Roll No. | | | | | | | | | | | | | **Total No. of Pages : 02**

Total No. of Questions : 08

M.Tech.(Soil Mechanics & Foundation Engineering)
(2016 & Onwards) (Sem.–3)

SUB SURFACE OF GEOPHYSICAL EXPLORATION

Subject Code : CESE-10
M.Code : 37202

Time : 3 Hrs. **Max. Marks : 100**

INSTRUCTIONS 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 factors which are relevant of well balanced sub-surface exploration program. (10)

b) What are the factors to be considered while selecting depth and spacing of boring for various civil engineering projects? Explain giving justification for each. (10)

Q2. a) Describe different types of soil samplers and situations where each is used indicating its advantages and disadvantages. (10)

b) 75 mm is the thickness of the sampling tube. If the area ratio required is 20%, determine the thickness of sampling tube. (5)

c) What is the significance of using bentonite slurry in dynamic cone penetration test? (5)

Q3. a) Describe, with neat sketch, rotary drilling method. In what circumstances would you recommend this method? (10 + 2)

b) Distinguish between : (8)

i. Open drive sampler and Piston sampler

ii. Disturbed and Undisturbed sample.

Q4. Write short note on the following :

a) Cyclic plate load test (7)

b) Pressure meter test (7)

c) Static cone penetration method (6)

Q5. Distinguish clearly to bring out difference between following :

a) Resistivity mapping and Resistivity sounding. (5)

b) Shell and auger boring; and Wash boring. (5)

c) Representative and Non-representative samples. (5)

d) Plate load test and Cyclic plate load test. (5)

Q6. a) Explain the dynamic cone penetration test and give correlation with SPT value. (10)

b) The observed standard penetration test value in a deposit of fine silty sand was 38 at a depth of 8 m. The water table exist at a depth of 3.5 m below the ground level. Find the corrected value of N. The unit weight of soil above water table is 14 kN/m^3 and below water table is 18.8 kN/m^3. (5)

c) Give the relative merits and demerits of in situ direct shear test and m-situ vane shear test. (5)

Q7. a) What are geophysical methods of sub-soil exploration? Describe any one method in detail. (2 + 10)

b) Sketch the types of augers used in soil exploration. Also, state their suitability under different soil conditions. (5 + 3)

Q8. a) Describe methods of stabilizing bore holes enumerating their relative merits and demerits. (10)

b) A pumping test was carried out in a test well of 200 mm diameter for a confined aquifer to determine its permeability. The thickness of aquifer was 4.5 m. The drawdown in the test well from the original peizometric level at a steady discharge of 0.0267 m^3/s was found to be 5 m. The radius of influence is about 90 m. If the original piezometric level is at a height of 10 m above the bed of aquifer, compute the co-efficient of permeability. (10)

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.