Enrollment No./Seat No.:

GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering - SEMESTER - IV EXAMINATION - SUMMER 2025

Subject Code: 3142209 **Date: 19-05-2025**

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.

			Marks
Q.1	**(a)**	What do you understand by bulk density?	**03**
	(b)	Discuss the application of rock mechanics in mining.	**04**
	(c)	What do you mean by Compressive strength of rock? Explain the determination of uni-axial compressive strength of rock with one example.	**07**
Q.2	**(a)**	Write the different ways of roof testing.	**03**
	(b)	How to determine porosity of rock sample? Explain with one example.	**04**
	(c)	Discuss rock mass rating (RMR) & rock structure rating (RSR) system in detail.	**07**
		OR	
	(c)	Discuss in detail the theory of reinforcement of rock mass by rock bolting.	**07**
Q.3	**(a)**	Define Ideally Plastic, perfectly Plastic and Elastic Plastic materials.	**03**
	(b)	Explain moisture content of rock with one example.	**04**
	(c)	What is Rock Quality Designation Index (RQD)? How it is determined?	**07**
		OR	
	(a)	What do you understand by permeability?	**03**
	(b)	Explain Modulus of elasticity and Poisson's ratio.	**04**
	(c)	Describe the tests or methods to determine the Permeability of rock sample.	**07**
Q.4	**(a)**	Write the mohr's scale of hardness.	**03**
	(b)	Discuss the effect of joints and fracture on mechanical properties of rocks.	**04**
	(c)	Discuss the Griffith's theory of fracture in rock mass.	**07**
		OR	
	(a)	Explain the creep behaviour of rock.	**03**
	(b)	What is Brazilian test? Explain with one example.	**04**
	(c)	Explain hydraulic fracturing method in detail.	**07**
Q.5	**(a)**	What do you understand by pre-mining state of stress?	**03**

(b)	Explain different types of failure in rock.	**04**
(c)	Describe the dynamic properties of rock in detail.	**07**

OR

(a)	With the help of neat diagram, explain stress-strain curve.	**03**
(b)	Explain Mohr's and Coulomb theories of rock failure.	**04**
(c)	Name the methods of determining of shear strength of rock? Explain any one method in detail.	**07**

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