

Enrolment No./Seat No _____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER-IV (NEW) EXAMINATION – WINTER 2024

Subject Code:3142209

Date:27-11-2024

Subject Name:Rock Mechanics

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

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|------------|-----|--|-----------|
| Q.1 | (a) | Name the physico-mechanical properties of rock. | 03 |
| | (b) | Why knowledge of physico-mechanical properties is important for a mining engineer? | 04 |
| | (c) | Discuss “Compressive strength of rock” in detail. | 07 |
| Q.2 | (a) | What do you understand by permeability? | 03 |
| | (b) | How to calculate density of rock sample? Explain with one example. | 04 |
| | (c) | Explain the Rock Quality Designation Index (RQD) in detail with one example. | 07 |
| OR | | | |
| | (c) | Discuss in detail the theory of reinforcement of rock mass by rock bolting. | 07 |
| Q.3 | (a) | Define Modulus of elasticity and Poisson’s ratio. | 03 |
| | (b) | How hardness of rock is determined? Also write the mohr’s scale of hardness. | 04 |
| | (c) | Discuss rock mass rating (RMR) & Q system in detail. | 07 |
| OR | | | |
| Q.3 | (a) | What do you understand by pre-mining state of stress? | 03 |
| | (b) | Explain Porosity and moisture content of rock. | 04 |
| | (c) | Explain dynamic properties of rock. | 07 |
| Q.4 | (a) | Define Ideally Plastic, perfectly Plastic and Elastic Plastic materials. | 03 |
| | (b) | Explain different types of failure in rock. | 04 |
| | (c) | Name the methods of determining of shear strength of rock? Discuss any one method in detail. | 07 |
| OR | | | |
| Q.4 | (a) | With the help of neat diagram, explain stress-strain curve. | 03 |
| | (b) | Explain Mohr’s and Coulomb theories of rock failure. | 04 |
| | (c) | Explain hydraulic fracturing method in detail. | 07 |
| Q.5 | (a) | How to do the roof testing? | 03 |
| | (b) | Explain the creep behaviour of rock. | 04 |
| | (c) | Describe briefly about the different tests to determine the Permeability of rock sample. | 07 |
| OR | | | |
| Q.5 | (a) | Write the effect of joints and fracture on mechanical properties of rocks. | 03 |
| | (b) | What is Brazilian test? Explain with one example. | 04 |
| | (c) | Discuss the Griffith’s theory of fracture in rock mass. | 07 |