DEPARTMENT OF CIVIL ENGINEERING

MINOR I :CEL727 DESIGN OF INDUSTRIAL STRUCTURES (2010-11) MINOR 2

Time allowed: 1hour **Date :** 09 October 2010
Venue : III 336 **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.

Q1. Analysis of a shed structure results in following forces at the base of the steel column.

S. No.	LOAD CASE	FORCE (kN) (+ive for tension)	MOMENT (kNm)	HORIZONTAL FORCE (kN)
1	Dead loads	-15	0	0
2	Imposed loads	-20	0	0
3	Wind normal to ridge, inside suction	3.2	74.5	39.8
4	Wind normal to ridge, inside pressure	53	70.5	35.6
5	Wind along ridge, inside suction	0	4.2	4.2
6	Wind along ridge, inside pressure	46.3	4.2	4.2

(i) Which of the above wind cases will govern the design of the column support system? Justify your answer.

(ii) For the worst load combination, determine the diameter of the anchor bolt of property class 4.6, as per the arrangement shown in Fig. 1. Assume the concrete of the pedestal to be M30 grade. The base plate may be assumed 800x800 in size.

(3 + 7 =10 marks)

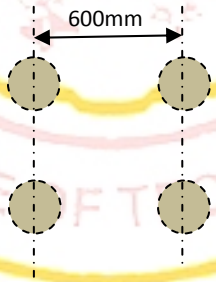

Fig. 1. Arrangement of anchor bolts

Q2. A 25m tall chimney of 1m diameter is proposed to be constructed in NCR region. Assuming 200mm wall thickness, 100cm brick lining, 0.65% vertical reinforcement steel, $\alpha = 60^{o}$, $\Delta T = 70^{o}C$, determine the following:

(i) Stresses in concrete and steel due to dead loads + wind on the leeward side.

(ii) Stresses at the same location as in (i) due to temperature gradient.

Assume M30 concrete Fe 500 steel and effective cover to reinforcement to be 60mm.

(5 + 5 =10 marks)