R16

Reg. No:

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech III Year II Semester Regular Examinations May 2019
GEOTECHNICAL ENGINEERING-II
(Civil Engineering)

Time: 3 hours   Max. Marks: 60

(Answer all Five Units **5 x 12 = 60** Marks)

UNIT-I

1 **a** With a neat sketch explain the process of advancing wash boring. What are the
limitations of wash boring?   8M
   b Write short notes on the following:
   i). Rotary drilling   ii). Percussion drilling   4M

OR

2 **a** Describe the construct of spilt spoon sampler.   7M
   b Explain how the sample is extracted using split spoon sampler   5M

UNIT-II

3 **a** A new canal is excavated to a depth of 5 m below ground level, through a soil
having the following characteristics: $c = 14$ kN/m3; $\Phi = 15o$; $e = 0.8$ and $G = 2.70$.
The slope of banks is 1 in 1. Calculate the factor of safety with respect to cohesion
when the canal runs full. If it is suddenly and completely emptied, what will be the
factor of safety?   6M
   b What is stability number? What is its utility in the analysis of stability of slopes?   6M

OR

4 **a** A cutting is to be made in a soil with slope of 30o to the horizontal and a depth of 15
m. the propertied of soil are: $\gamma = 20$ kN/m^3; $\Phi = 15^o$ and $c = 25$ kN/m^2. Determine
the factor of safety of the slope against slip, assuming friction and cohesion to be
mobilized to the same proportion of their ultimate values.   6M
   b Describe Bishop's simplified method   6M

UNIT-III

5 **a** A vertical retaining wall 10 m high supports a cohesionless fill with $\gamma = 1.8$ g/cm3.
The upper surface of the fill raises from the crest of the wall at tan angle of 20° with
the horizontal. Assuming $\Phi = 30^o$ and $\delta = 20^o$, determine the total active earth
pressure using the analytical approach of Coulomb   7M
   b What are the assumptions of Rankine's theory?   5M

OR

6 **a** A wall 5.4 m high, retains sand. If the loose state the sand has a void ratio of 0.63
and $\Phi = 27^o$, while the sense state, the corresponding values of void ratio and Φ are
0.36 and 45° respectively. Compare the ratio of active and passive earth pressure in
the two cases, assuming $G = 2.64$.   7M
   b What are the assumptions in Coulomb's theory   5M

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UNIT-IV

7 a A footing 2 m square is laid at a depth of 1.3 m below the ground surface. Determine the net ultimate bearing capacity suing IS code method. Unit weight of soil is 20 kN/m3, angle of internal friction is 30° and the soil is cohesion less. Also estimate the ultimate bearing capacity of the footing when water table raises to the ground surface   7M

   b What are different types of shallow foundations?   5M

OR

8 a What are the points to be considered while fixing the depth of footing? Discuss Rankine's formula for the minimum depth.   6M

   b . Define the following
      i)Net safe settlement pressure ii). Net allowable bearing pressure   6M

UNIT-V

9 a A 30 cm diameter concrete pile is driven into a homogeneous consolidated clay deposit (Cu = 40 kN/m2, α = 0.7). If the embedded length is 10 m, estimate the safe load if factor of safety is 2.5.   7M

   b Discuss how ultimate load is given by Engineering News Record Formula   5M

OR

10 a A square group of 9 piles was driven into soft clay extending to a large depth. The diameter and length of the piles were 30 cm and 9 m respectively. If the unconfined compression strength of the clay is 9 t/m2, and the pile spacing is 90 cm centre to centre, what is the capacity of the group? Assume a factor of safety of 2.5 and adhesion factor of 0.75.   7M

    b How do you estimate group capacity of piles in clay?   5M

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