Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII (NEW) EXAMINATION – SUMMER 2024

Subject Code: 3172213 Date:22-05-2024

Subject Name: Rock Fragmentation

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)**	Draw the line diagram or sketch of components of drilling equipment & name the components.	**03**
	(b)	Explain delay detonators and its advantages with neat sketch	**04**
	(c)	Discuss the properties of explosive in detail.	**07**
Q.2	**(a)**	Name the factors affecting the selection of drill machines.	**03**
	(b)	Differentiate between low explosive & high explosive with suitable examples.	**04**
	(c)	What is mechanics of drilling? Explain the mechanism of rock breakage by percussive drilling with neat sketch.	**07**
		OR	
	(c)	Write a short note on stoper and drifter. Also discuss the construction and operation of wagon drill machine.	**07**
Q.3	**(a)**	Make a tree diagram of classification of drilling methods.	**03**
	(b)	Discuss the principle and operation of "jack hammer" drill machine used in underground coal mining.	**04**
	(c)	Define powder factor with its importance in blasting? Calculate the powder factor (kg/m^3) from below data :- (i) Bench Height – 12 m (ii) Hole Dia. – 170 mm and amount of explosive loaded in blast hole = 11.5 kg/m. Assume the parameters if required.	**07**
		OR	
Q.3	**(a)**	Compare rotary drilling method with percussive drilling method.	**03**
	(b)	Discuss the blast design pattern using in surface mine with neat sketch.	**04**
	(c)	Why control blasting methods are used in mines? Explain any two method of control blasting in detail.	**07**
Q.4	**(a)**	Explain the importance of permitted explosive in underground coal mines. Also write its type.	**03**
	(b)	What is VOD and how it is determined?	**04**
	(c)	Calculate the powder factor in tonne/kg from below data: ☙ Bench height including subgrade drilling = 10 m ☙ Burden = 4 m ☙ Spacing = 5 m ☙ Subgrade drilling = 0.5 m ☙ Stemming length = 3 m If the diameter of the hole is 200 mm and density of explosive and rock is 0.9 tonne/m^3 and 2 tonne/m^3 respectively.	**07**

OR

Q.4	**(a)**	Explain the application and importance of high speed video camera in mining.	**03**
	(b)	Why drillability is important? Also write the factors affecting the drillability of rock.	**04**
	(c)	Discuss the causes and Impact of ground vibration and air blast on the neighboring structures and communities. Also explain its mittigative measures.	**07**
Q.5	**(a)**	What are the advantages of using image analysis technique for fragmentation analysis of a muckpile?	**03**
	(b)	What do you mean by penetration rate and how it is determined in the mine? Explain with one example.	**04**
	(c)	What is secondary blasting? Explain its types in detail.	**07**

OR

Q.5	**(a)**	Differentiate between the term slurry and emulsion explosive.	**03**
	(b)	Write a short note on bit wear.	**04**
	(c)	Discuss the blast design pattern using in underground mine with neat sketch..	**07**

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