C.U.SHAH UNIVERSITY
Summer Examination-2017

Subject Name : Geotechnical Engineering-II

Subject Code : 4TE06GTEI   **Branch : B.Tech (Civil)**

Semester : 6   **Date : 19/04/2017**   **Time : 02:30 To 05:30**   **Marks :70**

Instructions:
  (1) Use of Programmable calculator & any other electronic instrument is prohibited.
  (2) Instructions written on main answer book are strictly to be obeyed.
  (3) Draw neat diagrams and figures (if necessary) at right places.
  (4) Assume suitable data if needed.

Q-1   **Attempt the following questions:**   **(14)**

a) A vertical cut made in a clay deposit having c=30 kN/m^2,Φ=0, γ=16 kN/m^3. Determine the maximum depth of cut so that the cut is stable. Take Sn=0.261.   1

b) Write the uses of stability number.   1

c) What is active earth pressure?   1

d) Write two assumption in Rankin's theory.   1

e) Where sheet piles are used?   1

f) A plate load test was carried out on a plate size 30 cm $\times$ 30 cm at the level of prototype foundation. The soil at the site was cohesionless with the water table at greater depth. The plate settled by 10 mm at a load intensity of 160 kN/m^2. Determine the settlement of a square footing of size 2m$\times$2m under the same load intensity.   1

g) Enlist the factors affecting bearing capacity.   1

h) What is an undisturbed soil sample?   1

i) Depth of exploration is depend on the which factors?   1

j) Where coffer dam is used?   1

k) What is isobar diagram?   1

l) Gives the two examples of flexible pavement.   1

m) What is pile driving?   1

n) Give the minimum thickness of base course in flexible pavement.   1

Attempt any four questions from Q-2 to Q-8

Q-2   **Attempt all questions**   **(14)**
a) Write a short note on "Swedish circle method".   **08**
b) A soil mass is retained by a smooth backed vertical wall of 6.0 m height. The soil has bulk unit weight of 20 kN/m^3 and Φ=16°. The top of the soil is level with the top of the wall and is horizontal. If the soil surface carries a uniformly distributed load of 4.5 kN/m^2, determine the total active thrust on the wall per linear metre of   **06**

the wall and its point of application.

Q-3   **Attempt all questions**   **(14)**

a) A retaining wall 6m high supports earth with its face vertical. The earth is cohesionless with particle specific gravity 2.69, angle of internal friction 35° and porosity 40.5%. The earth surface is horizontal and level with the top of the wall. Determine the earth thrust and its line of action on the wall, if the earth is water logged to level 2.5 m below the top surface. Neglect wall friction. Draw the pressure diagrams.   **07**

b) Explain in detail the construction of newmark's influence chart. How is it used?   **07**

Q-4   **Attempt all questions**   **(14)**

a) A rectangular Area 2m × 4m carries a uniform load of 80 kN/m^2 at the ground surface. Find the vertical pressure at 5m below the corner and centre of the loaded area.   **07**

b) Calculate the factor of safety of a slope in a clay, the slip circle has radius 13.5m and central angle 60°. The c.g. of the wedges is 5m away horizontally from the centre of rotation. Area of wedges is 35 m^2. The soil properties are: c = 30 kN/m^2, γ=20.5 kN/m^3.   **07**

Q-5   **Attempt all questions**   **(14)**

a) Explain the Bishop's method of stability   **07**

b) Enlist and explain the factors affecting the selection of type of foundation.   **07**

Q-6   **Attempt all questions**   **(14)**

a) Explain the pile load test to determine the bearing resistance of pile.   **07**

b) What is ultimate bearing capacity of a circular footing of 1.5 m diameter resting on the surface of a saturated clay of unconfined compressive strength of 100 kN/m^2? What is the safe value, if the factor of safety is 3?   **07**

Q-7   **all questions**   **(14)**

a) A Square group of 25 piles extends between depth of 2m and 12 m in a deposit of 20 m thick stiff clay overlying rock. The piles are 0.5 m in diameter and are spaced at 1 m centre to centre in the group. The undrained shear strength of the clay at the pile base level is 180 kPa and the average value of the undrained shear strength over the depth of the pile is 110 kPa. The adhesion coefficient is 0.45. Estimate the capacity of the pile group considering an overall factor of safety equal to 3 against shear failure. N_c corresponding to Φ_u=0 is 9.   **07**

b) Write the basic principles involved in the geophysical methods of subsurface soil exploration.   **07**

Q-8   **Attempt all questions**   **(14)**

a) One meter wide long footing is located at a depth of 2.0m from the ground level. The supporting soil is compressible and has shear strength parameters c= 32 kN/m^2 and Φ= 24°, γ=18 kN/m^3. The Water table is at a great depth, compute the safe load that can be carried by the long footing per meter length of the wall. Adopt FOS= 3.0   **07**

b) Write short note on group action and efficiency of pile group.   **07**