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Roll No.....

4th Sem,

Branch : Civil Engineering

Subject : Soil Mechanics & Foundation Engineering

Time : 3 Hrs. **M.M. : 100**

SECTION-A

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

Q.1 Black cotton soil chiefly contains clay mineral.(CO-1)

a) Illite b) Montmorillonite

c) Kaolinite d) None of these

Q.2 The fundamental equation of void ratio (e), specific gravity (G), water content (w) and degree of saturations (S) is (CO-2)

a) e= wGS b) G=ew/s

c) e = WG/s d) S=ew/G

Q.3 Uniformity co-efficient is the ratio of (CO-3)

a) D_{10} to D_{60} b) D_{30} to D_{60}

c) D_{60} to D_{10} d) D_{60} to D_{30}

Q.4 The property of a soil which permits water to percolate through it is called (CO-4)

a) Moisture content b) Capillarity

c) Permeability d) None of these

Q.5 Neutral stress refer to (CO-5)

a) Submerged weight of soil

b) Saturated weight of soil

c) Pore water pressure

d) Minor principal stress

Q.6 Consolidation theory was given by (CO-6)

a) Skempton b) Rankine

c) Terzaghi d) Westergard

Q.7 Unconfined compression test is generally done on saturated clays for which the apparent angle of shearing resistance is (CO-7)

a) 15^0 b) 20^0

c) 30^0 d) 0

Q.8 The dry unit weight y_d is computed by the relationship. (CO-8)

A) $\gamma_d = \gamma x (1+w)$ b) $\gamma_d = \gamma/1+w)$

c) $\gamma_d = \gamma+(1+w)$ d) $\gamma_d = (1+w)/\gamma$

Q.9 Which type of sample is not generally collected in soil excavation. (CO-9)

a) Block b) Circular

c) Cylindrical d) All of these

Q.10 The pile having one or more bulbs for resisting lateral loads. (CO-11)

a) Fender pile b) Tension pile

c) Batter pile d) Under - reamed pile

SECTION-B

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

Q.11 The black cotton soil is an example of _____ soil (CO-1)

Q.12 Phase diagram is also known as block diagram. (True/False) (CO-2)

Q.13 Particle size analysis is also known as ____. (CO-3)

Q.14 _____is used to find the coefficient of permeability of soils in the laboratory. (CO-4)

Q.15 Pore water pressure acts equally on all sides of soil particles. (True/False) (CO-5)

Q.16 Tilt is an example of _____. (CO-6)

Q.17 The shear strength equation was proposed by ____. (CO-7)

Q.18 Core-cutter method is used to calculate _____ of soil. (CO-8)

Q.19 The shape of an isobar is called_____. (CO-9)

Q20. The thin tube sampler gives _____ sample. (CO-10)

SECTION-C

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

Q.21 What do you mean by Black cotton soil & discuss their properties. Also list the major Research institution who are working on soil mechanics and foundation Engineering India. (CO-1)

Q.22 A partially saturated soil has a volume of 500 cm^3 in natural state and a weight of 800 g. After completely drying out in an oven, the dry weight is 750g. The specific gravity of soil grain is 2.70.
Calculate i) Void ratio ii) Porosity iii) Water content iv) Degree of saturation from three phase diagram. (CO-2)

Q.23 Derive relation between e(void ratio), S(degree of saturation) and w(water content). (CO-2)

Q.24 When a given sample of sand was tested in laboratory, the void ratio in the loosest and densest possible states were 0.95 and 0.40 respectively calculate i) relative density ii) degree of saturation given moisture content = 15%, unit weight of soil = 1.70g/cc and G=2.65. (CO-3)

Q.25 Explain constant head permeability method. (CO-4)

Q.26 Write a short note on the following: (CO-5)

a) Role of voids in soil mass

b) Quick sand

Q.27 Define the following (CO-6)

a) heaving

b) Consolidation settlement

c) Co-efficient of volume change

d) Secondary consolidation

Q.28 Give comparison between direct shear test and triaxial shear test. (CO-7)

Q.29 Differentiate between compaction and consolidation. (CO-8)

Q.30 What is sand drain method of compaction explain? (CO-8)

Q.31 Explain concept of vertical stress distribution in soils due to foundation loads. (CO-10)

Q.32 Give significance of Ultimate bearing capacity & net safe bearing capacity. (CO-10)

Q.33 Explain thin wall and piston samples with sketches. (CO-9)

Q.34 Explain handling of disturbed and undisturbed samples. (CO-9)

Q.35 Give the classification of piles according to function of pies. (CO-11)

SECTION-D

Note : Long Answer type question. Attempt any two questions. (2x10=20)

Q.36 a) Give concept of shallow & deep foundation. (CO-11)
b) Explain types of shallow foundations with diagram.

Q.37 Explain various methods of soil exploration. Along with their advantages and disadvantages. (CO-10)

Q.38 a) Give examples of shear failure in soils. (CO-7)
b) Explain concept of shear strength. What are the factors affecting the shear strength of soil.

Note : Course Outcome (CO) mentioned in the question paper is for official purpose only.