

22251

12425

03 Hours / 70 Marks

Seat No.

--	--	--	--	--	--	--	--

-
- Instructions* –
- (1) All Questions are *Compulsory*.
 - (2) Answer each next main Question on a new page.
 - (3) Illustrate your answer 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, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. **Attempt any FIVE of the following:** **10**
 - a) Define stress and strain.
 - b) Define:
 - i) Young's modulus
 - ii) Poisson's ratio.
 - c) Define RQD.
 - d) Define factor of safety of pillar design.
 - e) Define Coal Bump.
 - f) Enlist the various methods to find out shear strength of rock specimen.

P.T.O.

- g) Define:
- i) Competent rock
 - ii) Intact rock.

2. Attempt any THREE of the following: 12

- a) Compare the three moduli of elasticity.
- b) Explain how will you find out shear strength of a rock sample with the help of Mohr's circle and Mohr's envelope.
- c) Describe the procedure of point load strength index of rock sample.
- d) What is rock burst. Write various causes of rock burst.

3. Attempt any THREE of the following: 12

- a) Explain following physical properties of rock.
 - i) Moisture content and degree of saturation
 - ii) Permeability
- b) Explain impact strength index.
- c) Illustrate the working principle of borehole extensometer with neat sketch.
- d) Calculate the shear strength of rock at depth of 180 mt. The average bulk density of rock mass is 2.8 T/m^3 . The respective value of cohesion and angle of internal friction for the rock are $51 \times 10^5 \text{ N/m}^2$ and 25° .

4. Attempt any THREE of the following: 12

- a) Explain various premining stresses in the rock.
- b) Elaborate rockmass classification based on RQD.
- c) Distinguish between convergence and dilation.
- d) Explain working principle of load cell.
- e) Explain construction of remote convergence indicator.

5. Attempt any TWO of the following:**12**

- a) Elaborate the Bieniawski's RMR classification of rockmass.
- b) Define rebound hardness and explain how you will find out rebound hardness by Schmidt hammer.
- c) Define insitu stress and describe the procedure to find out insitu stress by flat jack method.

6. Attempt any TWO of the following:**12**

- a) State and explain various material characteristics.
 - b) Explain CMRI-ISM geomechanics classification system.
 - c) Explain various factor's which affects the pillar design.
-