Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER– IV(NEW) EXAMINATION – SUMMER 2023

Subject Code:3142209 Date:19-07-2023

Subject Name:Rock Mechanics

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)**	Define the term rock mechanics. Discuss the application of rock mechanics in mining.	**03**
	(b)	State the aims and objectives of a rock mass classification.	**04**
	(c)	Explain dynamic properties of rock and rock mass.	**07**
Q.2	**(a)**	Discuss the factors influencing velocity of waves through a rock mass.	**03**
	(b)	Explain the analysis of stress-strain curve with neat sketch.	**04**
	(c)	Explain the Griffith's theory of fracture in rock mass.	**07**
		OR	
	(c)	Explain the Empirical criteria of rock failure.	**07**
Q.3	**(a)**	Discuss the size and scale effect on strength of rocks. How does information about elasticity of a rock mass help in designing structures over them?	**03**
	(b)	Explain the constitutive relations in isotropic and anisotropic rock under static and dynamic loading.	**04**
	(c)	Describe the method for determination of modulus of elasticity and Poisson's ratio of a rock sample.	**07**
		OR	
Q.3	**(a)**	Explain how slake durability of rock is determined.	**03**
	(b)	Define the physical and mechanical properties of rocks. Discuss which information's we get out of them.	**04**
	(c)	Define strength of rock. Explain different types of strength.	**07**
Q.4	**(a)**	Discuss the factors on which mechanical properties of rocks depends.	**03**
	(b)	Explain failure of rocks. Describe the types of failure.	**04**
	(c)	Explain Mohr's scale of hardness and role of hardness in rock mass.	**07**
		OR	
Q.4	**(a)**	Discuss the effect of texture of rocks on the propagation of waves through it.	**03**
	(b)	Define abrasivity. Explain how it is determined in rock.	**04**
	(c)	Explain the permeability of rocks with its experimental determination.	**07**
Q.5	**(a)**	Discuss the sources of pre-mining stress.	**03**
	(b)	Explain the Rock Quality Designation Index (RQD).	**04**
	(c)	Explain the forces and displacements associated with cable bolting.	**07**

OR

Q.5	**(a)**	Explain the application of rock mass classification in mining problems.	**03**
	(b)	Describe the Rock Mass Rating (RMR) by Bieniawski.	**04**
	(c)	Explain the redistribution of rock pressure on conventional and powered support.	**07**

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