

## GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-V EXAMINATION – SUMMER 2025

Subject Code:3152206

Date:28-05-2025

Subject Name:Underground Coal 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
<b>Q.1*</b> (a) Write the rank of coal in terms of increasing moisture content.	<b>03</b>
(b) Explain the term shaft, Incline and Adit with neat sketch.	<b>04</b>
(c) Discuss panel system of mining with neat sketch? How panel size is decided in Bord and Pillar method of working? Explain briefly.	<b>07</b>
<b>Q.2</b> (a) Name the subsidiary of coal India limited (CIL) with their headquarter name.	<b>03</b>
(b) Explain the basic principle of bord and pillar method with neat sketch.	<b>04</b>
(c) Discuss the method of development of bord and pillar mining by blasting off the solid. Also draw the sketches of patterns of blast holes.	<b>07</b>
<b>OR</b>	
(c) Discuss the procedure to establish the design of a new longwall face or district.	<b>07</b>
<b>Q.3</b> (a) Write the applicability conditions of longwall method of mining.	<b>03</b>
(b) Explain theories of origin of coal in detail.	<b>04</b>
(c) Calculate number of pillar in the panel if output per day from the panel is 340 tonnes, number of working days in a month is 26, incubation period of coal seam is 6 month and percentage recovery in the panel is 78 %. Assume width of square pillar is 22.5 m, height of pillar is 3 m and density of coal is 1.4 tonnes/m <sup>3</sup> .	<b>07</b>
<b>OR</b>	
<b>Q.3</b> (a) When do we need to support mines and why?	<b>03</b>
(b) What are the variants of longwall face layouts? Explain with neat sketch.	<b>04</b>
(c) Discuss the principles of pillar extraction techniques? Also Explain the pillar extraction techniques with neat sketch.	<b>07</b>
<b>Q.4</b> (a) Draw a neat sketch of a longwall face & name the elements.	<b>03</b>
(b) How factor of safety of pillar is determined? Explain with one example.	<b>04</b>
(c) Explain longwall retreating and advancing method with neat sketch. Also write the advantages of longwall mining.	<b>07</b>
<b>OR</b>	
<b>Q.4</b> (a) What are the ideal characteristics of stowing material used in stowing?	<b>03</b>
(b) How to calculate percentage of extraction during development & depillaring? Explain with one example.	<b>04</b>
(c) Discuss the process of hydraulic stowing with a neat sketch.	<b>07</b>

- Q.5** (a) Write the classification of coal seam as per thickness, Depth and Inclination. **03**
- (b) State the advantages and disadvantages of mechanical stowing. **04**
- (c) Discuss the operations involved & facilities provided in a mixing chamber of sand stowing. **07**

**OR**

- Q.5** (a) What do you mean by cyclic and non-cyclic operations? **03**
- (b) What do you understand by roof bolting? Also explain its principle of action and functions. **04**
- (c) Give a brief idea about hydraulic and friction props. **07**

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