DEPARTMENT OF CIVIL ENGINEERING

MINOR I :CEL727 DESIGN OF INDUSTRIAL STRUCTURES
(2013-14)

Time allowed: 1hour   **Date**   : 06 February 2014
Venue   : V 216   **Max marks : 20**

NOTE: (a) This question paper contains two questions and two printed pages. (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. (e) All dimensions shown are in mm.

Question 1.

Comment on the adequacy of the pile group shown in the figure below for following forces arrived at top of pile cap for the load combination : Dead Loads + Earthquake in x direction.

P	=	**2000 kN**
Hx	=	**100 kN**
Mx	=	**200 kNm**
Hy	=	**20 kN**
My	=	**3000 kNm**

The geotechnical report of the site provides the pile load capacities as:

Tension	=	150 kN
Compression	=	1000 kN
Lateral load	=	24 kN

The report allows 25% increment in the allowable pile load capacities under earthquake. If you feel that the existing system is over safe, suggest an alternate economical solution. If you find the system inadequate, suggest suitable remedial measures.

(**10 marks**)

PLAN　　　　　　　　　　　　　　　　　**ELEVATION**
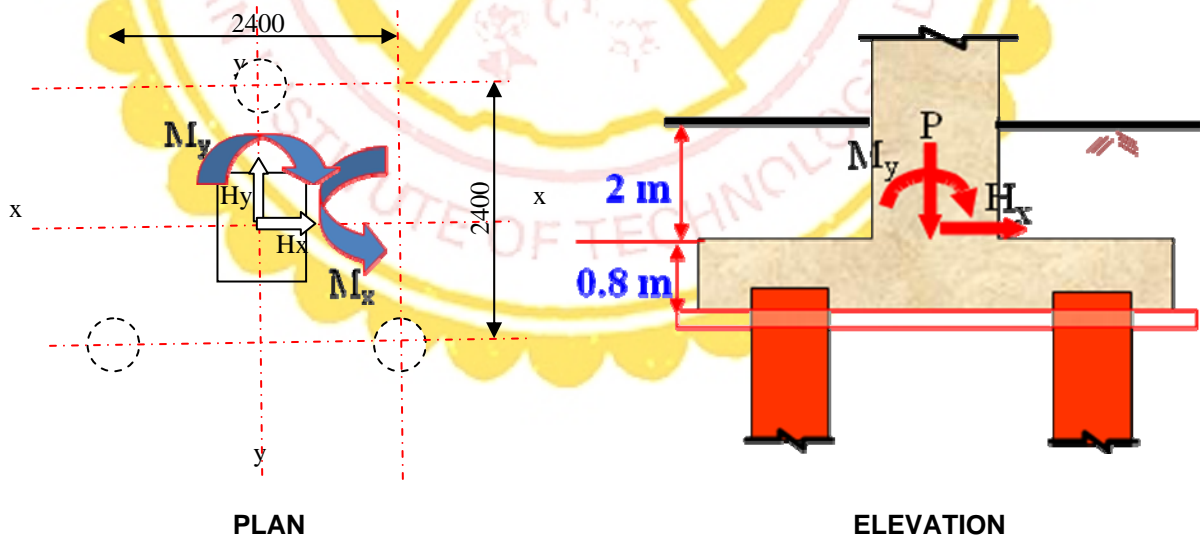
Question 2.

Fig. 2 shows an RC foundation supporting a machine operating at 30 Hz and exerting torque about the vertical axis with an amplitude of 150 kNm. The soil has allowable net bearing pressure of 400 kN/m^2. The dimensions of the block are as shown in Fig. 2

Determine the adequacy of the foundation against resonance and the amplitude of vibrations. Can the dimensions of the foundation be reduced? On the other hand, any provision of the relevant code of practice is violated, suggest possible solution.

Machine

300

1000

3300 (SQUARE)