petroleum oils :
i) Pour point ii) Octane number
iii) Aniline point iv) Aviation fuel power number
v) Cloud point.
- b) Narrate briefly the method used for the production of olefines from Naphtha.
- c) Draw the Fischer-Tropsch process flow chart for producing liquid fuel from coal. $5 + 5 + 5$
11. What are the several characteristic features of a solar collector ? Why transparent covers are used in a flat collector ? Describe the working principle of a solar pond. What are the resources for geothermal energy ? $4 + 2 + 6 + 3$