

TCE-601

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Even Semester Examination 2017-18

B.Tech. (SEMESTER-VI)

DESIGN OF REINFORCED CONCRETE STRUCTURE

Time: 03:00 Hours

Max Marks : 100

Note: Attempt all questions. Each question carries equal marks.

1. Attempt any four questions:

- (a) Draw a pressure distribution diagram for a rigid base water tanks.
- (b) What is general consideration for circular water tanks as per IS: 3370.
- (c) How many types of stresses induced in spherical dome of water tank? Explain with sketch.
- (d) Explain method of pre-stressing with sketch.
- (e) What are the design loads that are expected to come on a building?

2. Attempt following question:

- (a) Design a circular water tank of capacity liters of total height 4.2m which is resting on ground. The joint between wall and tank base is flexible. Use M20 concrete and Fe415 steel.

3. Attempt any two questions:

- (a) A pre-stressed rectangular beam of size 100mm wide and 250 mm deep is pre-tensioned with 6 bars of 7mm at an eccentricity of 95mm. Estimate the total loss of pre-stressing force if an initial pre-stress in wire is 1200 N/mm^2 . Given $E_s=2 \times 10^5 \text{ N/mm}^2$, $E_c=35000 \text{ N/mm}^2$ and $\phi=1.6$

(b) A pre-tensioned concrete beam of size 100mm x 250mm is pre-stressed with a force of 120 kN at an eccentricity of 50mm. Estimate the loss of pre-stress. Take $E_s=210\text{KN/mm}^2$ and $E_c=35\text{KN/mm}^2$.

(c) Determine the loss of pre-stressing force due to shrinkage of concrete in a beam of size 150mm x 300mm with 6 wires of 7mm size, if

(i) It is a pre-tensioned member

(ii) It is post-tensioned member and age of concrete at transfer is 12 days.

4. Attempt any two questions:

(a) Differentiate between

(i) Pre-tensioning and post-tensioning.

(ii) P.C.C. and R.C.C.

(b) A beam 300 mm x 450 mm section is prestressed at a constant eccentricity of 90 mm. If the net losses in the prestress is 20% and final force of prestress is 700 kN, Find the initial and final stresses due to prestress alone.

(c) A post-tensioned pre-stressed concrete beam of rectangular section 250mm wide and is to be designed for an imposed load of 12kN/m over simply supported span of 12m. A stress in concrete must not exceed 17N/mm^2 in compression and 1.4N/mm^2 in tension at any time. Loss of pre-stress is 15%. Calculate

(i) Minimum depth required

(ii) Initial pre-stressing force

(iii) Eccentricity required

5. Attempt any one question:

(a) Design a continuous rectangular beam of span 7m to carry a dead load of 12kN/m and a live load of 16kN/m. The beam is continuous over 3 spans and is supported by a column. Use M-20 concrete and Fe-415 steel.

- (b) A continuous beam of span 6m is cast monolithically with slab of 150mm thickness. The width of beam is 250mm and effective depth is 500mm. The spacing of continuous beam is 3.6m. After the analysis it is found that the beam is subjected to working moment of 120 KN-m at mid span and 200 KN-m at support. After making 25% re-distribution design a continuous beam. Use M-20 concrete and Fe-415 steel.

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