

[4]

Total No. of Questions : 4

OR

Find the design moment for deck slab of culvert for NH to suit the following data.

Clear span = 6 m, width of bearing = 0.4 m, wearing coat = 80 mm, kerb width = 600 mm, carriage width = 7.5 m, loading = IRC class AA tracked vehicle.

CE-702

B.E. VII Semester

Examination, June 2016

Advanced Structural Design - II (RCC)

Time : Three Hours

Maximum Marks : 70

- Note:** i) Answer five questions. In each question part A, B, C is compulsory and D part has internal choice.
ii) All parts of each question are to be attempted at one place.
iii) All questions carry equal marks, out of which part A and B (Max. 50 words) carry 2 marks, part C (Max. 100 words) carry 3 marks, part D (Max. 400 words) carry 7 marks.
iv) Except numericals, Derivation, Design and Drawing etc.

1. a) Define sway and non sway buildings.
b) Name different types of bracings.
c) Discuss various factors to be considered for determination of the general dimension of the rectangular shear walls.
d) A bar bell type shear wall with central part 3600×150 mm and two 420×420 mm strong bands at each end is supported on a footing $8\text{m} \times 4\text{m}$, which rests on soil whose modulus is $30,000 \text{ kN/m}^3$. Determine the lateral stiffness of the wall. Assume $f_{ck} = 20 \text{ MPa}$ and height of the wall as 15 m.

OR

(2)

A portal frame with ends hinged is to be analysed for the following data:

Spacing of portal frames = 4.2 m, Height of columns = 4.5 m, Distance between column centres = 10 m, LL on roof = 1.5 kN/m². Find design moments.

2. a) Discuss the component of counterfort type retaining wall.
- b) Discuss the behaviour of cantilever type retaining wall.
- c) Explain the method of fixing preliminary dimensions of retaining wall.
- d) Design the upright slab of a counterfort retaining wall to retain earth 7.8 m high above ground level. The back fill is horizontal and $\phi = 30^\circ$. The unit weight of back fill = 18 kN/m³, SBC = 200 kN/m².

OR

Design the counter for above retaining wall, use M20 concrete and Fe415 steel.

3. a) Differentiate between flexible and rigid base circular tanks.
- b) Explain the minimum reinforcement and their spacing for water tank.
- c) Discuss the approximate method of design of water tank.
- d) A rectangular RCC water tank with an open top is required to store 80 KL of water. The inside dimensions of the tank may be taken as 4m x 6m. Design the side walls of the tank.

(3)

OR

Design the top dome top ring beam of an intake type water tank. Dia. of cylindrical portion = 12 m, Height of cylindrical portion = 8.0 m, Height of top dome = 2.0 m. Use M20 concrete and Fe415 steel.

4. a) Define Bunker.
- b) Discuss the design of hopper bottom of a bunker.
- c) Draw the diagram showing the equilibrium of the material which is just like wedge for Airy's theory.
- d) A silo with internal diameter 6.0 m, height of cylindrical portion 15 m and central opening with 0.5 m is to be built to store wheat. Design the cylindrical wall and apply checks.

OR

Design the hopper bottom of above silo.

5. a) What is prestressed concrete?
- b) Explain prestressing concepts?
- c) Explain effective width.
- d) A prestressed concrete beam of section 200 x 300 mm is used over an effective span of 6m to support an imposed load of 4 kN/m. At central section of beam, find the magnitude of an eccentric prestressing force located 90 mm from the bottom of the beam, which would nullify the bottom fibre stress due to loading.