

B.Tech IV Year I Semester (R13) Supplementary Examinations June 2017

GEOTECHNICAL ENGINEERING – II

(Civil Engineering)

Time: 3 hours

Max. Marks: 70

PART – A

(Compulsory Question)

- 1 Answer the following: (10 X 02 = 20 Marks)
- What is area ratio? What is its significance?
 - Give the pictorial representation of various types of failure of finite slopes.
 - What are the types of earth pressures on a retaining wall?
 - Distinguish between gross pressure intensity & net pressure intensity.
 - What do you mean by end bearing & friction piles?
 - What is negative skin friction? What is its effect on load a pile foundation?
 - What is the practical significance of pile load test?
 - Distinguish between driven and bored piles.
 - What is a caisson? What are its types?
 - Discuss an two comments about the use of dynamic formulae

PART – B

(Answer all five units, 5 X 10 = 50 Marks)

UNIT – I

- 2 (a) Explain briefly sampling by: (i) Split spoon. (ii) Thin wall tube & piston type.
(b) What are the fundamental requirements of sampling tube?

OR

- 3 (a) Explain with sketches the modes of bearing capacity failures.
(b) Explain briefly the geophysical methods for soil exploration.

UNIT – II

- 4 (a) Explain the stability analysis of infinite slopes for: (i) Cohesionless soil. (ii) Cohesive soil.
(b) A 5 m deep canal has side slopes 1:1. The properties of soil are $c_u = 20$ kPa, $\phi = 10^\circ$, $e = 0.8$ and $G = 2.80$. If Taylor's stability number is 0.108, determine the factor of safety with respect to cohesion, when the canal runs full. Also find the same in case of sudden drawdown, if Taylor's stability number for this condition is 0.137.

OR

- 5 (a) Derive an expression for the factor of safety of a purely cohesive soil slope using Swedish slip circle method.
(b) Define Taylor's stability number and explain how it is used in the stability analysis of slope under submerged condition.

UNIT – III

- 6 (a) Explain with the sketches the various types of earth pressures on a retaining wall.
(b) A vertical excavation was made in a clay deposit ($\phi = 0$ and $\gamma = 20$ kN/m³). It caved in after the depth of digging reached 4 m. Calculate the value of cohesion. If the same clay is used as backfill against the retaining wall up to a height of 8 m, calculate total active earth pressure. Also sketch the pressure diagram on the wall.

OR

- 7 (a) Explain how active and passive earth pressures on retaining walls are determined using Coulomb's earth pressure theory.
(b) A retaining wall 5 m high, with vertical back supports a backfill ($\gamma = 20$ kN/m³ and $\phi = 30^\circ$) with horizontal ground surface. The angle of wall friction may be taken as 20° . A footing, running parallel to the retaining wall and carrying a load intensity of 20 kN/m is to be constructed. Find the safe distance of the footing from the face of the wall so that there is no increase in lateral pressure on the wall due to the load of footing. Use Rankine's graphical method

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UNIT – IV

- 8 (a) State the assumptions made in Terzaghi's bearing capacity analysis. Distinguish between general and local shear failures.
- (b) A square footing of size 2.5 m is built in a homogeneous bed of dense sand of unit weight 20 kN/m^3 at a depth of 1.5 m below the ground surface. Estimate the safe load that can be carried by footing with a factor of safety of 3 against shear failure. Take $N_c = 65.4$, $N_q = 49.4$ and $N_\gamma = 54.0$

OR

- 9 (a) Explain the plate load test to determine the bearing of soils. What are its limitations?
- (b) Plate load tests were conducted in a cohesive soil using two plates of different sizes and the following results were obtained. Find the size of the square footing to carry a load of 800 kN at a settlement of 25 mm.

Load (kN)	Size of plate (m)	Settlement (mm)
40	0.3 x 0.3	25
100	0.6 x 0.6	25

UNIT – V

- 10 (a) With the help of sketch, explain the load transfer mechanism in a single pile.
- (b) Explain the method of estimating bearing capacity of pile groups in cohesive soils.
- OR**
- 11 (a) Explain with sketches the various types of caisson foundations.
- (b) Explain the problems associated and precautionary measures to be taken during installation of caisson foundations.

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