

NO: Ex/ChE/PC/H/T/315/2023 (S)

B.CHEM.ENGINEERING EXAMINATION, 2023(s)

(3rd Year, 1st Semester, Supplementary)

ENERGY ENGINEERING (HONS)

Time: Three Hours.

Full Marks : 100

(50 marks for each Part)

Use separate Answer Script for each Part

PART I

Answer any two questions. All questions carry equal marks.

Assume missing data, if any.

7+ (2+10)+6=25

- 1 (a) Write the merits and demerits of wet and dry coal cleaning processes.
- (b) What is the significance of near gravity material (ngm) in coal washing? Describe the operation of a 'Baum jig' for coal washing.
- (c) Define gross calorific value, net calorific value and caking index of coal.

[Turn over

10+10+(2+3)= 25

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- (a) What physico chemical changes are taking place during carbonisation with temperature?
- (b) Using simplified diagram, briefly describe low temperature carbonisation of coal.
- (c) What is the role of limestone in blast furnace? Mention all the reactions that are taking place inside the blast furnace.

6+8+(2+2+2+5)= 25

3 (a) Mention the merits and demerits of beehive coke oven.

(b) Briefly discuss the production of bio-fuel from bio mass through anaerobic digestion mentioning the pertinent reactions involved.

(c) What are the compositions of producer gas and water gas? How producer gas is produced? Mention the reactions involved for the production of producer gas.

**BACHELOR OF CHEMICAL ENGINEERING SUPPLEMENTARY
EXAMINATION, 2023****(Third Year, First Semester)****ENERGY ENGINEERING (HONS.)**

Time: Three hours

Full Marks: 100
(50 marks for each part)**Use a separate Answer-script for each part****Part II**Answer ***any TEN*** questions

10×5

1. CNG can be transported through underground pipelines but not LNG — why? CO2
2. Bulk storage of LPG can be done in Horton's sphere or bullets — discuss their relative advantages and disadvantages. CO2
3. The volatility of gasoline affects the performance of the engine in a number of ways — briefly discuss them. CO3
4. The minimum flash temperature of kerosene is generally placed above the prevailing ambient temperature — why? What about gasoline? CO3
5. Low temperature heat recovery does not appear to be a welcome idea — why? CO1
6. Briefly discuss the shale gas extraction process. CO2
7. In a nuclear power plant, primary coolant is inside the containment structure and the secondary coolant is contained within the steam generator — why? CO4
8. In a nuclear power plant what is "spent fuel"? What is done with it and why? CO4
9. A viable geothermal system requires heat, permeability, and water. Comment. CO4
10. With the help of a neat sketch, discuss how a fuel cell operates. CO4
11. Solar thermal collectors utilize the principle of 'greenhouse effect' — Discuss. CO4
12. Approximately 2% of the solar energy reaching the earth is converted into wind energy. Comment. CO4