B.E. Mining Engineering Fifth Semester

MN501 - Rock Mechanics

P. Pages : 2 **GUG/W/18/1651**

Time : Three Hours * 1 3 0 0 * Max. Marks : 80

Notes : 1. Due credit will be given to neatness and adequate dimensions.
2. Assume suitable data wherever necessary.
3. Illustrate your answer wherever necessary with the help of neat sketches.
4. Marks are indicted to the right.

1. Explain with illustrative sketch stress-strain curve in the case of intact coal specimen subjected to uniaxial test in compression. Also explain determination of peak stress at failure, Poisson's ratio, secant's and tangent modulus of elasticity on the same stress-strain curve. **10+6=16**

OR

2. Define **2x4+4+4=16**
i) Intact Rock, ii) Rock Mass, iii) Rock Mechanics, and
iv) Rock Engineering. Discuss the behaviour of intact rock and rock mass and its relevance w. r. t. the mining engineering, rock mechanics and rock engineering.

3. What are the following stress states: **16**
Uniaxial stress, biaxial stress, triaxial stress, polyaxial stress, pure shear stress and hydro-static stress? Explain with illustrative sketches.

OR

4. Describe a method to determine uni-axial tensile strength of rock specimen in Laboratory. **9+7=16**
Explain with sketch how ProtodyaKonov strength Index is measured.

5. Describe the Flat-Jack Method of measuring insitu underground stresses? Compare it with Hydro-fracturing method? **16**

OR

6. Describe in brief, what you think is meant by each of the following terms: Natural stress, Induced stress, Gravitational stress, Tectonic stress, residual stress, Thermal stress, Palaeo stress, Near-field stress, Far-field stress, Local stress. **16**

7. Explain with illustrative sketches various rheological models applicable in mining Engineering. What is time-dependent beahviour of rock masses? **12+4=16**

OR

8. Distinguish the principles and utility of single-criterion classification schemes for rock masses from multi-criteria classification schemes. Discuss a few important single criterion classification schemes applicable for rock masses. **6+10=16**

9. What is Soil? Explain different types of soil. Discuss, briefly, some important Physico-mechanical properties of black cotton soil and its effect w.r.t. the active mine slope as well as dump slope stability point of view. **2+6+8 =16**

OR

10. a) Explain, with the help of illustrative sketches, Griffith's theory of failure applicable to the rock. **8**

b) How are normal and shear stress components plotted on Mohr's circle? Demonstrate with illustrative sketch. Also show how such a Mohr's circle is used to determine cohesion and angle of internal friction. **8**

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