M.E. Second Semester (Civil Engineering (Geotechnical Engineering)) (Full Time) (C.G.S. - New)

13049 : Soil Dynamics and Machine Foundation : 2 SFGE 1

P. Pages : 2

Time : Three Hours

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AW - 3647

Max. Marks : 80

Notes :
1. All question carry equal marks.
2. Due credit will be given to neatness and adequate dimensions.
3. Assume suitable data wherever necessary.
4. Diagrams and Chemicals equations should be given wherever necessary.
5. Retain the construction lines.
6. Illustrate your answer necessary with the help of neat sketches.
7. Use of slide rule logarithmic tables, Steam tables, Moller's Chart, Drawing instrument, Thermodynamic table for moist air, Psychrometric Charts and Refrigeration charts is permitted.
8. Solve **any five** questions.
9. Use of pen Blue/Black ink/refill only for writing the answer book.

1. a) Define the free vibrations and forced vibrations of a machine foundation system and the general criteria for design of machine foundation. **8**

b) Assuming resonance to have occurred at the frequency of 20 cycle per second in the vertical vibration of a test block of 1.0mx1.0mx1.0m size, determine the coefficient of uniform compression (Cu). The man of oscillator is 50.0 kg, the unit man of test block is 2400 kg/m^3. **8**

If the force produced by the oscillator at 12 cycle per second is 1000.00 kN, compute the maximum amplitude in the vertical direction at 12 cycle per second.

2. a) Discuss the free end condition and fixed end condition of a rod of length L vibrating vibrating in normal mode by considering **8**

i) Free – Free condition

ii) Fixed – Free condition

ii) Fixed – Fixed condition.

b) A foundation block weigh 30 kN rests on a soil for which stiffness may be assumed as 25000 kN/m. The machine is vibrated vertically by an exciting force (3.0 sin 30t) kN. Find the natural frequency natural period, natural circular frequency and amplitude of vertical displacement. The damping factor is 0.50. **8**

3. a) Discuss the horizonal block resonant test to determine. **8**

i) Coefficient of elastic non uniform compression

ii) Coefficient of elastic non uniform shear.

b) Discuss the vertical block resonant test to determine 8

i) Coefficient of elastic uniform compression Cu

ii) Young's modulus E

iii) Damping ratio ξ of the soil.

4. a) Discuss various types of machine foundation and their design criteria. 8

b) Describe with the help of neat sketches. 8

i) Seismic cross bore hole survey

ii) Seismic up bore hole survey

iii) Seismic down bore hole survey.

5. a) Discuss the design criteria of foundation of rotating machine. 8

b) Discuss the resonant method of two dimensional analysis of rotary machines for vertical frequency. 8

6. a) Discuss various processes of isolation in machine foundation. 8

b) Discuss the force isolation and notation isolation of a machine and foundation system. 8

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