

(3 Hours)

[Total marks: 80]

- N.B. : (1) Question no 1 is **compulsory**.
 (2) Attempt any **three** questions out of remaining **five**.
 (3) Draw sketches wherever necessary.
 (4) Figures to the right indicate full marks.

1. a) Identify the minerals with the help of following properties: 5
- i) Form – Broad crystals, Color – Flesh coloured, Lustre – Pearly, Hardness 6
 - ii) Form – Lamellar, Color – Black, Lustre – Pearly, Cleavage – Basal Pinacoid
 - iii) Fracture – Conchoidal, Cleavage – Absent, Hardness – 7, Color – Purple
 - iv) Form – Massive, Streak – Lead grey, Lustre – Metallic, Chem. Comp. – PbS
 - v) Lustre – Silky, Fracture – Splintery, Form – Fibrous
- b) Define the following (any 5) 5
- i) Solifluction
 - ii) Fault Plane
 - iii) Outcrop
 - iv) Axial Plane
 - v) Streak
 - vi) Volcanic Tuff
- c) Write the difference between the following pairs: 10
- i) Disconformity and Non Conformity
 - ii) Epicenter and Focus
 - iii) Seismograph and Seismogram
 - iv) Haematite and Magnetite
 - v) Pothole and Cirque
2. a) What are the agents of Metamorphism? Mention the different types of metamorphism with suitable examples. 5
- b) What is perched water table? Mention different sources of groundwater. 5
- c) What do you mean by Fold? Describe various types of folds with neat diagram. 10
3. a) On a horizontal tunnel a bed of sandstone dips 30° eastwards and its true thickness is 200 m. Determine its vertical thickness and width of the outcrop in the tunnel. 5
- b) Explain normal and reverse faults with diagram. 5
- c) Describe classification of igneous rock on the basis of formation and Silica percentage. 10

4. a) Explain Central and Fissure type of Volcanic eruption with diagram. 5
- b) Discuss about the water bearing qualities of rocks. 5
- c) Differentiate rock and rock mass. Calculate the Core Recovery and RQD from the given data and evaluate the rock on the basis of obtained result. 10

Total Run = 2.5 m					
Sample No	Length of core sample (in cm)	Nature of joints in lower end of sample	Sample No	Length of core sample (in cm)	Nature of joints in lower end of sample
1	30	N	9	34	N
2	10	N	10	06	M
3	25	N	11	02	N
4	06	M	12	24	N
5	02	M	13	04	M
6	01	N	14	06	N
7	29	N	15	04	M
8	21	M	16	05	N

5. a) Explain porphyritic and poikilitic texture of igneous rock with neat diagram. 5
- b) Mention different structures found in sedimentary rock. 5
- c) Classify the rocks according to Geomechanics classification for a rock having UCS of 190Mpa and RQD of 80% with average spacing of discontinuity of 1000mm which is slightly rough in nature and highly weathered. The strike is perpendicular to the tunnel axis and dips at an angle of 25°; Also 8 lit/min groundwater inflows the tunnel length per 10 m. Calculate the RMR value of the rock and state the condition of rocks for tunnel construction. (Note – RMR table would be provided to solve this problem). 10
6. Write Short Notes on the following (any 4) 5 x 4 = 20
- Interior of the earth
 - Angular unconformity
 - Physical properties of minerals
 - Gravity dam
 - Chemical weathering
