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GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER-V (NEW) EXAMINATION – WINTER 2020

Subject Code:3152107

Date:27/01/2021

Subject Name:Non Ferrous Extractive Metallurgy

Time:10:30 AM TO 12:30 PM

Total Marks: 56

Instructions:

1. Attempt any **FOUR** questions out of **EIGHT** questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

Marks

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|------------|------------------------------------------------------------------------------------------------------|-----------|
| Q.1 | (a) What is Extractive Metallurgy? List out basic types of Extraction processes. | 03 |
| | (b) Explain fluidized bed roasting with its mechanism. | 04 |
| | (c) List out Ores/ Minerals with their chemical compositions of metals Al, Cu, Pb, Ti, Sn Mg and Zn. | 07 |
| Q.2 | (a) Explain Distillation with suitable example of metal. | 03 |
| | (b) Differentiate between Pelletizing and Sintering. | 04 |
| | (c) Compare merits and demerits of Pyro and Hydro metallurgy. | 07 |
| Q.3 | (a) Differentiate between drying and Calcination. | 03 |
| | (b) Explain fused salt electrolysis. | 04 |
| | (c) Explain electrolytic refining of Aluminum. | 07 |
| Q.4 | (a) What are limitations of Ellingham diagram? | 03 |
| | (b) Differentiate between Electrowinning and Electro refining. | 04 |
| | (c) Explain Bayer's process with flow sheet for extraction of Aluminum . | 07 |
| Q.5 | (a) Explain autoclave in pressure leaching. | 03 |
| | (b) Explain the ion exchange process. | 04 |
| | (c) Discuss oxide free energy diagram in pyrometallurgy. | 07 |
| Q.6 | (a) Discuss Kroll process. | 03 |
| | (b) Explain in brief about rate of reaction. | 04 |
| | (c) Derive and explain Arrhenius Equation. | 07 |
| Q.7 | (a) Draw flow sheet of Pyro metallurgical extraction of zinc. | 03 |
| | (b) Draw flow sheet of blast furnace smelting and refining of lead bullion. | 04 |
| | (c) Explain Mitsubishi process for Copper production. | 07 |
| Q.8 | (a) Explain the PIDGEON process of Magnesium extraction. | 03 |
| | (b) Discuss smelting of Tin Concentrate. | 04 |
| | (c) Explain Hydro metallurgy route of Ni extraction . | 07 |
