Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV(NEW) EXAMINATION – WINTER 2022

Subject Code:3142209 Date:17-12-2022

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 rock mechanics. Discuss the application of rock mechanics.	**03**
	(b)	Explain failure of rocks. Describe the types of failure.	**04**
	(c)	Define strength of rock. Explain different types of strength.	**07**
Q.2	**(a)**	List out the name of physical and mechanical properties of rock.	**03**
	(b)	Explain the analysis of stress and strain curve.	**04**
	(c)	Explain Mohr's scale of hardness and role of hardness in rock mass.	**07**
		OR	
	(c)	Discuss the Griffith's theory of fracture in rock mass.	**07**
Q.3	**(a)**	Explain the application of rock mass classification in mining problems.	**03**
	(b)	Explain porosity and density of rock.	**04**
	(c)	Discuss the theory of reinforcement of rock mass by different types of support system.	**07**
		OR	
Q.3	**(a)**	Discuss the factors on which mechanical properties of rocks depends.	**03**
	(b)	Explain the Rock Quality Designation Index (RQD).	**04**
	(c)	Discuss Mohr's and Coulomb theories of failure.	**07**
Q.4	**(a)**	Compare RMR classification system with Q system.	**03**
	(b)	State the aims and objectives of a rock mass classification.	**04**
	(c)	Define abrasivity. Explain how it is determined in rock.	**07**
		OR	
Q.4	**(a)**	Explain how slake durability of rock is determined.	**03**
	(b)	Differentiate between isotropic and anisotropic rock.	**04**
	(c)	Explain dynamic properties of rock and rock mass.	**07**
Q.5	**(a)**	Discuss the factors affecting strength of rock.	**03**
	(b)	Describe the method for determination of modulus of elasticity and Poisson's ratio of a rock sample.	**04**
	(c)	Describe roof testing and stitching in the support system.	**07**
		OR	
Q.5	**(a)**	Determine hydro-fracturing of rock in pre-mining state of stress.	**03**
	(b)	Define permeability. Discuss the uses of permeability.	**04**
	(c)	Explain static and dynamic methods for determining elastic constant of rock.	**07**

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