Code No: 156BA

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year II Semester Examinations, January/February - 2025
FOUNDATION ENGINEERING
(Civil Engineering)

Time: 3 Hours **Max. Marks: 75**

Note: i) Question paper consists of Part A, Part B.
ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.
iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A
(25 Marks)

1.a)	What is the commercial name of drilling mud?	[2]
b)	Describe stationary piston sampler giving special features of this sampler.	[3]
c)	What is the criterion for the stability of an infinite slope in sand?	[2]
d)	What is Taylor's stability number and how to use the stability chart?	[3]
e)	Cohesionless soils are best suited as backfill material? Justify your answer.	[2]
f)	What are the stability requirements for retaining wall?	[3]
g)	State the factors affecting location of footing	[2]
h)	List the harmful effects of differential settlements.	[3]
i)	What is the necessity of pile foundation?	[2]
j)	Dynamic formulae are best suited for coarse grained soils. Justify your answer.	[3]

PART – B
(50 Marks)

2.a) What are various methods of soil exploration? Explain any indirect method with figure and limitations.
b) Compare the salient features of Standard Penetration Test and Plate Load Test. [5+5]

OR

3.a) Explain in detail the various factors that help to decide the depth and number of bore holes required for sub soil exploration.
b) Compute the area ratio of a thin-walled tube sampler having an external diameter of 6cm and a wall thickness of 2.25mm. Would you recommend the sampler for obtaining undisturbed soil samples? Why? [5+5]

4.a) Explain how the factor of safety is estimated for the slope of an embankment in sudden drawdown condition in full reservoir level.
b) An infinitely long slope is made up of a c-φ soil having the properties cohesion (c) = 20 kPa and dry unit weight of soil (γ_d) = 16 kN/m^3. The angle of internal friction and critical height of slope are 40^0 and 5 m respectively. What is the angle of internal friction of the soil to maintain the liming equilibrium? [5+5]

OR

5.a) What is stability factor? Discuss the importance and uses of stability charts in the analysis of stability of slopes.
b) How is Bishops rigorous analysis different from his simplified method? [5+5]

6.a) With a neat sketch, explain Coulomb's theory of earth pressure.

b) Explain with neat sketch the different types of retaining walls. [5+5]

OR

7. A soil mass is retained on a smooth backed vertical wall of 6.0 m height. The soil has a bulk unit weight of 20 kN/m^2 and $\varphi = 16^0$. The top of the soil is level with top of the wall and horizontal. If the soil surface carries a uniformly distributed load of 4.5 kN/m^2, determine the total active thrust on wall per meter of wall and its point of application. [10]

8. A 2.5 m wide strip footing is founded at a depth of 2.0 m below the ground level in a homogeneous pure clay bed. The unit cohesion of clay is 35 kPa. Due to seasonal fluctuations of water table from peak summer to peak monsoon, compute the change in the net ultimate bearing capacity as per Terzaghi's theory. [10]

OR

9. A square footing of size 2.5 m × 2.5 m is placed 1.0 m below the ground surface on a cohesion less homogeneous soil stratum. Considering that the ground water table is located at the base of the footing, the unit weights of soil above and below the ground water table are 18 kN/m^3 and 20 kN/m^3 respectively, and the bearing capacity factor N_q is 58, the net ultimate bearing capacity of the soil is estimated as 1706 kPa. Earlier a plate load test was carried out with a circular plate of 30 cm diameter in the same foundation pit during a dry season, when the water table was located beyond the plate influence zone. Using Terzaghi's bearing capacity formulation, what is the ultimate bearing capacity of the plate? [10]

10. A square concrete pile of 10 m length is driven into a deep layer of uniform homogeneous clay. Average unconfined compressive strength of the clay, determined through laboratory tests on undisturbed samples extracted from clay layer, is 100 kPa. Determine the width of the pile required if the ultimate compressive load capacity of the driven pile is 632 kN? [10]

OR

11.a) A group of 9 friction piles are arranged in a square grid maintaining equal spacing in all directions. Each pile is of diameter 300 mm and length 7 m. Assume that the soil is cohesion less with effective friction angle 32^0. Determine the center to center spacing of the piles for the pile group efficiency of 60%?

b) Write a detailed note on methodology to conduct a pile load test. [5+5]

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