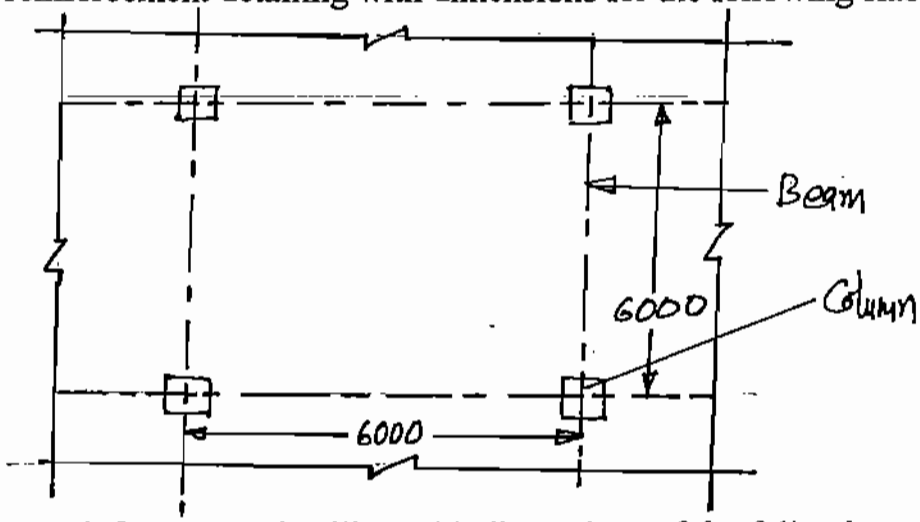
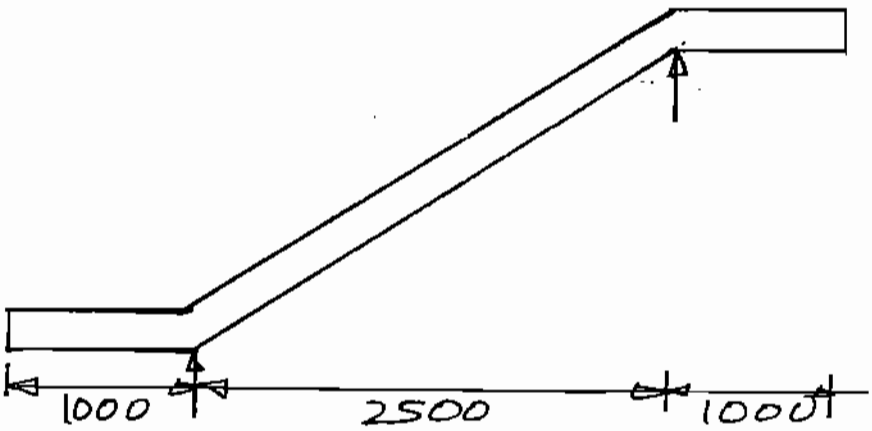
CIVIL ENGINEERING DEPARTMENT
SUBJECT: CEL 232- CONCRETE MATERIAL AND DESIGN
MAJOR TEST : II SEMESTER 2007 - 2008
Full marks: 40, Date: 03-05-2008, Time: 01.00 to 03.00
Please answer all questions

Q.1 (a) Draw reinforcement detailing with dimensions for the following slab-4



(b) Draw reinforcement detailing with dimensions of the following R.C. Structure. -4



(c) Define equilibrium and compatibility torsions. -2

(d) What are critical sections for one way and two way shears in isolated footing for column. -2

(e) What do you understand by Design Concrete Mix and High Performance Concrete. -4

PTO

Days –	2	4	6	8	10	12
Corresponding **BOD** (mg/L) -	153	203	296	350	390	422

6. Water containing 25 mg/L of Fluoride is to be treated to produce an effluent of 0.10 mg/L of Fluoride using Powdered Activated Carbon. Activated Carbon is to be added to the flow stream and the mixture shall be subsequently settled in the following sedimentation tank. Estimate the quantity of Activated Carbon required for treating the influent to the required residual concentration if the water flow rate is 0.11 m^3/sec. Batch mix tests were carried out in a laboratory to assess the adsorption process using 1lit solutions of Fluoride concentration 25 mg/L. Test results are given below:

Tests	Act. Carbon Added (gms)	Equilibrium Conc. of Fluoride (mg/L)
1.	0.25	6.0
2.	0.32	1.0
3.	0.50	0.25
4.	1.0	0.09

(10 marks)

$X/m = K_f \ C_e^{1/n}$

$X/m = a\,b\,C_e / (1 + b\,C_e)$

$C^{0.86} t$ = a constant

$H_f = 4\,f\,l\,V^2 / (2gd)$

$HP = w\,H / (75\,\eta)$

$V = \theta c\,Q\,Y\,(So - S) / (X(1 + k_d\,\theta c))$