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Total No. of Pages : 02

Total No. of Questions : 08

M.Tech.(Geo Technical Engineering)/(Soil Mechanics & Foundation Engineering) (2013 & Onwards) (Sem.-1)

SUB SURFACE OF GEOPHYSICAL EXPLORATION

Subject Code : CESE-10

Paper ID : [E1008]

Time : 3 Hrs.

Max. Marks : 100

INSTRUCTION TO CANDIDATES :

1. Attempt any FIVE questions out of EIGHT questions.
2. Each question carries TWENTY marks.
3. Notations used carry usual meanings.
4. Any Missing data may be assumed appropriately.

Q1 a) Enumerate and explain the various objectives of soil exploration. (5)

b) What is meant by significant depth of exploration? Give two empirical guidelines to determine the depth of exploration. (4+6)

c) What would be number and spacing of bore holes in the following circumstances?

i. A three storey office building premise to cover a plan area of 100 m × 100 m

ii. One km stretch of a National Highway

Justify your answer with suitable codal provision or otherwise. (5+5)

Q2 a) How is static cone penetration test carried out for determining subsurface soil condition? Describe in detail. (10)

b) The following dimensions are given for a Shelby tube sampler :

External diameter = 51 mm

Internal diameter = 48 mm

Determine the area ratio. Also, explain its significance. (3+2)

c) What are advantages and limitations of doing the vane shear test? Enumerate. (5)

Q3 a) What is block resonance test? Explain the test process with help of a neat sketch. (2+10)

- b) What are the assumptions made in field permeability test? What is the significance of observation wells in groundwater observation? (4+4)
- Q4 Write short notes on the following :
- a) Large size shear box test. (10)
- b) Pressuremeter test. (10)
- Q5 a) How Geophysical exploration using electrical resistivity method is carried out in the field? State that under what circumstances it will be more suitable? (10+2)
- b) What is stabilization of bore holes? Briefly write down any three methods of stabilization. (8)
- Q6 a) Describe the Standard Penetration Test used in soil exploration. Explain the various corrections to be applied to the observed value of N. (10)
- b) If a thin walled sampler is pushed fast into following soils, what will be the effect of disturbance (i) Sensitive clay (ii) Sandy silt (iii) Sandy clay. (10)
- Q7 a) Define the following terms which are used in subsoil exploration.
- i. Recovery ratio.
- ii. Representative sample.
- iii. Inside clearance of sampler.
- iv. Outside clearance of sampler. (8)
- b) Discuss with neat sketch wash boring method used in soil exploration. What are its advantages and limitations? (8+4)
- Q8 a) For what purpose and how cyclic plate load test is conducted? Describe giving neat sketches. (10)
- b) During a pumping test, a well was sunk through a stratum of dense sand 10m deep overlying an impervious stratum. Observation holes were drilled at 15 m and 6.75 m (distance Center to Centre) from the well. Initially the water level in the well was 2.50 m below the ground surface. After pumping until steady conditions had been achieved, the water level in the two observation wells had dropped 0.5 m and 1.95 m, respectively. If the steady discharge was 5 litres/sec, determine the coefficient of permeability. (10)