Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.TECH (CE)/SEM-3/CE-305/2009-10

2009

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 : $10 \times 1 = 10$

i) Which mineral has elonated structure ?

a) Beryl b) Barite

c) Igneous rock d) Sedimentary rock.

ii) Which mineral has bladed like structure ?

a) Kyanite b) Vermiculite

c) Slate d) Gypsum.

iii) Hypabyssal is one type of

a) igneous rock b) sedimentary rock

c) metamorphic rock d) mineral.

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iv) One of the factors of metamorphism is

a) temperature b) magma

c) lava d) cleavage.

v) Marble is

a) igneous rock b) sedimentary rock

c) metamorphic rock d) mineral.

vi) Eolian is

a) transported soil b) residual soil

c) red soil d) black soil.

vii) Plutonic rocks are always from the cooling of

a) the lava underwater

b) magma just below the surfacce of the earth

c) lava over the surface of the earth

d) magma at great depths below the surface of the earth.

viii) Poiklitic texture is characterized with

a) pressence of large sized crystals in a fine ground mass

b) presence of small sized crystals dispersed within the body of a large sized mineral

c) distribution of crystals of same size in a fine grained ground mass

d) the entire constituents being present in glassy form.

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ix) Lopoliths are defined as

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

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

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

d) neither concordant nor discordant, having irregular relationship.

x) Equigranular textures are often named as

a) granitic texture

b) anhedral texture

c) euhedral texture

d) subhedral texture.

xi) The softest mineral known as per Mohr's scale is

a) quartz b) orthoclase

c) talc d) calcite.

xii) The weight of a mineral in water is 25 gm and in air is 50 gm. The specific gravity of the mineral is

a) 2 b) 2·5

c) 1·5 d) none of these.

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xiii) Crystals belonging to orthorhombic system are referred to

a) 3 mutually perpendicular crystallographic axes

b) 2 mutually perpendicular crystallographic axes

c) 4 mutually perpendicular crystallographic axes

d) none of these.

xiv) An isometric or cubic system has ..... planes of symmetry.

a) 6 b) 9

c) 3 d) none of these.

GROUP – B

(Short Answer Type Questions)

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

2. a) Define dip and strike.

b) Distinguish between Joint and Fault.

c) What do you mean by attitude of a bed is 30° SW ?

2 + 2 + 1

3. Define weathering. Explain how climate, rock types topography and time influence the types of soil produced by weathering. 1 + 4

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4. What is folded and faulted strata in geological mapping ? Give the schematic diagrams of symmetrical, asymmetrical, overturned and recumbent anticlines and synclines. 1 + 4

5. What are minerals ? What are their physical properties ? 1 + 4

6. What is unconformity ? What are the different types of unconformities ? 1 + 4

7. What is graded bedding ? What is its use in geological reconstruction ? 1 + 4

GROUP – C

(Long Answer Type Questions)

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

8. How are soils formed ? How are they classified on the basis of formation ? What are current-bedding and ripple marks ? Discuss on the different modes of transportation by river. 2 + 4 + 3 + 6

9. What are the parameters of an earthquake ? What do you mean by the term intensity and magnitude of an earthquake ? Describe the intensity scale of an earthquake. Explain the terms in the formula for magnitude of an earthquake. Describe a method of determining earthquake epicenter. 3 + 2 + 5 + 1 + 4

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10. What are the different zones of groundwater ? What is cone of depression in groundwater ? How is this property of groundwater useful in civil engineering construction in an area that lies below the groundwater table ? Illustrate with neat sketches. 4 + 3 + 8

11. Describe the general importance of the following geological investigation for any large Civil Engineering Project :

    Topography, Lithology, Structure, Groundwater conditions and Seismicity of the area. 3 + 3 + 3 + 3 + 3

12. Explain the necessity and imprtance of Geophysical invesigations in Civil Engineering Project. In general how many kinds of Geophysical methods of investigation are carried out for the physical property of subsurface formations for Civil Engineering Project ?

    Write the name of the Geophysical methods which is carried out for measuring the following physical properties. Also, write the Geophysical Unit of these physical propereties :

    Density, Magnetic Susceptibility, Natural Remanent Magnetism, Electrical Resistivity, Electrical Conductivity, Electrochemical Activity, Elastic Property. 2 + 6 + 7

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13. What do you mean by electrical resistivity method ? What are the geological factors which influence the electrical resistivity ? What are the main applications of Profiling, Sounding and Potential method ? What do you mean by symmetrical and asymmetrical electrode configurations ? Explain with examples. Explain with examples the Electrical Resistivity studies for Civil Engineering Projects.

1 + 3 + 3 + 5 + 3

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