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Total Number of Pages: 02

B.Tech.
PCCI4401

7th Semester Regular/Back Examination 2017-18

Foundation Engineering

BRANCH : CIVIL

Time: 3 Hours

Max Marks: 70

Q.CODE : B220

Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

Q1 Answer the following questions : **(2x10)**

- Enumerate various types of retaining walls. What is the main thrust on a retaining wall?
- Differentiate between Rankine and Coulomb theories of earth pressure.
- Distinguish between local and punching shear failure.
- What are the criteria for deciding the depth of foundation?
- When and why a group of piles under a column is recommended? Sketch it.
- Sketch the load settlement curves from plate loadtests for various soils on a single chart.
- Write a critical note on 'negative skin friction' in piles.
- Which one is better in collecting undisturbed samples; (i) split-spoon sampler or (ii) thin-walled sampler?
- One sampler has an area ratio of 21% while another has 9%; which of these samplers would you prefer and why?
- Differentiate between cleavage and parting.

Q2 a) A retaining wall with a smooth vertical back is 10 m high and retains a two layer sand backfill with following properties: **(5)**

$$0 - 6 \text{ m depth: } c' = 0, \phi' = 31^\circ, \gamma = 19 \text{ kN/m}^3$$

$$\text{Below 6 m depth: } c' = 0, \phi' = 34^\circ, \gamma = 22 \text{ kN/m}^3$$

Show the active earth pressure distribution assuming that the water table is well below the base of the wall.

b) Discuss Rebhan's graphical solution for active earth pressure when β is not equal to Φ and β line and Φ line meet at a great distance. **(5)**

Q3 a) A strip footing, 1 m wide, rests on the surface of a dry cohesion less soil having angle of internal friction (Φ) = 28° , and unit weight = 20 kN/m^3 . What is the ultimate bearing capacity? What is the value, if there is complete flooding? Assume $N_\gamma = 11$. **(5)**

b) Discuss a pile load test. **(5)**

Q4 (a) Discuss how you can obtain the bearing capacity of a soil from a cone penetration test. **(5)**

(b) How is the settlement of footings estimated? **(5)**

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Q5 a) Design a square pile group to carry 400 kN in clay with a unconfined compression strength of 60 kPa. The piles are 30 cm diameter and 6 m long. Adhesion factor may be taken as 0.6. **(5)**

b) A 40 cm diameter pile penetrates a deposit of soft clay 10 m deep and rests on sand. Compute the skin friction resistance. The clay has a unit cohesion of 6 N/cm². Assume an adhesion factor of 0.6 for the clay. **(5)**

Q6 a) Sketch a well foundation showing all its component parts. How do you estimate the depth and bearing capacity of a well foundation? **(5)**

b) Discuss the electrical resistivity method of geophysical exploration. **(5)**

Q7 a) What are various penetration tests useful for sub-soil exploration? Discuss the standard penetration test (SPT) in detail including the procedure for obtaining a sample. How can you relate relative density with the observed/corrected N value **(5)**

b) Why are undisturbed samples required? Discuss any one procedure for obtaining undisturbed samples for a multi-storeyed building project. **(5)**

Q8 Write brief notes on any FIVE : (2 x 5)

a) Dilatometer parameters

b) Earth pressure at rest.

c) Fender piles

d) Mat foundation

e) Strike and a dip

f) Degree of disturbance

g) Recovery ratio.

h) Cleavage in rocks

i) N₆₀