

TCE-603

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Printed Pages : 4

Roll No. to be filled in your Answer Book

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B. Tech. (CE)

(6TH Semester) Examination, 2015**Foundation engineering**

Time: 3.00 Hrs]

[Max. Marks: 100

Note: All questions are compulsory.**Q.1 Attempt any FOUR questions.**

- Write the different types of shear failures? With suitable diagram.
- State assumption made in terzaghi theory for shallow foundation.
- What are factors affecting sample disturbance?
- A 16 pile group has to be arranged in the form of a square in soft clay with uniform spacing. Neglecting end bearing, determine optimum value of the piles in terms of the pile diameter, assuming a shear mobilization factor of 0.6.?
- A pile is driven with a single acting steam hammer of weight 15kn with a free fall of 900mm; the average set value per blow is 27.50. Find safe load using engineering news formula considering efficiency as 90%.

Q .2 Attempt any FOUR questions.

- What do mean by soil exploration? Write also the methods of soil exploration.
- If unconfined compressive strength in natural of clay is 200kpa and in remoulded case 180kpa. Then find out the sensitivity of clay?

- c). A retaining wall 6m high, with vertical back, supports a cohesive backfill having unit weight of 19KN/m^3 , apparent cohesion is 26kpa and angle of internal friction zero. Calculate (a) internal pressure intensity at top of the wall, (b) depth of tension cracks, (c) lateral pressure intensity at base.
- d). what is the definition of factor of safety and what is its significance?
- e). What is negative skin friction? With suitable diagram and example.

Q.3 Attempt any TWO questions.

- a). What is penetrometer test? Describe all the types in detail.
- b). Using terzaghi theory, determine the ultimate bearing capacity of a strip footing 1.5m wide resting on a saturated clay ($C_u=30\text{kpa}$, internal angle friction=0 and saturated unit weight is 20kn/m^3) at a depth of 2m below ground level. The water table is also at a depth of 2m from the ground level. If the water level rises by 1m, calculate the % reduction in the ultimate bearing capacity..
- c). A retaining wall with a smooth vertical back is 10m high and retains a two layer sand backfill with the following properties: 0-5m depth: $c'=0$, internal angle friction=30 and unit weight is 18kn/m^3 . Below 5m: $c'=0$, internal angle friction=34 and unit weight= 20kn/m^3 . Show the active earth pressure distribution, assuming that the water table is well below the base of the wall.

Q.4 Attempt any two question

- a). A square group of 25 piles extends between depths of 2m and 12m thick stiff clay overlaying rock. The piles are 0.5m dia and are spaced at 1 m c/c. the undrained shear

- strength of clay at pile base level is 180kpa and the average value of the undrained shear strength over the depth of the pile is 110kpa. The adhesion factor is 0.45. Estimating the capacity of the pile group considering an $N_c=9$ and angle of internal friction is zero.
- b). The cone penetration resistance obtained in a clay soil in a CPT was 50kg/cm². Determine the undrained strength of the clay. The total overburden pressure at a depth was 100kpa.
- d). Differentiate between shallow and pile foundation. And describe the types of shallow foundation with neat diagram.

Q.5 Attempt any two questions

- a). Determine the ultimate bearing capacity of a strip footing, 1.5m wide, with its base at a depth of 1m, if the water table is located (a) at a depth of 0.5m below the ground surface, (b) at a depth of 0.5m below the base of the footing. Take saturated unit weight is 20kn/m³, angle of internal friction is 38 and c is zero. And take $N_q=48.9$ and $N_y=64$.
- b). A bored concrete pile of 30cm dia and 6.50m length passes through stiff clay subjected to a seasonal shrinkage and swelling upto a depth of 1.5m. the average undrained strength of clay is 50kpa below the pile tip. Find

the ultimate load capacity assuming adhesion factor of 0.3. Neglect the top 1.50m soil.

- c). what is well foundation? And what is remedial measures of tilt and shifts?

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