

**B.Tech. CIVIL ENGINEERING (BTCLEVI)**

**Term-End Examination**

00912

**December, 2017**

**BICEE-013 : ELEMENTS OF SOIL DYNAMICS  
AND MACHINE FOUNDATION**

*Time : 3 hours*

*Maximum Marks : 70*

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**Note :** Answer any *five* questions. All questions carry equal marks. Assume missing data, if any. Use of scientific calculator is permitted.

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1. (a) Discuss how damping factor is determined for a single degree of freedom system. 7
- (b) A vibrating system consists of a mass of 5 kg, a spring stiffness of 5 N/mm and a dashpot with a damping coefficient of 0.1 N-sec/m. Find logarithmic decrement and damping ratio. 7
  
2. Describe the generation and characteristics of the following : 14
  - (a) Compression Wave
  - (b) Shear Wave
  - (c) Rayleigh Wave

3. (a) Discuss the factors affecting cyclic triaxial compression test. 7
- (b) Discuss vertical block resonance test. Explain how the coefficient of elastic uniform compression is obtained. 7
4. Describe the method of obtaining the maximum horizontal dynamic load that can be applied on the footing. Write the expression for finding the rotation of the footing. 14
5. A 7.0 m high retaining wall with back face inclined  $20^\circ$  with vertical retains sandy soil with the following properties :
- Bulk density =  $18.5 \text{ kN/m}^3$
- Angle of shearing resistance =  $33^\circ$
- Angle of wall friction =  $20^\circ$
- The backfill surface is sloping at an angle  $10^\circ$  to the horizontal. Find the total active earth pressure under static and dynamic conditions. Assume  $\alpha_n = 0.1$ . 14

6. Describe the terms Initial Liquefaction, Liquefaction and Cyclic Mobility with neat sketches. 14
7. What are the different types of machines ? Discuss the general requirements of machine foundations. 14
8. Explain the step-by-step design procedure of foundation for a reciprocating machine. 14
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