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GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–VII (NEW) EXAMINATION – WINTER 2020

Subject Code:2172207 **Date:28/01/2021**

Subject Name:Rock Fragmentation

Time:10:30 AM TO 12:30 PM **Total Marks: 56**

Instructions:

1. **Attempt any FOUR questions out of EIGHT questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

			MARKS
Q.1	**(a)**	What are the factors influencing the selection of drill machine? Explain the operational components of drilling system.	**03**
	(b)	Explain delay detonators and its advantages with neat sketch	**04**
	(c)	What do you mean by rock blasting? Describe the blast design parameters in detail.	**07**
Q.2	**(a)**	Differentiate between low explosive & high explosive with suitable examples.	**03**
	(b)	It is proposed to load 5.5 inch diameter blast hole with bulk ANFO. The mining engineer would like to use "9 feet × 9 feet" drill pattern. The bench height is 35 feet and each hole is to be fired on separate delay. Assuming the burden distance is correct, will the 9 feet spacing be acceptable?	**04**
	(c)	What is mechanics of drilling? Explain the mechanism of rock breakage by percussive drilling with neat sketch.	**07**
Q.3	**(a)**	What is booster? Also explain the composition of explosive.	**03**
	(b)	Discuss the principle and operation of "down the hole hammer (DTH)" drill machine.	**04**
	(c)	A contractor plans to use dynamite that has specific gravity of 1.4 to open an excavation in granite rock. The drilling equipment will drill a 5 inch blasthole. Dynamite comes in packaged with 3.75 inch and 4.5 inch diameter sticks. If the bench height is 20 feet and specific gravity of granite is 2.8, which package of dynamite will result in lesser blasting problems? Also calculate stemming length and subgrade drilling depth.	**07**
Q.4	**(a)**	What are electric and non-electric methods of blasting system?	**03**
	(b)	Compare rotary drilling method with percussive drilling method.	**04**
	(c)	Why control blasting methods are used in mines? Explain any two method of control blasting in detail.	**07**
Q.5	**(a)**	Explain permitted explosive and its type	**03**
	(b)	What is VOD and how it is determined?	**04**
	(c)	What is the importance of powder factor? Calculate the powder factor in kg/m^3, if the bench height is 12 m, subgrade drilling is 0.35 m, stemming height is 1.8 m, drill hole diameter is 130 mm. Take specific gravity of explosive is 1.3 and loading rate of explosive per meter in hole is 8.5 kg.	**07**
Q.6	**(a)**	What is delay blasting technique? Explain briefly.	**03**
	(b)	How drillability of rock is determined in laboratory? 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**

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Q.7	**(a)**	What do you understand by nuclear blasting?	**03**
	(b)	Explain novel methods of drilling.	**04**
	(c)	What is secondary blasting? Explain its types in detail.	**07**
Q.8	**(a)**	Write a note on ANFO.	**03**
	(b)	Explain different types of bit wear and effects of bit wear.	**04**
	(c)	Discuss the recent developments in explosive and blasting techniques.	**07**

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