Code No: **RT41263** **R13** **Set No. 1**

IV B.Tech I Semester Supplementary Examinations, February/March - 2018

ROCK MECHANICS AND GROUND CONTROL

(Mining Engineering)

Time: 3 hours **Max. Marks: 70**

Question paper consists of Part-A and Part-B
Answer ALL sub questions from Part-A
Answer any THREE questions from Part-B
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PART–A *(22 Marks)*

1. a) State the scope of Rock Mechanics? [3]
   b) List the physical and Mechanical properties of rocks? [3]
   c) Write the procedure for find out photo elastic stress? [4]
   d) List the characteristics of coal measures strata? [4]
   e) State the Installation procedure of a resin grouted rock bolt? [4]
   f) Explain the causes of bumps in mines? [4]

PART–B *(3x16 = 48 Marks)*

2. a) The stresses acting on a plane whose normal makes an angle **45** with reference to x-axis are as follows. σ_{XX} = 10 MPa, σ_{YY} = 20 MPa & τ_{XY}= 10 MPa. Represent the stresses using Mohr's circle method. [8]
   b) If the static Young's Modulus (E) and Poisson's Ratio (μ) of a rock are 25 GPa and 0.30 respectively, Calculate the value of the shear modulus (G) in GPa? [8]

3. a) Explain various modes of rock failure under uniaxial compressive, tensile and shear stresses. [8]
   b) Compare the procedures for determining the compressive and tensile strength of rocks for regular rock samples. [8]

4. a) What are boundary stresses? Explain it with an example for an underground opening. [8]
   b) State the Coulomb - Navier's theory of failure of rock. [8]

5. a) Describe about Pre mining stresses. [8]
   b) Explain about Theories of mechanics of strata behavior. [8]

6. a) What are the objectives and limitations of the underground mine supports? [8]
   b) Explain briefly the constructional features of a closed circuit hydraulic prop. [8]

7. For a subcritical phase of subsidence Illustrate with a neat sketch the subsidence profile in the Dip-Rise orientation, When the coal seam is of uniform thickness but dipping moderately. Mark the following on your sketch.
   (i) Angles of draw
   (ii) Transition points
   (iii) Maximum subsidence in the profile. [16]