



DEPARTMENT OF CIVIL ENGINEERING

MINOR I :CVL 861 ANALYSIS AND DESIGN OF MACHINE FOUNDATIONS (2015-16)

Time allowed: 1hour
Venue : V 216

Date : 29 August 2015
Max marks : 20

NOTE: (a) This question paper contains two questions and 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.

Determine the minimum size required for an isolated footing supporting a machine of weight 100 kN and exerting a static horizontal force of 25 kN at height of 500mm above the ground level.

The geotechnical report recommends that the foundation be positioned 1.5m below the ground level. The water table starts 0.5m below the ground level. The allowable net bearing pressure at 1.5 m below the ground level is 150 kN/m².

Question 2.

Determine the forces generated by a piston-crank machine operating at a frequency of 50 Hz if the weight of piston is 1.5 kg, that of the connecting rod is 0.75 kg and that of the crank is 50 kg. There are no other moving masses involved in the machine. The length of the crank is 400mm and that of the connecting rod is 700mm, and both have uniform cross-section.

(5 marks)

Question 3.

Determine the dynamic amplification factor of a reciprocating machine (reciprocating in vertical plane) if the eccentric mass is 400g, total weight of the machine being 300 kg and operating frequency being 75 Hz. The machine rests on a 1x1x1m RC block on a soil which has a safe net bearing capacity of 300 kN/m².

(5 marks)

Question 4.

Determine K_z , K_{θ_x} , K_{θ_y} and K_ϕ for a machine foundation with dimensions 3x2x1m (along x, y and z directions) resting on a soil which has a safe net bearing capacity of 200 300 kN/m²

(4 marks)