bottom sections are 40 and 60 m, respectively. Tower is also subjected to 1.6 kN/m^2. Analyse for membrane forces developed in shell due to self weight and wind loads. **15**

Section D

7. A lathe machine weight 250 kN, with base area 2×5.0 m, speed 1000 rpm, mass inertia 8000 kgm^4, and vertical excitation force 75 kN. The soil has safe bearing capacity 175 kN/m^2, coefficient of elastic uniform compression is 60 MN/m^3. Design the foundation using M 20 grade concrete and Fe 415 grade of steel if allowable amplitude is limited to 0.20 mm.

15

8. A power hammer has the following features Weight of hammer = 25 kN, weight of anvil = 50 kN, weight of frame 40 kN, anvil base area = 1.25 × 2.5 m, drop height of tup = 1.5 m

BB-564

M. Tech. EXAMINATION, Dec. 2018

(Second Semester)

(B. Scheme) (Re-appear Only)

CE(SE)

CES510

ADVANCED CONCRETE STRUCTURES

Time : 3 *Hours*]　　　　[*Maximum Marks :* 75

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Five* questions only which carry equal marks. However, a student should attempt at least one question from every Section. Use of Indian standards is allowed. Any data if missing can be suitably assumed. Use of scientific calculator is allowed.

Section A

1. A water tank with 2500 kl capacity has size 20 m × 25 m × 5.5 m. The tank is just above the ground level. Using IS : 3370 2009 design the vertical wall of tank. M 30 grade of concrete and Fe 250 grade of steel are to be used. **15**

2. An intz type of water tank has been constructed with the following data :
Height of water tank 4.5 m, free board = 0.60 m, Radius of top dome = 4.55 m, radius of bottom dome = 3.4 m, Rise of top dome = 1.25 m, Rise of bottom dome = 1.425 m. Use M 30 grade of concrete and Fe 415 grade of steel to design the cylindrical walls of water tank by limit state method as per IS : 3370 2009. **15**

Section B

3. Design a circular bunker to store 30 tonnes of coal. Coal weighs 10 kN/m^3 with angle of repose 30°. Use limit state method to design with M 25 grade of concrete and Fe 500 grade of steel. **15**

4. Compare horizontal pressures developed at 5 m intervals in a cement silo of internal diameter 12 m and height 30 m using Janssen's and Airy's theories. Given density of cement = 16 kN/m^3, coefficient of friction between concrete and cement = 0.55 coefficient of friction (filling) = 0.31 angle of repose of cement = 18°. **15**

Section C

5. Decide the section at base of a 30 m high chimney and 3 m diameter throughout. The chimney is located in Delhi. The chimney is to be built with M 25 grade of concrete and Fe 415 grade of steel. **15**

6. A hyperbolic cooling tower of overall height 120 m has a throat radius of 35 metre. The throat section is located at 35 m from the top of the shell. The diameters of the top and

coefficient of restitution = 0.6. The soil has safe bearing capacity 150 kN/m^2, coefficient of elastic uniform compression is 50 MN/m^3. Design the foundation using M 25 grade concrete and Fe 415 grade of steel with 300 m thick wooden cushion to the anvil, assume Young's modulus of timer as 1600 MN/m^3.

15