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BICEE-013

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

Term-End Examination

June, 2019

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

Time : 3 Hours

Maximum Marks : 70

Note : Attempt any five questions. All questions carry equal marks. Assume missing data, if any. Use of scientific calculator is permitted. Give a neat sketches if required.

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1. (a) Explain unbalanced forced vibrations. 7
(b) Prove that in frequency dependent excitation the damping factor ξ is given by the following expression :

$$\xi = \frac{1}{2} \left(\frac{f_1 - f_2}{2 f_n} \right),$$

where f_1 and f_2 are frequencies at which the amplitude is $1/\sqrt{2}$ times the peak amplitude. 7

2. The data of a refractor test is given below. Determine the depth of the refractor using time intercept approach and critical distance approach : 14

Distance of Geophones from source (m)	Travel time (milli sec)
0	0
5	3
10	5
15	7
20	9
25	10

3. Explain the following : $7 \times 2 = 14$
- (a) Seismic cross-borehole survey
- (b) Vertical block resonance test
4. At a particular soil site, the top 10.0 m soil is medium grained sand having dry density 17.5 kN/m^3 . The water table is 6.5 m below the ground surface. Find the shear modulus of the soil at depth of 7.0 m below ground surface.
- Given specific gravity of soil = 2.67 14
- Angle of shearing resistance of the soil = 37°

5. A 6.0 m high retaining wall with back face inclined 22° with vertical retains sandy soil with the following properties :

Bulk density of sand = 18 kN/m^3

Angle of shearing resistance = 32°

Angle of wall friction = 20°

Angle of surcharge = 12°

Determine the total active earth pressure under the static and dynamic conditions both.

Assume $\alpha_h = 0.1$. 14

6. Discuss the solvent features of liquefaction studies made by shake table test and blast tests. 14
7. Explain how the natural frequencies and amplitudes of motion of the foundation all determined taking into account of embedment effect and apparent soil mass, 14
8. Explain the difference between active screening and passive screening. Discuss the procedure of designing the open trench barrier in both the cases. 14