

7E7063

sRoll No. \_\_\_\_\_

Total No of Pages: **4****7E7063****B. Tech. VII Sem. (Main/Back) Exam., Nov.-Dec.-2016****Civil Engineering****7CE3A Design of Concrete Structures - II****Time: 3 Hours****Maximum Marks: 80****Min. Passing Marks Main: 26****Min. Passing Marks Back: 24****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

2. IRC: 6

**UNIT - I**

Q.1 Explain the following terms.(Any two)

[16]

- (a) Post and pre – tensioning system
- (b) Load balancing concept
- (c) Losses in pre stressing

**OR**

Q.1 A post tensioned pre stress concrete beam of 30m span is subjected to a transfer pre stress force of 2500kN strength. The profile of the cable is parabolic with maximum eccentricity of 200mm at mid span. Determine pre stress and jacking force required if jacking is done from both ends of beam. The beam has a cross section 500 × 800 mm and is pre stressed with 9 cables consisting of 12 wires of 5mm dia. Take  $E_s = 2.1 \times 10^5 \text{ N/mm}^2$  and  $E_c = 3.5 \times 10^4 \text{ N/mm}^2$ .

[16]

[7E7063]

Page 1 of 4

[9000]

**UNIT - II**

- Q.2 (a) A Semi circular beam with radius of 4m is simply supported at ends, and is continuous over a column at its middle . Determine shear force, bending moment and torsional moment at different points and plot their diagrams, if beam carries a uniformly distributed load of 20kN/m length of the beam, inclusive of its own weight. [16]

**OR**

- Q.2 (a) Design a rectangular beam with section 300mm × 500mm. Beam is subjected to moment  $M_u = 60\text{kNm}$ , shear force  $V_u = 50\text{kN}$  and torsional moment  $T_u = 40\text{kNm}$ . Consider concrete grade of M20, steel grade Fe 415 and nominal cover of 35 mm at bottom. [12]
- (b) Write a note on redistribution of bending moments in beams, taking an example of fixed end beam with uniformly distributed load. [4]

**UNIT - III**

- Q.3 (a) Derive the formula for Meridional thrust and hoop stress for spherical dome, for uniformly distributed load and concentrated load at the crown. [10]
- (b) How does the L/B ratio affect the design criteria of a rectangular tank? [6]

**OR**

- Q.3 Design top dome, top ring beam and cylindrical wall for a Intze tank with the capacity of 9,00,000 liters. Assume diameter of cylindrical portion  $D = 14\text{m}$ , height of conical dome  $h_0 = 2\text{m}$ , diameter of ring beam  $B_2$ ,  $D_0 = 10$ . Bearing capacity of soil is  $150\text{kN/m}^2$ . Also assume the intensity of wind pressure as  $1500\text{N/m}^2$ . Use M20 concrete and HYSD bars. [16]

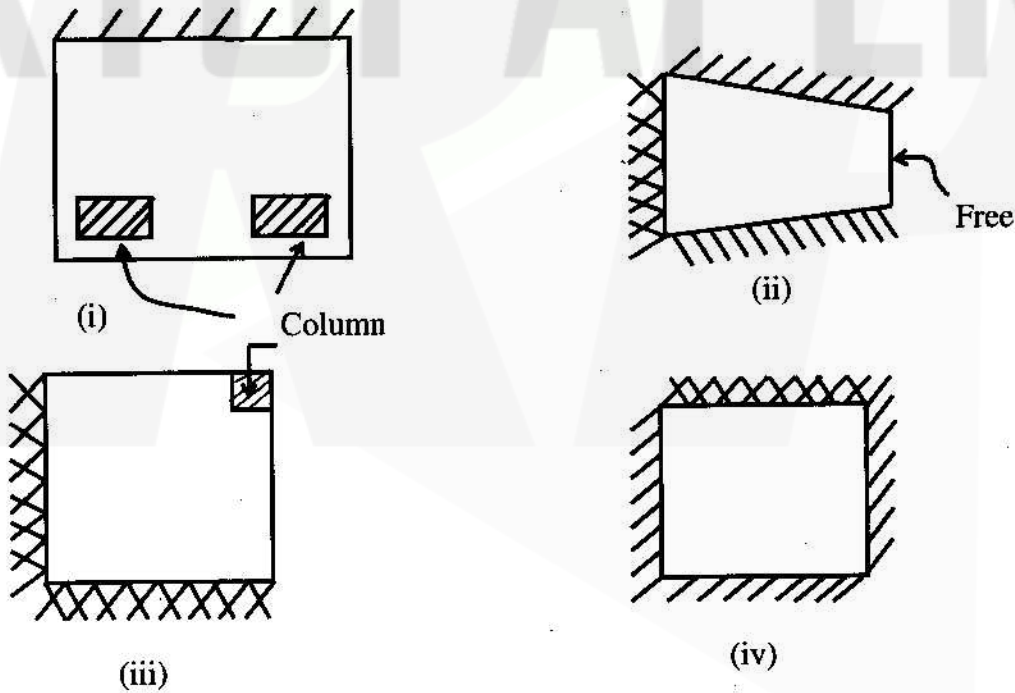
**UNIT - IV**

Q.4. Design the vertical stem of a cantilever retaining wall for a height of 4m out of which 3m is above ground level. The top of earth retained is surcharged at an angle of  $10^\circ$  with the horizontal. The angle of repose of earth is  $29^\circ$  and its density is  $17\text{kN/m}^3$ . The safe bearing pressure is  $100\text{kN/m}^2$ . Top thickness of wall is 150mm. Thickness of base slab is 400 mm. Draw sketches of reinforcement details. Use M20 and Fe415. [16]

**OR**

Q.4 (a) Draw yield line diagrams:

[10]



(b) What is the structural difference between a cantilever and a counterfort retaining wall. [6]

**UNIT - V**

Q.5 Design a slab culvert of span 6m (clear) for class A wheel loading across a national highway for two lane carriage way width. Assume necessary data and consider concrete grade M.25 and steel Fe 415. [16]

**OR**

Q.5 Design a slab for culvert for a clear span of 6m having a clear road way of 7.5m for a single vehicle of IRC class AA track vehicle loading only. Wearing coat 80mm, Footpath on either side 1m. Width of bearing is 0.4m. Use M25 and Fe 415. [16]