Scheme - I

Sample Question Paper

Program Name : **Civil Engineering Program Group**

Program Code : **CE/CR/CS**

Semester : **Fourth**

22404

Course Title : **Geo-Technical Engineering**

Max. Marks : **70** **Time: 3 Hours**

Instructions:

1) All questions are compulsory.
2) Illustrate your answers with neat sketches wherever necessary.
3) Figures to the right indicate full marks.
4) Assume suitable data if necessary.
5) Preferably, write the answers in sequential order.

Q.1 Attempt any FIVE of the following. **(10 Marks)**

a) Classify the rock based on its mode of origin.
b) Define soil as per IS 2809-1972.
c) Define density index stating its expression.
d) Give the meaning of gap graded soil.
e) State two field situations where soil compaction is necessary.
f) Define liquid limit and plastic limit of soil.
g) State the necessity of soil investigation.

Q.2 Attempt any THREE of the following. **(12 Marks)**

a) Explain the soil as three phase system.
b) Explain the experimental procedure of determination of liquid limit of given soil sample.
c) Calculate the voids ratio and dry density if the soil sample has 30% porosity and specific gravity as 2.6.
d) Explain the importance of geology in civil engineering constructions.

Q.3) Attempt any THREE of the following. **(12 Marks)**

a) State the field situations where permeability of soil is necessary.
b) State the assumptions made in Terzaghi's analysis bearing capacity failures of soil.
c) Explain the plate load test for determination of bearing capacity of soil.
d) Explain the effect of water table on bearing capacity of soil.

Q.4) Attempt any THREE of the following. **(12 Marks)**

a) Differentiate between active earth pressure and passive earth pressure.
b) Explain the standard proctor test to determine OMC and MDD of soil.
c) Differentiate between compaction and consolidation with four points.

d) Explain the falling head method to determine coefficient of permeability.
e) Calculate the coefficient of permeability if a soil sample of 10cm diameter and 25cm length was tested in the permeameter under constant water head 15cm for 12 minutes. The discharge collected in the measuring cylinder found to be 150cc.

Q.5) Attempt any <u>TWO</u> of the following. (12 Marks)

a) Explain the various field applications of geotechnical engineering in detail.
b) Explain the Mohr-Coulomb's theory to determine the shear strength of soil.
c) Explain the sieve analysis test for grading of soil with the help of particle size distribution curve.

Q.6) Attempt any <u>TWO</u> of the following. (12 Marks)

a) Explain the direct shear test to determine shear strength of soil with neat sketch.
b) Calculate the OMC and MDD values for the soil sample having following data using graph paper.

Bulk Density in gm/cc	1.15	1.38	1.52	2.06	1.78	1.66	1.40
Moisture in %	20	27	35	42	40	33	24

c) Explain the criteria for deciding the location and number of test pits and bores for the construction of various civil engineering structures.

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Scheme - I

Sample Test Paper - I

Program Name : **Civil Engineering Program Group**

Program Code : **CE/CR/CS**

Semester : **Fourth**

22404

Course Title : **Geo-Technical Engineering**

Max. Marks : **20** **Time: 1 Hour**

Instructions:

1) All questions are compulsory.
2) Illustrate your answers with neat sketches wherever necessary.
3) Figures to the right indicate full marks.
4) Assume suitable data if necessary.
5) Preferably, write the answers in sequential order.

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Q.1 Attempt any <u>FOUR</u> of the following. **(08 Marks)**

a) Define mineralogy and petrology.

b) Explain the use of soil as foundation material.

c) Classify the soil based on three phase system.

d) State the difference between well graded and poorly graded soil.

e) Write the Darcy's law of permeability with its expression.

f) List the factors affecting the permeability of soil.

Q.2 Attempt any <u>THREE</u> of the following. **(12 Marks)**

a) Classify the igneous rock based on mode of occurrence.

b) Explain the application of geotechnical engineering in earth and water retaining structures.

c) Describe the procedure of determination of specific gravity of soil using pycnometer method.

d) Calculate the coefficient of uniformity and coefficient of curvature for the given data: D_{10} = 0.16mm, D_{30} = 0.21mm, D_{60} = 0.42mm.

e) Explain the determination of coefficient of permeability of soil using constant head method.

Scheme - I

Sample Test Paper - II

Program Name : **Civil Engineering Program Group**

Program Code : **CE/CR/CS**

Semester : **Fourth**

22404

Course Title : **Geo-Technical Engineering**

Max. Marks : **20** **Time: 1 Hour**

Instructions:

1) All questions are compulsory.
2) Illustrate your answers with neat sketches wherever necessary.
3) Figures to the right indicate full marks.
4) Assume suitable data if necessary.
5) Preferably, write the answers in sequential order.

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Q.1 Attempt any <u>FOUR</u> of the following. **(08 Marks)**

a) State the field situations of shear failure of soil.

b) State the relationship between safe bearing capacity and ultimate bearing capacity.

c) Suggest four methods of improving bearing capacity of soil.

d) Give the necessity of soil compaction.

e) Define Optimum Moisture Content and Maximum Dry Density of soil.

f) State the significance of C.B.R. test on soil.

Q.2 Attempt any <u>THREE</u> of the following. **(12 Marks)**

a) Draw shear strength envelope stating the shear strength equations for (i) Purely cohesive soil (ii) Cohesionless soil

b) Explain with sketch the plate load test carried out on foundation soil.

c) Differentiate between active earth pressure and passive earth pressure.

d) Explain the standard proctor test to determine OMC and MDD values of soil.

e) Describe the dilatancy test to be carried out on soil in the field.
