Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–V (NEW) EXAMINATION – WINTER 2024

Subject Code:3152206 Date:17-12-2024

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)**	What do you mean by rank of coal?	**03**
	(b)	Mention any Six subsidiaries of coal India & their headquarters.	**04**
	(c)	Discuss the method of development of bord and pillar mining by blasting off the solid. Also draw the sketches of patterns of shotholes.	**07**
Q.2	**(a)**	List out the factors affecting the choice of coal mining methods.	**03**
	(b)	Explain "Drift theory" of origin of coal.	**04**
	(c)	Differentiate between Mechanical Stowing and Pneumatic Stowing.	**07**
		OR	
	(c)	A bord and pillar of a coal mine lying at a depth 200 m from surface is developed with 30 m width of bord, galleries of width 4.6 m and height of gallery is 3 m. Find out (i) Load on pillar in kg/cm^2 (ii) Strength of pillar in kg/cm^2 (iii) Factor of safety of pillar. Assume density of the overburden material is 2.306 tonnes/m^3.	**07**
Q.3	**(a)**	Under what circumstances, bord and pillar method of working adopted?	**03**
	(b)	What are the various means of access of opening up of coal seam? Explain with neat sketch.	**04**
	(c)	What are the factors affecting the design of Bord and Pillar method of working? Explain briefly.	**07**
		OR	
Q.3	**(a)**	Draw a neat sketch of a longwall advancing double unit face & name the elements.	**03**
	(b)	A coal panel is being developed in a seam of 5 m thickness by galleries of 3 m height × 4 m width separated by pillars of 22.5 m × 22.5 m size. Calculate the percentage of extraction during development and depillaring. Assume the data if required.	**04**
	(c)	What are the principles of pillar extraction techniques? Also explain the sequence of pillar extraction with diagonal line & step diagonal line of face with a neat sketch.	**07**
Q.4	**(a)**	When do we need to support mines and why?	**03**
	(b)	What are the factors affecting the layout of longwall face? Explain briefly.	**04**
	(c)	How development is done by using continuous miner? Also draw a layout for development of five heading using continuous miner.	**07**
		OR	
Q.4	**(a)**	Under what circumstances, depillaring with stowing method is adopted?	**03**
	(b)	Explain longwall retreating method with neat sketch.	**04**

	(c)	Discuss the process of hydraulic stowing with a neat sketch.	**07**
Q.5	**(a)**	What are the ideal characteristics of stowing material used in stowing?	**03**
	(b)	What do you mean by roof bolting? Also explain its principle of action and functions.	**04**
	(c)	Give a brief idea about hydraulic and friction props.	**07**

OR

Q.5	**(a)**	Name the different parts of a shearer with a schematic line diagram.	**03**
	(b)	State the advantages and disadvantages of mechanical stowing.	**04**
	(c)	What are the operations involved & facilities provided in a mixing chamber of sand stowing? Draw a neat sketch.	**07**

****