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

Total No. of Questions : 08

M.Tech.(Geo Technical Engineering) (2013 Batch)
M.Tech.(Soil Mechanics & Foundation Engineering) (2013 & Onwards)
(Sem.–3)

SOIL DYNAMICS

Subject Code : CESE-3
Paper ID : [E0980]

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. **Assume missing data, if any.**

Q1. a) What do you mean by tuning of a foundation? How is it achieved? (10)

b) *'The fault length and duration of an earthquake depends upon magnitude of an earthquake'*. Give your critical comments. (10)

Q2. A retaining wall 8 m high is inclined 20 degree to the vertical and retains horizontal backfill with the following properties :

$\gamma_{Soil} = 16 kN/m^3, \phi = 30 \text{ degree}, c = 5.5 kN/m^3$

There is a superimposed load of 15 kN/m^3 on the backfill. The wall is located in seismic zone IV. Compute

a) Dynamic active earth pressure.

b) Percentage increase in pressure over static earth pressure. (20)

Q3. What is Coulomb Theory? Discuss in detail about application of Modified Coulomb Theory. Illustrate your answer with an example. (20)

Q4. '*It is important to perform Dynamic analysis for vertical loads*'. Discuss in detail the procedure and explain the importance. (20)

Q5. a) Explain the terms '*Liquefaction*' and '*Cyclic Mobility*'. (8)

b) The sand deposit of fine sand of finite thickness is located at a depth of 3 m. Sand deposit is located in zone IV. The corrected value of SPT = 8. Taking γ_{Soil} = 16 kN/m^3 and γ_{sub} =7 kN/ m^3, compute the factor of safety against liquefaction for saturated sand located at a depth of 2.9 m. (12)

Q6. a) What are the main characteristics of a reciprocating machine and a rotary machine? (12)

b) Discuss the four basic soil spring constants used in analysis of foundations subjected to dynamic loads. (8)

Q7. a) What is damping factor? What is its importance? (8)

b) The response of a block foundation exited by an oscillator was noted as 20 cps. The amplitude of vibration at resonance was 1mm. The dynamic force oscillator at 20 cps is Kn. if the total weight of the block and the oscillator is 20 kN, calculate the damping factor. (12)

Q8. Write notes on :

a) Vibration Isolation. (6)

b) Behaviour of retaining walls during earthquakes. (6)

c) Vibration Table studies. (8)