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S.E. (Mining) (Sem-IV) (Revised Course 2016-2017)  
EXAMINATION MAY/JUNE 2019  
Rock Mechanics & Ground Control - I

[Duration : 3 Hours]

[Max Marks : 100]

**Instructions:**

- 1) Answer FIVE questions; At least TWO from PART-A, TWO from PART-B and ONE from PART-C.
- 2) Draw neat sketches in pencil, whenever required and necessary.
- 3) Figures to the right indicate full marks assigned to that question.

**PART A**

- Q.1
- a. What do you understand by rock mechanics? Write its application in mining. **08**
  - b. Write a note on constraints in rock mechanism application. **06**
  - c. What are principle stresses? How it is determined? **06**
- Q.2
- a. Draw a complete stress-strain curve and explain its various parameters. **08**
  - b. Describe with neat sketch Mohr's circle of stresses. Write some application of Mohr's circle in rock mechanics. **12**
- Q.3
- a. What do you mean by Rock Mass Classification system? **05**
  - b. Describe Rock Mass Rating (RMR) classification in detail? **15**

**PART B**

- Q.4
- a. What do you mean by rock failure theory? Describe any one rock failure theory in detail. **10**
  - b. What is the general meaning of rheology? Describe the various type of rheological model in detail. **10**
- Q.5
- a. Briefly explain the compressive strength of rock. Describe any one experimental method of determination for compressive strength of rocks. **10**
  - b. Explain the dynamic method of determination of elastic constants by ultrasonic method. **10**
- Q.6
- a. What is slope failure? Describe different types of slope failure in detail with neat sketch. **12**
  - b. State briefly various types of slop stabilization techniques. **08**

**PART C**

- Q.7
- a. What is durability of rocks? Describe the process of Slake durability index test in laboratory. **10**
  - b. Describe the different types of physical properties of rocks. **10**

- Q.8 a. In a series of triaxial compressive tests on a sedimentary rock. The following represent the stresses at peak load conditions: 10

Sample test Number	$\sigma_3$ (MPa)	$\sigma_1$ (MPa)
1	1	5
2	2	12
3	3	20
4	4	36
5	5	50

Determine values of 'c' and ' $\phi$ ' that best fit the data (use graph paper to plot the result).

- b. Explain with neat sketch Brazilian Test' for determining tensile strength of rock sample. 10