

Enrollment No./Seat No.:

GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering - SEMESTER - VI EXAMINATION - WINTER 2025

Subject Code: 3162202

Date: 02-12-2025

Subject Name: Underground Metalliferous Mining

Time: 02:30 PM TO 05:00 PM

Total Marks: 70

Instructions

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

| | Marks |
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| Q.1 (a) List and explain three important factors related to the ore body's geometry that influence the selection of a stoping method. | 03 |
| (b) Differentiate between a Shaft and an Adit as primary mine entries. | 04 |
| (c) Describe the Room and Pillar method in detail, covering its applicability and the concept of Pillar Sizing. | 07 |
| Q.2 (a) Explain the concept of Accessories Entries in mine development. | 03 |
| (b) Differentiate between Supported, Unsupported (Open), and Caving methods in the general classification. | 04 |
| (c) Explain the Sublevel Stoping method, including its stope preparation and typical unit operations. | 07 |

OR

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|---|-----------|
| (c) Detail the process of stope preparation and the sequence of stopping operations in the Shrinkage Stoping method. | 07 |
| Q.3 (a) How do the physical and mechanical characteristics of the ore and the enclosing rocks dictate the choice of an extraction method? | 03 |
| (b) Explain the primary purpose and function of horizontal mine development. | 04 |
| (c) Explain the principle and applicability of the Sublevel Caving method. Also Detail the unit operation of ore drawing in Sublevel Caving, and what measures are taken to control dilution? | 07 |

OR

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|--|-----------|
| (a) What are the key limitations of the Square Set Stoping method, and why is it rarely used today? | 03 |
| (b) Explain the significance of Ore Grade and its distribution and the value of the product in selecting a stoping method. | 04 |
| (c) Describe the stope preparation and unit operation sequence for the Cut and Fill Stoping method. | 07 |

Q.4 (a) What is the main factor determining whether a deposit is suitable for the Caving method class? **03**

(b) Explain the concept of Block Caving, focusing on the required caving characteristics of the ore body and overlying rock. **04**

(c) Discuss the transportation considerations and challenges specific to a high-output, highly mechanized method like Sublevel Stoping. **07**

OR

(a) Which type of machinery would be deployed for drilling in the Large Diameter Blast Hole method? **03**

(b) What are the merits and demerits of the Shrinkage Stoping method? **04**

(c) How does the Alimak raise climber method work? Give a thorough explanation. **07**

Q.5 (a) What is the definition and introduction to Mine Closure in the context of metal mining? **03**

(b) What is the role of backfill material in Cut and Fill Stoping, and what are common sources? **04**

(c) Explain the different phases typically involved in the life cycle of a mine leading up to and including its closure. **07**

OR

(a) What are the factors that determine the extraction ratio in the Room and Pillar method? **03**

(b) Explain the concept of ore draw and how it is managed in the Shrinkage Stoping operation. **04**

(c) List and elaborate the crucial planning guidelines that must be established during the initial phase of mine closure planning. **07**
