

Menoufia University
 Faculty of Engineering
 Shebin El-Kom
 Dept. : Civil Engineering
 Semester : Second-Final Exam
 Academic Year: 2017-2108



Postgraduate: Diploma
 Subject: Site Investigation
 Code No. : CVE 516
 Date: 23/05/2018
 Time Allowed: 3.00 hours
 Total Marks: 100

Answer the following questions and any missing data can be reasonably assumed

Question (1)

(23)

- 1-a) A thin-walled tube (OD = 76.2mm, ID = 73mm) was pushed into a soft clay at the bottom of a borehole a distance of 600mm. When the sampler was recovered, a measurement done inside the tube indicated a recovered sample length of 575 mm. Calculate the recovery and area ratios.
- 1-b) Explain the objectives of site investigation.
- 1-c) A multistory building consists of twelve floors. The building covers 1800 m² (60.0 × 30.0 m). Assume the soil is average stratified. Suggest number of borings required, borings distribution, boring depth and list the tests required for soil classification and for determining the bearing capacity of soil and soil settlement assuming the top 15 meters of the soil are silty clay soil overlying a deep layer of sandy soil.
- 1-d) Explain the cone penetration test (CPT) used in subsurface exploration.

Question (2)

(22)

- 2-a) Show schematically different parts of piston sampler.
- 2-b) List the factors, which cause soil disturbance.
- 2-c) For the given borehole loge sheet, calculate the bearing capacity for sample no. (3). And calculate the size of square footing to carry a load of 100 ton. Also, comment on the given boring log.

Field Samples		Depth of Sampling (m)		N ^o -Value			Visual Description of Soil
No.	Type	From	To	6"	16"	36"	
1	D	0.0	2.0				Black and grey moist fill,
2	U	2.0	4.0				Black peat.
3	S.S	4.5	5.0	11	14	6	Sandy clay and silt mixture.
4	D	5.0	7.0				Sandy silt and clay mixture.
5	U	7.0	9.0				Silt with fine gravel and traces of fine sand.
6	S.S	9.5	10.0	4	8	3	Sandy clay and silt mixture.

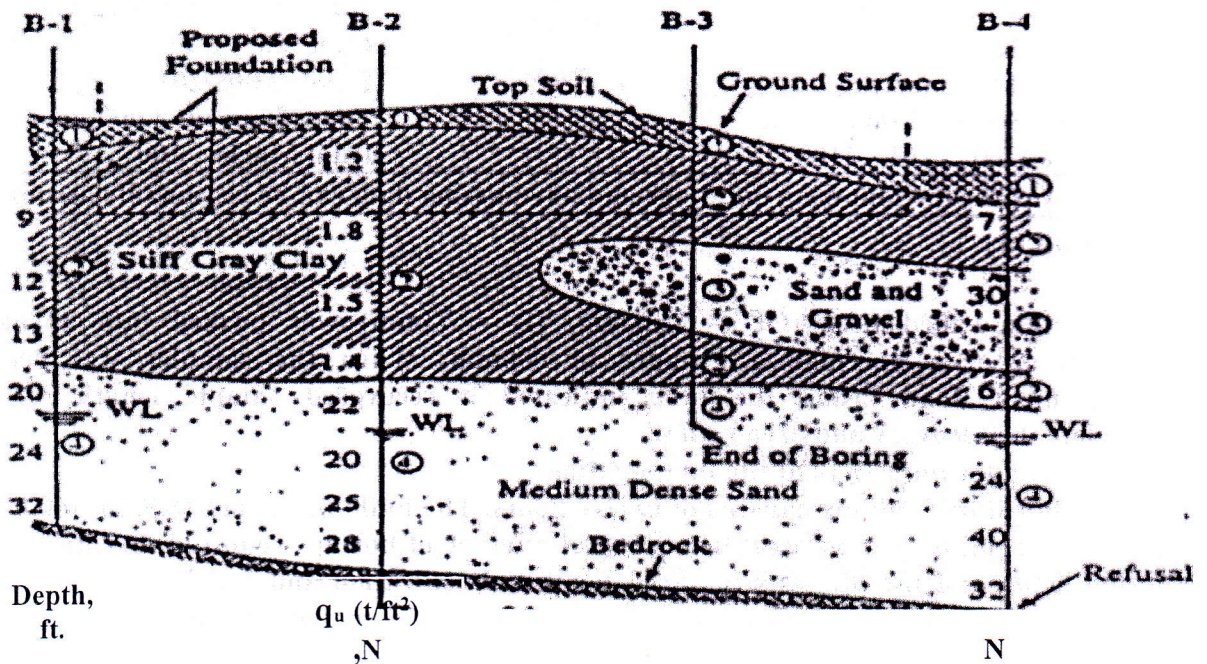
Question (3)

(25)

- 3-a) Show the criteria used for determining the borehole depth and boring number.
- 3-b) Differentiate between soil report and field report.
- 3-c) Use Housel method to determine the size of square footing required to carry a column load P = 45 tons if the two plate loading tests results are as given below:-
- plate size (1) = 35x35 cm, corresponding load= 5.6 tons; relative to 1.0 cm settlement.
 - plate size (2) = 50x50 cm, corresponding load =10 tons; relative to 1.0 cm settlement.
- 3-d) - For the given longitudinal soil cross section:
- Calculate the maximum and minimum executed boring depth in feet.
 - For the shown proposed foundation level, what will the value of bearing capacity?
 - What is meant by refusal in the given profile?
 - What is the suitable foundation type for the given soil profile.

Not: N= No. of blows of SPT.

q_u = Unconfined compression strength (t/ft^2).



Question (4) Comment on the following statements by True or False & explain as possible: (10)

- 1- Depth of test pit is limited to 3 m.
- 2- In subsoil investigation, the seismic methods are most frequently used. These methods are based on the variation of the wave velocity in different earth materials.
- 3- A subsurface investigation is typically performed in distinct stages, although some activities of one stage may overlap with other stages.
- 4- Field reconnaissance, including a site walkover and field mapping.
- 5- The ultimate pile bearing capacity can be determined from CPT data.
- 6- Plate load test may be carried out near ground surface or at the bottom of the borehole.
- 7- Bjerrum has reported that the obtained undrained cohesion by vane shear tests may give unsafe results for foundation design as the plasticity of soils increases.
- 8- SPT is one of the most important soil tests for geotechnical engineers because it is widely used in calculating different soil parameters.
- 9- The obtained samples should be tested according to the procedure of the American Society for Testing and Materials (ASTM) or the British Standards (BS), or Egyptian Standards (ES), whichever is appropriate.
- 10- Undisturbed samples (U) can be tested for strength and compressibility to determine the stress strain characteristics of the material, in addition to classification and chemical tests.

Question (5) Choose the correct answer for the following: (20)

- 1- Test pit:
 - a- Is dug either by hand or by backhoe.
 - b- Large quantities of disturbed samples can be obtained.
 - c- Large blocks of undisturbed samples can be carved out.
 - d- All of the above.
- 2- The auger is available in different types as:
 - a- Helical auger.
 - b- Short flight auger.