GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER–V (NEW) EXAMINATION – SUMMER 2024

Subject Code: 3152206   **Date:31-05-2024**

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
Q.1	**(a)**	List out the factors affecting the choice of coal mining methods.	**03**
	(b)	Explain theories of origin of coal in detail.	**04**
	(c)	Briefly explain the method of development of bord and pillar mining by blasting off the solid. Also draw the sketches of patterns of blast holes.	**07**
Q.2	**(a)**	Write the factors affecting the size of pillars in bord and pillar mining.	**03**
	(b)	What are the factors affecting the layout of longwall face? Explain briefly.	**04**
	(c)	A bord and pillar of a coal mine lying at a depth 200 m from surface is developed with 22.5 m width of bord, galleries of width 3.0 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. Assume density of the overburden material is 2.306 tonnes/m^3.	**07**

OR

	(c)	Differentiate between Mechanical Stowing and Pneumatic Stowing.	**07**
Q.3	**(a)**	What do you mean by rank of coal?	**03**
	(b)	What are the various means of access of opening up of coal seam? Explain with neat sketch.	**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.3	**(a)**	Draw a neat sketch of a longwall advancing double unit face & name the elements.	**03**
	(b)	How to determine the panel size in Bord and Pillar method of working? Explain briefly.	**04**
	(c)	Calculate number of pillar in the panel if output per day from the panel is 350 tonnes, number of working days in a month is 25, incubation period of coal seam is 6 month and percentage recovery in the panel is 75%. Assume width of square pillar is 22.5 m, height of pillar is 3 m and density of coal is 1.4 tonnes/m^3	**07**
Q.4	**(a)**	When do we need to support mines and why?	**03**
	(b)	How to calculate percentage of extraction during development & depillaring? Explain with one example.	**04**
	(c)	What are the principles of pillar extraction techniques? Explain pillar extraction techniques in detail.	**07**

OR

Q.4	**(a)**	Name the different parts of a shearer with a schematic line diagram.	**03**
	(b)	Explain longwall retreating method with neat sketch.	**04**
	(c)	What are the operations involved & facilities provided in a mixing chamber of sand stowing? Draw 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) Under what circumstances, depillaring with stowing method is adopted? **03**

(b) State the advantages and disadvantages of mechanical stowing. **04**

(c) Discuss the process of hydraulic stowing with a neat sketch. **07**

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