Scheme - I

Sample Question Paper

Program Name	: Mining and Mine Surveying/Mine Engineering/Mining Engineering.	
Program Code	: MS/MZ/MN	
Year	: Second	**22251**
Subject Title	: Rock Mechanics	

Marks: 70   **Time: 3 Hours**

Instructions:
1. All Questions are Compulsory.
2. Answer each next main Question on a new page.
3. Illustrate your answers with neat sketches wherever necessary.
4. Figures to the right indicate full marks.
5. Assume suitable data, if necessary.
6. Use of Non-programmable Electronic Pocket Calculator is permissible.
7. Mobile Phone or any other Electronic Communication devices are not permissible in Examination Hall.

Q.1 Attempt any FIVE of the following: **(10 Marks)**

a) Define porosity and permeability.
b) Calculate the tensile strength of a hard rock specimen, prepared as per ISRM standards, having diameter readings of 48.55mm, 48.50mm, 48.60mm. The specimen fails on a load of 20KN during the test.
c) Define dilation and convergence.
d) Define creep and creep curve.
e) Define Flexural strength.
f) Define Rock Burst.
g) Describe factor of safety in pillar design.

Q.2 Attempt any THREE of the following: **(12 Marks)**
a) Describe the premining stresses in the rock.
b) Describe the procedure of Point Load Strength Index of a rock sample.
c) Explain how will you determine tensile strength by using Brazilian Test.
d) Explain the material characteristics with its graphical representation.

Q.3 Attempt any THREE of the following: **(12 Marks)**
a) Calculate the shear strength of a rock at a depth of 170m. The average bulk density of the rockmass is 2.84 te/m^3. The respective values for cohesion and angle of internal friction for the rock are 51×10^5 N/m^2 and $26°$.
b) Distinguish between the three moduli of elasticity.
c) Enlist the various physic-mechanical properties of rockmass and describe rock structure and texture.
d) Explain the classification of field instrumentation for ground control and rock mechanics studies.

Q.4 Describe in brief (any THREE of the following): (12 Marks)
a) Schmidt rebound hammer.
b) RQD
c) Prevention of rock bumps.
d) Flat jack for insitu stress determination
e) Remote Convergence Indicator

Q.5 Attempt any TWO of the following: (12 Marks)
a) Describe the procedure of shear strength determination by triaxial compression.
b) Describe the procedure of determination of RMR using CMRI-ISM geomechanics classification system
c) Enlist the parameters are to be monitored for strata management in continuous miner & longwall working. Describe the system of strata monitoring there with a neat sketch.

Q.6 Attempt any TWO of the following: (12 Marks)

a) Compare the Bieniawski RMS classification system with CMRI-ISM geomechanics classification system.
b) Explain the tributary area concept for calculating the load on pillars.
c) Design a roof bolting system of support (for cement capsule bolt) in a development gallery and in junction under the following conditions:
Width of gallery = 4.2m; RMR = 44; rock density = 2.04 te/m^3. Assume suitable data if necessary.

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Scheme - I

Sample Question Paper for PROGRESSIVE TEST

Program Name	: **Mining and Mine Surveying/Mine Engineering/Mining Engineering.**	
Program Code	: **MS/MZ/MN**	
Year	: **Second**	**22251**
Subject Title	: **Rock Mechanics**	
Marks: 20		**Time: 1 Hours**

Q.1 Define the following terms (Any THREE):   **(06 Marks)**
a) Uniaxial Compressive Strength
b) Porosity and Permeability
c) Flexural strength
d) Homogeneous and Heterogeneous Rock
e) Moisture content & Degree of saturation

Q.2 Attempt any TWO of the following: **(08 Marks)**
a) Describe the premining stresses in the rock.
b) Describe the procedure of Point Load Strength Index of a rock sample.
c) Explain how will you determine tensile strength by using Brazilian Test.
d) Calculate the shear strength of a rock at a depth of 170m. The average bulk density of the rockmass is 2.84 te/m^3. The respective values for cohesion and angle of internal friction for the rock are 51x10^5 N/m^2 and 26°.

Q.3 Attempt any ONE of the following: **(06 Marks)**
a) Describe the procedure of shear strength determination by triaxial compression in detail.
b) Explain RQD with suitable example.
c) State objectives and quality of rockmass classification system.

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