Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.TECH (CE-OLD)/SEM-3/CE-305/2011-12

2011

ENGINEERING GEOLOGY

Time Allotted : 3 Hours *Full Marks* : 70

The figures in the margin indicate full marks.

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

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following : 10 × 1 = 10

i) The mean radius of the earth is

a) 6171 km b) 6271 km

c) 6371 km d) 6471 km.

ii) The Mohorovicic discontinuity surface is the boundary between

a) outer crust & inner crust

b) crust & mantle

c) mantle & core

d) outer core & inner core.

iii) The hardness of mineral quartz is

a) 5 b) 6

c) 7 d) 8.

iv) Crystal can be grouped into n classes, n is

a) 12 b) 22

c) 32 d) 42.

v) Granite is

a) a basic igneous rock

b) an intermediate igneous rock

c) an acid igneous rock

d) an ultrabasic igneous rock.

vi) Galena is an ore mineral of

a) iron b) lead

c) copper d) manganese.

vii) S-wave does not pass through

a) sedimentary rock

b) ore bodies

c) liquid

d) solidified igneous masses.

viii) Resistivity of crystalline igneous rocks is generally in the range of

a) 10^2 ohm-metres

b) less than 10 ohm-metres

c) 10^5 ohm-metres and above

d) none of these.

ix) In a place having a very narrow gorge with very good construction material available in abundance and there being shales at the base and hard and strong dolomites being along the abutments the engineer would normally go for a / an

a) Gravity dam b) Arch dam

c) Eastern dam d) Rockfill dam.

x) In tunnelling operations, rock bursts occur most commonly due to

a) release of strain energy from folded limbs

b) fall of rocks blocks due to blasting operations

c) lubrication of joint planes by ground water

d) none of these.

xi) A cut-back-bitumen is

a) bitmen drawn out of bitumen drums by cutting their covers

b) bitumen drawn out of bitumen drums and mining only with sand

c) bitumen drawn out of bitumen mines with some admixture like paraffin or petroleum

d) none of these.

xii) Lopoliths are defined as

a) concordant igneous bodies associated with natural basins, that is, those sedimentary formations which are inclined towards a common centre

b) concordant igneous bodies that occupy positions in the crests and troughs of the folds

c) discordant bodies that cut across the regional structure very conspicuously

d) neither concordant nor discordant, having irregular relationship.

xiii) Equigranular textures are often named as

a) granitic texture b) anhedral texture

c) euhedral texture d) subhedral texture.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. 3 × 5 = 15

2. Define mineral, crystal and amorphous substance. 2 + 2 + 1

3. Match the mineral with their composition : 5 ∞ 1

a)	Bauxite	i)	Fe_2O_3
b)	Aragonite	ii)	ZnS
c)	Pyrite	iii)	Al_2O_3 , $2H_2O$
d)	Hematite	iv)	FeS_2
e)	Sphalerite	v)	$CaCO_3$.

4. Write a note on hardness of a mineral.

5. Write a note on internal constitution of the earth.

6. Write a short note on railroad ballest and its importance.

7. Write short notes on seismographs and L-waves.

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

8. Define a fault structure and also give a comprehensive classification of fault.

9. Define fold and discuss different parts of a folded layer. Write a note on engineering consideration of fold structures in rock. 8 + 7

10. a) The apparent dips of a rock bed are 30° along S30°E and 45° along S30°W. Find the true dip of the rock bed. Determine it geometrically. 8

    b) The true dip of a bed is 30° towards S30°E. What should be its apparent dip towards S30°W. Determine it geometrically. 7

11. a) Give an account of important factors to be considered for evolving aseismic designs in a seismic region. 10

    b) Differentiate between intensity and magnitude of an earthquake. 5

12. a) Name the physical properties of minerals that may be needed for their identification. 4

    b) Name the minerals which have flaky, fibrous, pisolitic and granular forms. 4

    c) Name the minerals which are of the following colours : 2

        i) Dark-red-grey

        ii) Red

        iii) Olive green

        iv) Blue.

    d) What is streak ? Discuss its importance in identification of minerals. 3

    e) Give the hardness of the following minerals : 2

        i) Gypsum ii) Apatite

        iii) Quartz iv) Topaz.

13. Explain various properties that need thorough investigation for selection of stones for use in building construction.

OR

Write short notes on the following terms : 5 × 3

i) Compressive strength

ii) Modulus of elasticity

iii) Transverse strength and tensile strength

iv) Abrasive resistance

v) Porosity and absorption value.