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B.TECH.
(SEM VI) THEORY EXAMINATION 2022-2023
FOUNDATION DESIGN

Time: 3 Hours ***Total Marks: 100***

Note: Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. **2 x 10 = 20**

a. Discuss the factors affecting bearing capacity of soil.
b. Discuss different types of samplers.
c. What are the major criteria to be satisfied in the design of a foundation?
d. What do you mean by pressure bulb?
e. Differentiate between disturbed and undisturbed sample
f. Discuss the efficiency of pile.
g. Explain 'CURB' in well foundation.
h. Discuss the different Shapes of well foundation.
i. Discuss the Soil stabilization.
j. Explain Soil reinforcement.

SECTION B

2. Attempt any *three* of the following: **10x3=30**

a. Describe Site investigation and stages in sub surface exploration.
b. A circular footing for a circular column is 2.5 diameter and carriers a load of 1500 Kn. Find the factor of safety against bearing capacity with respect to shear failure, if the soil below the footing has following parameters: c=40 kN/ , ϕ=15°, =20 kN/ , D-depth of footing is 1.2 m, =12.5, =4.5, =2.5.
c. A precast concrete pile of 50 cm x 50 cm is to be driven into clay strata whose unconfined compressive strength is 110 kN/ .compute the length of the pile required to carry safe working load of 450Kn with factor of safety of 2.5. Assume the adhesion factor α as 0.6.
d. Describe about well sinking? What are the measures employed in controlling well sinking?
e. Write a brief note on use of geotextiles for filtration and drainage function of geotextiles.

SECTION C

3. Attempt any *one* part of the following: **10x1=10**

a. Discuss in detail various types of boring methods for Soil Exploration.
b. Discuss the Seismic refraction method of soil exploration with its limitations.

4. Attempt any *one* part of the following: **10x1=10**

a. A strip footing is 1.5 m wide and its base rests on 1 m below the ground surface. If the soil below the ground level is dense with c=100 kN/ and ϕ=38°, determine the ultimate bearing capacity, assume =20 kN/ .

b. A footing 2m square is laid at a depth of 1.3m below the ground surface. Take unit weight of soil as 18kN/m3 , angle of internal friction (Φ) = 300 and c= 0. Determine the net ultimate bearing capacity using Terzaghi's method if a)The water table rises to the level of the base. b)The water table is 1m below the base.

5. Attempt any *one* part of the following: 10x1=10

a. The pile group consisting of 4 piles, placed at 2.0 m center to center, forming a square pattern. The underground soil is clay, having at surface as 60 kN/ , and at the depth 10 m, as100 kN/ . Compute the allowable column load on the pile cap, if the piles are circular having diameters 0.5 m each and length as 10 m.

b. Discuss the various types of pile foundation on the basis of their structural characteristics.

6. Attempt any *one* part of the following: 10x1=10

a. Enumerate the various techniques that are deployed in controlling and correcting the tilts in foundation wells. Discuss with sketches, any two of these techniques.

b. What are the different shapes of foundation wells and discuss the components of well foundations.

7. Attempt any *one* part of the following: 10x1=10

a. Discuss the advantages and types of soil reinforcement.

b. Explain various application of soil reinforcement with neat diagrams.