PAPER ID-410699

Roll No: | | | | | | | | | | | | |

BTECH
(SEM VI) THEORY EXAMINATION 2023-24
FOUNDATION DESIGN

TIME: 3 HRS   **M.MARKS: 100**

Note: **1.** Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1.   Attempt *all* questions in brief.

a.	What information should be gathered for the planning of a site exploration?	2
b.	Write the purpose of a soil sampler?	2
c.	Differentiate between general shear failure and local shear failure.	2
d.	Discuss the effect of water table on bearing capacity of the soil.	2
e.	State the types of shallow foundations.	2
f.	Define group efficiency of pile.	2
g.	What is pile driver?	2
h.	Write the types retaining structures.	2
i.	Write the uses of soil reinforcement.	2
j.	Define idealized soils.	2

SECTION B

2.   Attempt any *three* of the following:

a.	List in chronological order the steps involved in performing a site exploration and characterization program.	10
b.	A footing 2m square is laid at a depth of 1.3 m below the ground surface. Determine the net ultimate bearing capacity using BIS formula. Take γ =20 kN/m^3, ϕ =30˚ and c= 0. For ϕ =30˚, take Nc =30.1, Nq =18.4 and Nγ = 22.4.	10
c.	A group of 9 piles with 3 piles in a row was driven into soft clay extending from ground level to a great depth. The diameter and length of piles were 30 cm and 10 cm respectively. The unconfined compression strength of clay is 70 kN/m^2. If the piles were spaced at 90cm centre to centre, compute the allowable load on the pile group on the basis of shear failure criteria for a factor of safety of 2.5, neglect bearing at the tip of piles, take m = 0.6 for shear mobilization around each pile.	10
d.	Describe the various method of correcting the tilts and shifts during sinking of caissons.	10
e.	Briefly explain the various functions performed by geosynthetics.	10

SECTION C

3.   Attempt any *one* part of the following:

a.	Describe the concept of the seismic refraction method and resistivity method in a geophysical survey to determine the subsurface profile.	10
b.	What is the purpose of driving the sampler into the soil using hammer blows in the Standard Penetration Test? Describe.	10

4.   Attempt any *one* part of the following:

a.	Derive the Terzaghi's bearing capacity expression for shallow strip footing.	10
b.	Explain in detail the contact pressure distribution below the footings and rafts.	10

5.   Attempt any *one* part of the following:

a.	A trapezoidal footing is to be produced to support two square columns of 30 cm and 50 cm sides respectively. Columns are 6 meters apart and the safe bearing capacity of the soil is 400 kN/m^2. The bigger column carries a load of 500 kN and the smaller carries a load of 3000kN. Design a suitable size of the footing so that if does not extend beyond the face of the columns	10
b.	Explain the under reamed pile foundation with neat sketch.	10

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6.   **Attempt any *one* part of the following:**

a.	Briefly describe what it means by the negative skin friction in piles, and an examples situation where the skin friction is negative?	10
b.	Mention the sinking procedure of the well foundation. Also, describe the grip length and scour depth.	10

7.   **Attempt any *one* part of the following:**

a.	Explain the Geosynthetic Clay Liner, its's advantages, disadvantages and applications.	10
b.	Briefly describe the following terms: a) Geotextile b) Geogrids c) Geonets d) Geomembranes	10