B.Tech Degree VIII Semester Examination May 2003

CE 804(A) ADVANCED DESIGN OF STRUCTURES
### (1999 Admissions)

Time: 3 Hours   Maximum Marks: 100

(Use of IS 456 and SP 16 permitted.
Assume suitable data wherever necessary)

I.   Design and sketch the reinforcement details of an interior panel of a flat slab with 6m square panel, if the column size be 500 x 500 mm. No column head or drop is provided. The dead load and live load may taken as 8000 N/m^2 and 6000 N/m^2 respectively. Use M$_{20}$ concrete and Fe-415 steel.   (25)

OR

II.   (a)   Design a reinforced concrete ribbed slab for a room 12 x 12 m. The live load is 2.5 KN/m^2 with rib spacings of 2m c/c. Use M$_{20}$ concrete and Fe 415 steel.   (15)

     (b)   What are the advantages of a deep beam ? What are the critical modes of failure of a deep beam ?   (10)

III.   Design a RCC chimney 45M high above ground level 3.8M external dia with fire brick lining 12 cm thick air gap of 8 cm. The Temperature above atmosphere goes up by 220°C. The coefficient of expansion in RCC may be taken as 11 x 10^{-6} per degree centigrade. Es = 2.1 x 10^6 kg/cm^2. The wind load upto 30M from GL may be taken as 0.8 KN/m^2 and above it as 1 KN/m^2. M 25 concrete and Fe 415 steel, safe Bearing capacity of soil is 200 KN/m^2.   (25)

OR

IV.   Design a silo to store 400 KN of clinkers. The angle of repose of clinkers is 30° and the storage is upto angle of repose. The unit weight of clinker is 1200 kg/m^3. Assume other datas as required stating them in the beginning of the answer.   (25)

V.   (a)   Briefly explain different types of shell roofs.   (5)

     (b)   Design a spherical roof cover of a circular tank of 5m diameter with rise 2m and it is 100 mm thick. Assume a load of 1 KN/m^2 including self weight. Use M$_{20}$ concrete and Fe 415 steel.   (20)

OR

VI.   (a)   A reinforced concrete shell having semicircular directrix is freely supported at the ends. Radius of the shell = 8m ; Length of shell = 38 m. Thickness of shell = 60 mm. Calculate membrane forces at x = 0, 9m and 18m and $\phi = 0$, 30°, 60° and 90° under its own weight.   (20)

     (b)   Compare the merits and demerits of reinforced concrete shell and dome.   (5)

VII.   (a)   Explain Whitney's method of analysis of folded plates.   (15)

     (b)   Describe the structural behaviour of folded plates.   (10)

OR

VIII.   Design a folded plate and sketch details of reinforcements with following data.
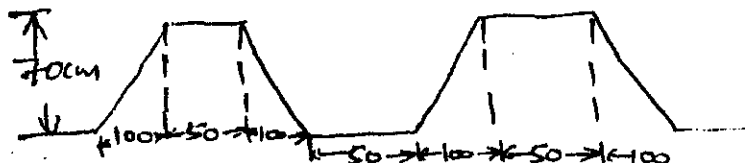
measurements are in cm
Thickness of folded plate is 10 cm. Load including self wt and superimposed load is 3.5 KN/m^2. Use M$_{20}$ concrete and Fe 415 grade steel.   (25)

***