BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: M. Tech **SEMESTER : II**
BRANCH: CEE **SESSION : SP/19**

SUBJECT: CE518 DYNAMICS OF SOIL AND FOUNDATIONS

TIME: 3 Hours **FULL MARKS: 50**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

Q.1(a) What are the forces acting on the mass of a single degree freedom system and hence derive the equation for amplitude for undamped free vibrations? [5]

Q.1(b) The rotor of a motor having mass 4 kg was running at a constant speed of 40 c/s with an eccentricity of 150 mm. The motor was mounted on an isolator with damping factor 0.25 Determine the stiffness such that 20% of the unbalanced force is transmitted to the foundation. Also determine the magnitude of the transmitted force. [5]

Q.2(a) Differentiate between particle wave velocity and wave propagation velocity. Derive the equation for wave propagation velocity when elastic waves travel in a rod of infinite length. [5]

Q.2(b) A shot is fired at the ground surface on a particular location and observations from geophones are as in table 1. Determine the depth of soil layer from time intercept approach and critical distance approach. [5]

Q.3(a) Explain the cyclic plate load test and hence to obtain coefficient of uniform compression. [5]

Q.3(b) What are the general requirements of machine foundations? [5]

Q.4(a) A retaining wall is 7 m high with back face inclined 20^0 and retains non cohesive backfill with γ =18 KN/m^3, Φ =32^0 and δ =20^0 . The backfill is inclined to the horizontal by 10^0 . The wall is located in a seismic area where α_h = 0.10 and α_v = 0.05. Compute the dynamic earth pressure using Culmann's graphical method. CO4,K5, PO- a,h [5]

Q.4(b) Write the equation for bearing capacity under pseudo-static analysis and explain the terms. [5]

Q.5(a) Explain the method of evaluating zone of liquefaction in the field. [5]

Q.5(b) Explain the various antiliquefaction measures (Any 5). [5]

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Table 1

Distance of geophone from shot point (m)	Travel time (Milli sec)
5	42.50
10	85.00
15	127.50
20	170.00
25	187.50
30	197.50
40	215.00