

- (ix) Which of the following is a non-conventional, non-renewable energy source?
 (a) Solar (b) Geothermal (c) Nuclear (d) Wind.
- (x) Hot spring gas is an example of
 (a) Biogas (b) Tidal energy
 (c) Geothermal energy (d) Nuclear energy.

Fill in the blanks with the correct word

- (xi) _____ coal is used as fuel in thermal power plant.
- (xii) Low temperature carbonization leads to higher yield of _____.
- (xiii) For a liquid fuel, flash point is _____ than fire point.
- (xiv) _____ reaction is the reversal of Boudouard reaction.
- (xv) If the inlet temperature of the working fluid is 20°C and the exhaust temperature is 8°C, then the theoretical efficiency of close cycle OTEC system is _____.

Group - B

2. (a) Briefly discuss the non-conventional sources of energy production. [[CO1](Understand/IOCQ)]
 (b) Give a general view on energy consumption of world. [[CO1](Analyse/HOCQ)]
6 + 6 = 12
3. (a) Justify the statement, “coal does not contains ash but it yields ash”. [[CO2](Analyse/HOCQ)]
 (b) Briefly discuss the characteristics of anthracite coal. [[CO2](Remember/LOCQ)]
 (c) Explain “all coking coal are caking but all caking are not coke”. [[CO2](Apply/IOCQ)]
4 + 4 + 4 = 12

Group - C

4. (a) Discuss how liquid fuels can be obtained using Fisher-Tropsch process. [[CO3](Analyse/HOCQ)]
 (b) Define the following:
 (i) Flash point, (ii) Aniline point and Diesel index, (iii) Cloud point, (iv) API Gravity. [[CO3](Remember/LOCQ)]
4 + 8 = 12
5. (a) Mention the purposes of catalytic cracking and thermal cracking in the refinery. [[CO4](Remember/LOCQ)]
 (b) Mention the operating conditions of the above processes and type catalyst used, if any. [[CO4](Remember/LOCQ)]
 (c) Mention the difference between octane number and cetane number. State their significance. [[CO3](Apply/IOCQ)]
3 + 3 + 6 = 12

Group - D

6. (a) Mention the processes for complete gasification of coal. With a sketch discuss any one of the processes. [[CO5](Analyse/HOCQ)]
- (b) Mention the components of refinery gases. Also state their uses. [[CO5](Remember/LOCQ)]
- (c) In a trial on a producer, the following results were obtained:
Gas yield = 3000 Nm³/te of coke
CV of coke = 5,800 kcal/kg
CV of gas = 1,160 kcal/ Nm³.
Find its cold gas efficiency. [[CO5](Apply/IOCQ)]
- 6 + 3 + 3 = 12**
7. (a) What is biogas? Explain briefly the anaerobic digestion process in the production of biogas. [[CO5](Analyse/HOCQ)]
- (b) Write a short note on “enhanced oil recovery process”. [[CO5](Remember/LOCQ)]
- (c) What are the composition of biogas? [[CO5](Remember/IOCQ)]
- (1 + 5) + 4 + 2 = 12**

Group - E

8. (a) Describe the working principle of flat plate solar collector with diagram. [[CO6](Analyse/HOCQ)]
- (b) What are heliostat? [[CO6](Remember/LOCQ)]
- (c) What is central receiver system? [[CO6](Remember/LOCQ)]
- (d) What is the role of heliostat in central receiver system? Differentiate between heliostat and photovoltaic cells in harnessing solar energy. [[CO6](Apply/IOCQ)]
- 5 + 1 + 2 + (1 + 3) = 12**
9. (a) Briefly describe the working principle of “Closed Rankine cycle OTEC system” with a help of a diagram. [[CO6](Analyse/HOCQ)]
- (b) Discuss the hydrogen production processes. [[CO6](Remember/LOCQ)]
- 8 + 4 = 12**

Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	33.33	26.04	40.63

