DEPARTMENT OF CIVIL ENGINEERING

MINOR I :CVL 861 ANALYSIS AND DESIGN OF MACHINE FOUNDATIONS (2018-19)

Time allowed: 1hour **Date** : 07 February 2019
Venue : LH 510 **Max marks** : 15

NOTE: (a) This question paper contains one page only. (b) All questions are compulsory. (c) **Assume any data which you deem is necessary but not supplied. (d)** Draw neat and clear sketches wherever required.

Question 1.

A rotating machine consisting of two synchronized rotors (one clockwise and other anti-clockwise) operating at a frequency of 10 Hz rests on an RC block of size 1x1x1 m, with its bottom located 0.5 m below the ground level. The eccentric mass is 0.25 kg in both rotors located at an eccentricity of 300 mm. Total mass of the machine is 450 kg. The soil underlying the foundation has a C_z equal to 50000 kN/m^3. The manufacturer of the machine has specified a safe vibration amplitude of 150 μm. Check the adequacy of the machine foundation from point of view of resonance and the amplitude of vibration.

(7 marks)

Question 2.

A strip footing 1.5 m wide with 0.3 m wide pedestal projecting 1 m above FGL supports a pipeline transporting oil. The NGL is located 0.5 m below FGL. Water table coincides with NGL. Bottom of the footing is located further 1 m below NGL. The pipeline engineer has specified a horizontal force of 35 kN/m in the lateral direction. Check the adequacy of the footing from overturning.

(5 marks)

Question 3.

Differentiate between the terms “safe net bearing capacity” and “allowable net bearing pressure”.

(3 marks)