

(3 Hours)

Total Marks : 80

- N.B.** 1. Question No. 1 is compulsory  
 2. Attempt any **Three** questions out of remaining **Five** questions.  
 3. Draw neat labeled **diagrams** wherever necessary.  
 4. All the parts of a question should be **grouped together**.  
 5. Figures to the **right** indicate marks

- Q.1 a Answer the following- 5  
 (i) Give characteristic properties and use of the following minerals-  
 Quartz  
 Orthoclase  
 Diamond  
 Talc  
 Galena
- Q.1 b Define the following terms- 5  
 (i) Geological Survey of India (GSI)  
 (ii) Creep  
 (iii) Central eruption  
 (iv) Mohorovicic Discontinuity  
 (v) Seismograph
- Q.1c Name the following- 5  
 (i) Which two tectonic plates collided to form Himalaya?  
 (ii) A coarse grained clastic sedimentary rock in which rounded pebbles are cemented together  
 (iii) Fine grained Igneous rocks formed by solidification of magma at the surface of the earth.  
 (iv) A Part of Dam which is used to release excess water from the reservoir  
 (v) A point exactly above the focus of an earthquake
- Q.1d Draw a neat sketch of the following- 5  
 (i) Alluvial fan  
 (ii) Recumbent fold  
 (iii) Axial Plane  
 (iv) U shaped valley  
 (v) Laccolith
- Q.2(a) What is plate Tectonic Theory? What are the different types of Plate boundaries , 10  
 Explain Convergent Plate boundary in detail, giving example.
- (b) Describe following landforms in short- 6  
 Ox bow lakes  
 Mushroom rock
- (c) Briefly describe the layered structure of Earth. 4

- Q.3(a) Describe agents of Metamorphism and correlate the agents of Metamorphism with different types of metamorphism. **5**
- (b) Give classification of sedimentary rocks. **5**
- (c) What is texture? Describe textures of igneous rocks with neat sketches and comment on the suitability of igneous rocks for foundation. **10**
- Q.4(a) What are faults, give terminology of faults? Describe various types of faults in the rocks and give their engineering considerations. **10**
- (b) An ore body is exposed on horizontal ground. It dips 30° eastward and the width of the outcrop is 300 m. Determine its True Thickness and vertical thickness. **6**
- (c) Explain unconformity, Describe angular unconformity in detail. **4**
- Q.5(a) Explain in detail the water bearing properties of rocks giving examples. Comment on the suitability of sandstone as water bearing strata. **10**
- (b) Define RQD and Core Recovery, Calculate RQD and Core Recovery from the given data and comment on the suitability of rocks for foundation purpose. **10**
- Total run 2m.

Sample No.	Length of the core in cms	Nature of the lower end of the core sample	Sample No.	Length of the core in cms	Nature of the lower end of the core sample
a	12	N	i	32	N
b	10	N	j	14	N
c	08	N	k	8	N
d	06	M	l	14	N
e	22	M	m	8	M
f	07	N	n	02	N
g	21	N	o	03	M
h	13	M	p	05	N

- Q.6 (a) Classify the rock according to Geomechanics (RMR) classification for a Rock having UCS of 180Mpa and RQD of 60% with average spacing of discontinuity of 900mm which is slightly rough in nature and highly weathered. The Strike is perpendicular to the tunnel axis and drive with dip is 40°. Also 8 lit/min groundwater inflows the tunnel length per 10m. Calculate the RMR value of the rock and state the condition of rock for tunnel construction. **10**
- (b) Give a brief account of favourable and unfavourable geological structures at a Dam site. **10**