CBCS SCHEME

USN | | | | | | | | | | |

15MN72

Seventh Semester B.E. Degree Examination, Dec.2018/Jan.2019
Ground Control

Time: 3 hrs. Max. Marks: 80

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Module-1

1 a. Explain the purpose of Ground Control and constraints in design of underground excavations. **(08 Marks)**

b. A circular opening of diameter 10m is located at a depth of 500m from the surface. The density of the overburden rock is 20kN/m^3. Calculate the magnitudes of the stresses at the boundary of the opening subjected to hydrostatic pressure condition. **(08 Marks)**

OR

2 a. Explain the concept of energy released during excavation using stress – volume diagram. **(08 Marks)**

b. A circular opening 5m dia. is located at a depth of 225m in a coal field. Following details are given below :
Compressive strength of coal = 40 MPa ;
Modulus of rupture of coal = 3.5 MPa ;
Poisson ratio = 0.2 ; Stress concentration factor in compression = 3.8 ;
Stress concentration factor in tensile = 0.2 ; Overburden rock density = 18kN/m^3 ;
Calculate the factor of safety in compression and in Tension and also comment on the values. **(08 Marks)**

Module-2

3 a. Explain the different classifications of Mine pillars. **(08 Marks)**

b. Explain the different Mechanisms of Mine pillar functions. **(08 Marks)**

OR

4 a. Explain the design principles of Bord and Pillar method of Mining. **(08 Marks)**

b. In an underground coal working following data's are obtained :
Depth of working = 200m ; Width of Galleries = 3m ; Height of galleries = 3m.
Width of square pillars between centres of Bords = 22.5m.
Density of coal = 2.306 tonnes/m^3. Strength of pillars = 150 kg/cm^2.
Determine the following : i) The load or stress on the pillars ii) Factor of safety. **(08 Marks)**

Module-3

5 a. Explain the causes and impacts of subsidence due to mining by Long wall method. **(08 Marks)**

b. Long wall mining is carried out having 140m wide , 8m thick seam at a depth of 300m from the surface. The dip of the seam is zero. Calculate the following :
i) Location and magnitude of the maximum subsidence on surface.
ii) Magnitude of subsidence on surface corresponds to the edge of the critical width of excavation. The subsidence factor is 0.4. **(08 Marks)**

OR

6 a. Explain with a neat sketch, the method of measuring subsidence profile due to long wall mining. **(08 Marks)**

b. An underground opening which is located at a depth of 300m to extract a coal seam of thickness 6m. The zero subsidence was measured at a distance of 150m on the surface from the edge of the opening. Calculate i) Angle of draw ii) Maximum subsidence if complete caving is allowed. **(08 Marks)**

Module-4

7 a. Explain with neat sketches the caving mechanism in long wall mining. **(08 Marks)**

b. Explain the Beam theory of caving. **(08 Marks)**

OR

8 a. Explain the phenomenon and types of coal Bump. **(08 Marks)**

b. Explain the various methods of controlling and prevention of Rockburst. **(08 Marks)**

Module-5

9 a. Explain the purpose of Rock mass classification. **(06 Marks)**

b. Explain with a neat sketch, the concept of Terzaghi's rock load , classification of rock mass. **(10 Marks)**

OR

10 a. Explain the various parameters considered for the calculation of RMR value and classify the rockmass based on RMR values. **(08 Marks)**

b. Explain the method of determination of Q value for the rockmass and give the classification of various support systems suggested based on Q values. **(08 Marks)**

* * * * *