BICEE-013

DEGREE - CIVIL

Term-End Examination

June, 2013

BICEE-013 : ELEMENTS OF SOIL DYNAMICS AND MACHINE FOUNDATION

*Time : 3 hours*   *Maximum Marks : 70*

*Note :   Answer **any five** questions. Assume missing data if any.*

1.   (a)   Discuss the various types of dynamic   7
           loading on soils, with emphasis on the
           nature of the source producing the load.

     (b)   Give a short note on the importance of soil   7
           dynamics.

2.   (a)   A mass supported by a spring has a static   7
           deflection of 0.5 mm. Determine its natural
           frequency of oscillation.

     (b)   Determine the equivalent spring constants   7
           for the systems of springs shown in the
           figure below.
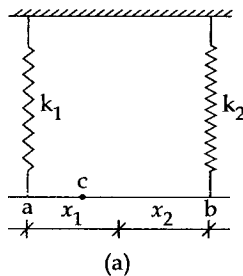
3. (a) Discuss permanent settlement in relation to machine foundation. 7

   (b) Give a list of soil characteristics and loading properties, which affect the stress deformation and strength characteristics of soils. 7

4. (a) Give an equation for the determination of co - efficient of elastic uniform compression of soil (cu). 7

   (b) Derive the relationship between shear modulus, young's modulus and co - efficient of elastic uniform compression. 7

5. Classify the machines based on the design criteria used for foundation design, and make an account of different types of machine foundations, with suitable sketches. 14

6. Discuss the behaviour of retaining walls during earthquakes. Illustrate with necessary diagrams and plots. 14

7. Explain the effects of Rayleigh surface wave, in respect to the particle motion at the surface. 14

8. A square foundation with dimensions $B \times B$ has to be constructed on a dense sand. Its depth is $D_6 = 1$ m. The unit weight and the static angle of friction of the soil can be assigned representative values of 18 kN/m^3 and 39° respectively. The foundation may occasionally be subjected to a maximum dynamic load of 1800 kN increasing at a moderate rate. Determine the site of the foundation using a safety factor of 3.

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