

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
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 Stopping method, including its stope preparation and typical unit operations.	07
OR	
(c) Detail the process of stope preparation and the sequence of stopping operations in the Shrinkage Stopping 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	
(a) What are the key limitations of the Square Set Stopping 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 Stopping 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 Stopping. **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 Stopping 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 Stopping, 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 Stopping operation. **04**
- (c)** List and elaborate the crucial planning guidelines that must be established during the initial phase of mine closure planning. **07**
