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4th Sem / Branch : Civil Engineering
Sub.: Soil Mechanics & Foundation Engineering

Time : 3Hrs. M.M. : 100

SECTION-A

Note: Multiple choice questions. All questions are compulsory (10x1=10)

Q.1 Transporting and re-depositiing soils is done by
a) Wind b) Water
c) Glacier d) All of the above

Q.2 Black cotton soil chiefly contains clay mineral
a) Illite b) Kaolinite
c) Montmorillonite d) None of these

Q.3 The fundamental equation of Void ratio (e) Specific gravity (G) Water content (w) and Degree of saturation (S) is
a) e = wGS b) e = wG/S
c) G = ew/S d) S = ew/G

Q.4 Maximum size of clay particles is
a) 0.002 mm b) 0.04 m
c) 0.06 mm d) 0.001 mm

Q.5 Falling head permeability test is preferable when soil sample is
a) Clayey b) Sandy gravels
c) Sandy d) Silty sand

Q.6 Effective stress is also knows as
a) Principal stress b) Pore pressure
c) Intergranular d) None of these

Q.7 Vane shear test is used for
a) Sand b) Silt
c) Moderate clay d) Soft & Sensitive clay

Q.8 Core cutter method is suitable only for
a) Sand b) Soft cohesive soils
c) None of the above d) All types of soils

Q.9 For $\phi = 0$ case, Nc value according to Terzaghi is
a) 9.5 b) 5.14
c) 5.7 d) 5.52

Q.10 Areas-ratio should be
a) Less than 5% b) Less than 10%
c) More than 5% d) More than 10%

SECTION-B

Note: Objective type questions. All questions are compulsory. (10x1=10)

Q.11 _____ pioneered the concept of Soil Mechanics.

Q.12 The black cotton soil is an example of _____ soil.

Q.13 For determining water content, temperature of oven is maintained at _____.

Q.14 To determine coefficient of permeability _____ tests are more accurate.

Q.15 Darcy's law is valid for _____ type of flow.

Q.16 Quick condition does not occur in _____ deposits.

Q.17 The compression of saturated soil due to expulsion of water is called_____.

Q.18 In direct shear test, the measurement of pore water pressure is _____.

Q.19 Sheep foot rollers are suitable for compacting _____ soils.

Q.20 Terzaghi's analysis is valid for _____ foundation.

SECTION-C

Note: Short answer type questions. Attempt any twelve questions out of fifteen questions. (12x5=60)

Q.21 How soil is formed? Explain the process of physical disintegration and chemical decomposition of rocks.

Q.22 A fully saturated clayey sample has a volume of 185 cc and weight of 331g. If the specific gravity of soil is 2.67, find out, (6) Void ratio (a) Porosity (iii) Water content (iv) Unit weight (bulk).

Q.23 Write a note on plasticity chart.

Q.24 Define Darcy's law. What are its limitations?

Q.25 a) Define total stress, effective stress and neutral stress acting on a soil mass

b) What is the importance of effective stress in engineering problems?

Q.26 Explain the principle of consolidation with the help of soil spring analogy.

Q.27 State the advantages and disadvantages of direct shear test.

Q.28 Define compaction. What is the difference between compaction and consolidation?

Q.29 Define Isobar and pressure bulb.

Q.30 Define area ratio and recovery ratio. What is their engineering importance?

Q.31 Define well foundation. Explain its necessity.

Q.32 Define disturbed and undisturbed samples. State their significance.

Q.33 Discuss the methods of improving bearing capacity of soils.

Q.34 In a constant head permeameter, the following observations were taken
Constant head = 6cm
Diameter of test sample = 10 cm
Quantity of water collected = 350 ml
Duration of the test = 270 sec.
Length of sample = 10cm
Calculate the coefficient of permeability of the soil

Q.35 Calculate void ratio and porosity of a saturated soil sample having water content of 40% Take G = 2.7.

SECTION-D

Note: Long answer type questions. Attempt any two questions out of three questions. (2x10=20)

Q.36 (a) Give concept of shallow & deep foundation
(b) Explain types of shallow foundations with diagram

Q.37 Explain the Standard Proctor Test used for determining the optimum Moisture content and maximum dry density of soil under normal Compaction.

Q.38 Explain the plate load test to find out ultimate bearing capacity of soils. State its limitations.