DEPARTMENT OF CIVIL ENGINEERING

MINOR I :CEL727 DESIGN OF INDUSTRIAL STRUCTURES (2012-13) MINOR 2

Time allowed: 1hour **Date :** 23 March 2013
Venue : V 216 **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:

Why does IS 13920 (1993) recommends a shear force for columns based on the limiting moments of resistances of the beams framing into the column rather than that of the column itself?

(3 marks)

Question 2:

Determine the spectral acceleration coefficient for block V of IIT Delhi in accordance with IS 1893(I):2002 assuming the frame height to b 10.5m and the shorter base dimension to be 8m.

(3 marks)

Question 3:

Determine the natural frequencies of a foundation block 2x2m in plan and having a thickness of 0.8m, supporting a machine whose mass is negligible. Assume C_z = 40 MN/m^3 for the soil. Yawning motion may be ignored.

(5 marks)

Question 4:

Determine the adequacy of the arrangement of anchor bolts of property class 8.6 shown in Fig. 1 for a column base if the worst load combination results in the ultimate tension of 100kN, moment of 200 kNm and a shear force of 50 kN at the bottom of the column. Assume the concrete of the pedestal to be M40 grade. Modify the arrangement if you find the design is undersafe or oversafe.

(7 + 2 = 9 marks)

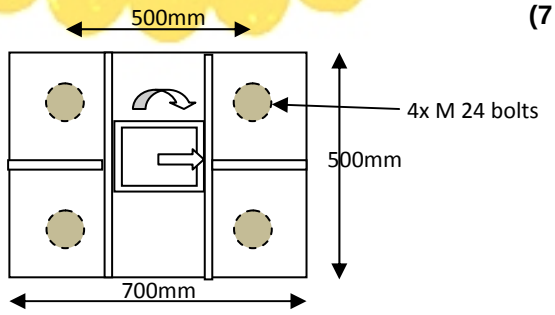

Fig. 1. Arrangement of anchor bolts