

**ENGINEERING GEOLOGY
(CIVL 2104)**

Time Allotted : 3 hrs

Full Marks : 70

Figures out of the right margin indicate full marks.

Candidates are required to answer Group A and any 5 (five) from Group B to E, taking at least one from each group.

Candidates are required to give answer in their own words as far as practicable.

**Group - A
(Multiple Choice Type Questions)**

1. Choose the correct alternative for the following: **10 × 1 = 10**
- (i) Hardest silicate -mineral in the Mohs scale of hardness is
 (a) Diamond (b) Feldspar
 (c) Corundum (d) Topaz.
- (ii) Cleavage of a mineral is
 (a) tendency to split along certain direction yielding smooth surfaces
 (b) appearance on a broken surface of a mineral
 (c) colour of the powder of a mineral
 (d) colour of the mineral.
- (iii) Epicenter of an earthquake is
 (a) the place of minimum damage
 (b) the largest distant point from focus
 (c) the point vertically above the focus on the surface
 (d) none of these.
- (iv) Other things being same, tunnel alignment is unsafe in a sound layered rock when it runs
 (a) parallel to the dip direction
 (b) parallel to the strike direction
 (c) oblique to the strike direction
 (d) none of these.
- (v) Groundwater can be explored by
 (a) magnetic method (b) ground penetrating radar
 (c) seismic method (d) resistivity method.
- (vi) The least stable mineral to weathering is
 (a) Feldspar (b) Olivine (c) Quartz (d) Haematite.

- (vii) Which of the following list of rocks is written in order of increasing grain size?
 (a) Sandstone, siltstone, conglomerate
 (b) Sandstone, conglomerate, siltstone
 (c) Conglomerate, sandstone, siltstone
 (d) Siltstone, sandstone, conglomerate.
- (viii) The discordant structure in igneous rocks is
 (a) Sill (b) Dyke (c) Phacolith (d) Lopolith.
- (ix) Andesite is a
 (a) Sedimentary rock (b) Volcanic rock
 (c) Hypabyssal rock (d) Ultrabasic rock.
- (x) Clinometer is used for
 (a) measuring humidity
 (b) measuring hardness of minerals
 (c) measuring attitude of beds
 (d) none of these.

Group - B

2. (a) What is "Streak" of a mineral? Why is it a more important physical property than the colour of a mineral? What is Mohs scale of hardness?
 (b) What is "Lustre" of a mineral? Give examples of two important lustres of a mineral.
(2 + 2 + 2) + (2 + 4) = 12
3. (a) What are intrusive and extrusive igneous rocks? Describe their salient features.
 (b) Give short notes on any two: (i) Laccolith (ii) Phacolith (iii) Nonclastic sedimentary rocks (iv) Schist rocks
(3 + 3) + (3 + 3) = 12

Group - C

4. (a) What is physical weathering? Write short notes on any two types of physical weathering.
 (b) What are pitch and plunge of a line on an inclined surface? Explain with diagram.
(2 + 4) + (4 + 2) = 12

5. (a) What is Synformal anticline? Classify folds on the basis of inclination of axial surface of folds.
- (b) What is the difference between a fault and a joint? Show the different parts of a fault with a diagram.

$$(2 + 4) + (2 + 4) = 12$$

Group - D

6. (a) What are porosity and permeability of rocks? What is tensile strength of a rock? Explain with an illustration.
- (b) Write a short note on different seismic waves. What is magnitude of an earthquake?

$$(3 + 3) + (3 + 3) = 12$$

7. (a) What do you mean by abrasive resistance of a rock? Explain how the compressive strength of a rock sample is measured.
- (b) Mention the qualities which are important for rocks to be considered as good building stones.

$$(2 + 4) + 6 = 12$$

Group - E

8. (a) What is resistivity profiling? Give the Werner electrode configuration and explain briefly the profiling method.
- (b) What are different types of concrete dams? What are the geological studies needed for the selection of a dam site?

$$(2 + 4) + (3 + 3) = 12$$

9. (a) What is the principle of Seismic methods in geophysical explorations? Explain briefly how the depth of anomaly is determined.
- (b) Show the different parts of a tunnel with an illustration. Mention the geological parameters to be considered before selecting the site of a tunnel to be constructed.

$$(2 + 4) + (3 + 3) = 12$$