B.Tech Degree VIII Semester (Supplementary)
Examination in Civil Engineering
May 2003

CE 804(A) ADVANCED DESIGN OF STRUCTURES
(1998 Admissions)

Time: 3 Hours   Maximum Marks: 100

(Uses of IS 456 and SP 16 are permitted.
Suitable data wherever required may be assumed.
Draw neat sketches wherever necessary)

I. (a) Explain the advantages and limitations of flat slabs.   (5)
    (b) Design a flat slab 6.0 x 6.5 m with drop for a superimposed load of 7.5 KN/m^2.
         Use M20 concrete and Fe 415 grade steel.   (20)

OR

II. (a) What contributes a deep beam ? Briefly enumerate the design procedure.   (9)
    (b) Design the side wall of a filter tank as deep beam with following data :-
         Depth of beam   =   1.8 m
         Width of beam   =   0.4 m
         Span (eff)   =   4.0 m
         Superimposed load (self wt excluded) is 150 KN/m. Use M 20 concrete and Fe 415
         grade steel.   (16)

III.   Design RCC chimney 50m height, 4m external dia, lined with fire-bricks 10 cm
         thick with air gap of 8 cm. The temperature above atmosphere is expected to be
         200° C. Coefficient of expansion is 11 x 10^{-6} per degree C. ES = 2.0 x 10^6 Kg/cm^2.
         Use M25 mix. Assume wind load as 1 KN/m^2 through out its height, the SBC of soil
         is 250 KN/m^2.   (25)

OR

IV.   Design a silo for storing grains with surcharge upto angle of repose of 30° upto a
         capacity of 20 Tons of grains. The unit weight of grains is 800 Kg/m^3. Use M25
         concrete and Fe 415 grade steel.   (25)

V.   A cylindrical shell roof having semicircular shape has a dia of 14m and a span length of
         28M. The thickness of shell is 8 cm. The superimposed load and self load put together
         is 3.5 KN/m^2. Calculate the membrane forces at
                  X = 0M; X = 7M and X = 14M
                  ϕ = 0° ; 20° , 40° and 60°.   (25)

OR

VI. (a) Draw neat sketches of various types of shells and explain the general structural
         behaviour of shells.   (15)
    (b) Explain dthe design procedure of cylindrical shell roof using beam method. (10)

VII. (a) Explain Whitney's method of analysis of folded plates.   (10)
     (b) Draw neat sketches of various types of folded plate roofs and mention their suitabi-
         lities/uses.   (15)

OR

VIII.   Analyse a symmetrical 'V' shaped folded plate roof as given below and design it using
         M20 concrete and Fe 415 grade steel. Superimposed load is 1.2 KN/m^2. (25)

***