

7E7063

Roll No. _

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B. Tech. VII Sem. (Main / Back) Exam., Nov. - Dec. - 2018
Civil Engineering

7CE3A Design of Concrete Structures - II

Time: 3 Hours

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Maximum Marks: 80
Min. Passing Marks: 26

Instructions to Candidates:

Attempt any five questions, selecting one question from each unit. All questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.

Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination.
(Mentioned in form No. 205)

1. IS : 456 (2000)

3. IRC : 21 (2000)

2. IS : 6 (2000)

4. IS : 3370 (Part - I & IV)

UNIT-I

Q.1 (a) Write the methods of Prestressing and explain the Freyssinet system with neat sketch. [8]

(b) What do you understand by various losses in Prestressing? Explain in brief. [8]

OR

Q.1 A prestressed concrete beam (400 mm x 600 mm) in section has a simple supported span of 6m. The beam is subjected to a u.d.l. of 16 kN/m (inclusive of self-weight). The effective pre-stressing force of 960kN is provided through prestressing straight tendons located at 200mm from soffit (lower third point). Determine the extreme fibre stresses in concrete at the mid span section. Give the neat sketch of the problem. [16]

UNIT- II

- Q.2 (a) Describe the terms "Primary torsion" and "Secondary torsion". [8]
- (b) Explain the concept of redistribution of moment. Also describe any two advantages of redistribution of moment in the design of statically indeterminate structures. [8]

OR

- Q.2 Design a continuous beam of a multistory building of three spans, each of 8 m center to center. The characteristic superimposed dead load including self-weight is 15 kN/m and characteristic live load is 13 kN/m. Design the critical section of rectangular beam by Limit State Method of design by assuming M-20 and Fe-415. Adopt width of beam 300 mm. Also design shear reinforcement using 8 mm diameter, two legged vertical stirrups. Also apply check for deflection. [16]

UNIT- III

- Q.3 (a) Differentiate between "membrane theory" and "beam theory" of analysis of shell structures. [8]
- (b) Develop the expression for meridional thrust in a circular dome for uniformly distributed load as per unit area of the surface. [8]

OR

- Q.3 Design a rectangular water tank resting on ground having base area of 4m × 6m. The height of water tank is 3.75m and keep a free board of 0.15m. Assume M-25 Grade of concrete and Fe-415 steel. Assume appropriate data and clearly state the assumptions. [16]

UNIT- IV

- Q.4 (a) What are the characteristics of Yield Line Theory? Also explain the concept of Yield Line Theory. [8]
- (b) What is structural difference between a cantilever and a counterfort retaining wall? [8]

OR

- Q.4 Calculate stability and design the vertical wall and heel slab only for a cantilever type retaining wall of height 4 m above ground level and overall height from the bottom of the footing is 5.0 m. Consider following data: [16]

- (a) Unit weight of soil = 15 kN/m^3
- (b) Angle of repose, $\phi = 30^\circ$
- (c) Bearing Capacity of soil = 150 kN/m^2
- (d) Coefficient of Friction between soil and base slab $\gamma = 0.50$
- (e) Concrete grade M – 20 and steel Fe – 415

Assume all other data and clearly state your assumptions.

UNIT- V

- Q.5 (a) What is criteria for economical span length in bridges? [8]
- (b) Explain the Box culvert bridge. Also explain the importance of hydraulic factors in bridge design. [8]

OR

Q.5 Design a R.C.C deck slab culvert for the following data – .

[16]

Clear span = 5.8 m

Kerb Width = 22.50 m

Carriage Way = 7.50 m

Width of piers = 560 mm

Wearing coat = 75 mm

Foot path = No

Concrete = M – 25

Steel = Fe – 415
