CBCS SCHEME

USN | | | | | | | | | |

Seventh Semester B.E. Degree Examination, Feb./Mar. 2022
Ground Control

Time: 3 hrs.   Max. Marks: 100

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

Module-1

1 a. A circular opening of diameter 7m is at a depth of 500m from the surface. The overburden pressure is 25kN/m³. For a stress ratio of one, determine the magnitude of the following stress along its boundary :
   i) Tangential stress   ii) Radial stress   iii) Shear stress.   **(10 Marks)**
   b. Determine the energy released during underground excavation.   **(10 Marks)**

OR

2 a. A series of circular opening with 6m diameter are spaced at 10m center to center. The depth of tunnels from the surface is 300m. The over burden pressure is 20kN/m³. Determine the safety of the tunnels for the following : Compressive strength = 50MPa ; Tensile strength = 5 MPa ; Poisson's ratio = 0.25 ; Compressive strength ratio = 5 Tensile strength ratio = 0.1 ; Width to pillar height ratio = 2.   **(10 Marks)**
   b. Explain BEM , FEM and FDM method of Numerical modeling.   **(10 Marks)**

Module-2

3 a. Predict the load carried by a pillar in an underground coal mine for rectangular, square and irregular shape using the Tributary Area method.   **(10 Marks)**
   b. Interpret the stress distribution with in and around the pillar with neat sketch.   **(10 Marks)**

OR

4 a. Summarize the effect of shape , size roof and floor of the pillar on pillar strength.   **(10 Marks)**
   b. Interpret the Methodologies for assessing the stability of a panel.   **(10 Marks)**

Module-3

5 a. Interpret the use of profile and influence function to determine the surface subsidence.   **(10 Marks)**
   b. Subsidence profile function S(x) along the lateral domain cross section over a flat long wall panel is given as : $S(x) = 0.8((0.996) - \tan h(8.3 \times /D))m$, where x = distance (m) from the inflection point , D = depth (m) of seam. Considering the inflection point lies vertically above the edge of the panel. Determine the angle of draw in degrees for a depth of 250m.   **(10 Marks)**

OR

6 a. Long wall panel of width 120m is extracted at a depth of 200m. Critical subsidence is reached when the panel length becomes 150m. If the seam were to be worked at a depth of 300m. Determine critical width of subsidence would be observed in 'm'.   **(10 Marks)**
   b. Interpret the use of wire line, time domain reflectometry and mechanical grouting methods to determine the subsurface subsidence.   **(10 Marks)**

Module-4

7 a. Summarize the failure mechanism of a main roof and stratified rock caving due to an underground opening. **(10 Marks)**

   b. Summarize the mechanisms of coal bump and rock bursts due to an underground excavation. **(10 Marks)**

OR

8 a. Explain the factors affecting the cavability due to an underground excavation. **(10 Marks)**

   b. Explain the factors affecting the coal bumps due to an underground excavation. **(10 Marks)**

Module-5

9 a. Classify the rock mass based on Paul's committee report for rock classification and suggest support system in underground mines based on the same. **(10 Marks)**

   b. Classify the rock mass based on rock structure rating and suggest the support system in underground mines based on the same. **(10 Marks)**

OR

10 a. Classify the Rock mass based on Rock mass rating and suggest the support system in underground mines based on the same. **(10 Marks)**

   b. Classify the Rock mass based on Geomechanics classification and suggest the support system in underground mines based on the same. **(10 Marks)**

* * * * *