Enrollment No./Seat No.:

GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering - SEMESTER - V EXAMINATION - WINTER 2025

Subject Code: 3152206 **Date: 02-12-2025**

Subject Name: Underground Coal Mining

Time: 10:30 AM TO 01:00 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 the different ranks of coal and explain the primary difference between them.	**03**
	(b)	Enumerate the main factors affecting the choice of a coal mining method.	**04**
	(c)	Discuss the factors that determine the optimum size of pillars and panels in bord and pillar method.	**07**
Q.2	**(a)**	List the types of machinery commonly used during the development phase of a coal mine.	**03**
	(b)	Explain the concept of a "panel" in underground coal mining and its role in design and development.	**04**
	(c)	Explain the concept of "Extraction by Caving" and "Extraction by Stowing" as a pillar extraction technique in Bord and Pillar method. .	**07**
		OR	
	(c)	Describe the Pneumatic Stowing method and list its main merits and demerits	**07**
Q.3	**(a)**	How coal seams are classified based on their thickness?	**03**
	(b)	Outline the general practices for opening up new coal deposits in major coalfields.	**04**
	(c)	How do engineers calculate how many pillars are needed in a panel? Give a sample calculation.	**07**
		OR	
	(a)	Contrast the layout and production potential of Single and Double unit longwall faces.	**03**
	(b)	Explain the application and function of a DERDS (Double Ended Ranging Drum Shearer).	**04**
	(c)	Describe the unit operations of winning, loading, and haulage in a Bord and Pillar mine.	**07**
Q.4	**(a)**	How does the rate of pillar extraction affect strata control and overall mine safety?	**03**

	(b)	Differentiate between the application and mechanism of timber props and friction/hydraulic props.	**04**
	(c)	Differentiate between the Advancing and Retreating Longwall systems in terms of panel development and ventilation with neat sketch.	**07**
		OR	
	(a)	What is the function of the Armoured Face Conveyor (AFC), and where is it positioned?	**03**
	(b)	Distinguish between Cyclic and Non-cyclic operations in Longwall mining.	**04**
	(c)	Detail the necessary arrangements for stowing material on the surface (Collection, Preparation, Storage).	**07**
Q.5	**(a)**	Summarize the concept and importance of Systematic Supporting Rules.	**03**
	(b)	Explain the function, applicability, and advantage of roof bolting.	**04**
	(c)	Describe the construction and function of cogs and hydraulic chocks as roof supports.	**07**
		OR	
	(a)	What are the key factors considered when determining the optimum length of a longwall face?	**03**
	(b)	Compare and contrast Mechanical Stowing with Hydraulic Stowing in terms of applicability and demerits.	**04**
	(c)	List and briefly describe the different types of roof bolts used in underground coal mines.	**07**

***