

Seat No.	
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B.E. (Civil) (Semester-VIII)
Examination, April - 2017
DESIGN OF CONCRETE STRUCTURES-II
Sub. Code : 67748

Day and Date : Tuesday, 25-04-2017

Total Marks : 100

Time : 2.00 p.m. to 5.00 p.m.

- Instructions :**
- 1) Attempt any three questions from each section.
 - 2) Figures to right indicates full marks.
 - 3) Assume suitable data wherever necessary and mention it clearly.
 - 4) Use of non programmable calculator is allowed.
 - 5) Use of relevant IS Codes are allowed.

SECTION-I

- Q1) Design the beam for following data, [16]**
- a) Bending Moment = 42 KN.m
 - b) Shear force = 30 KN
 - c) Twisting moment = 12 KN.m
 - d) Assume width of beam 300mm, Design the beam for torsion effect.
 - e) Use M20 and Fe 415 Grades of materials.
- Q2) A three span continuous beam ABCD is simply supported at A and D and continuous over support C and B. The beam carries a load of 230mm thick 3m high brick wall and superimposed load of 15KN/m. Design the beam using IS code coefficient. Span AB=BC=CD=6m. Unit weight of brick wall 20KN/m³. Use M20 and Fe 415. Sketch the reinforcement details. [16]**
- Q3) Design a open circular RCC water tank resting on ground. The capacity of tank is 550000 lit. of water. The joint between wall and base of tank is rigid. Depth of water tank is 4.5m. Use M20 and Fe 415. Adopt IS code method of design. Show the reinforcement details. [18]**
- Q4) a) Assuming suitable data, derive an expression for moment of resistance of singly reinforced balanced section as per working stress method. [8]**
- b) Explain the design procedure of circular water tank resting on ground with rigid base by I.S. code method. [8]**

P.T.O.

SECTION-II

- Q5) Discuss the terms,
- a) i) Tendon
 - ii) Strands
 - iii) Pre-tensioning
 - iv) Post-tensioning
- b) Explain different stages of loading in pre-stress concrete design.
- Q6) A pre-tensioned beam has a pre-stressing force of 1500KN in the tendon immediately after pre-stressing which eventually reduces to 1250KN. The beam carries two live loads of 40KN each in addition to its own weight. The two point loads of 40KN at distance of 5m from both ends and total span of beam 15m. Compute the extreme fiber stresses at mid span.
- a) Under initial condition,
 - b) At final condition.
- Q7) A post tensioned beam 150mm×300mm is having parabolic cable consisting of 12 wires of 5mm diameter. The cable having eccentricity of 50mm at mid span and eccentricity zero at ends. The initial stress is 1000N/mm². Find the total percentage of loss of pre-stress. The span is 10m. take $\mu=0.35$, $k=0.0015$, relaxation of steel=3%, $E_c=3.5 \times 10^4$, $E_s=2.1 \times 10^5$, creep coefficient=2.5, shrinkage strain= 2×10^{-4} .
- Q8) A post tensioned pre-stressed beam of rectangular section 250mm wide is to be designed for an imposed load of 15KN/m uniformly distributed on span of 15m. Stress in the concrete must not exceed 17N/mm² in compression and 1.4N/mm² in tension. The loss of Pre-stress may be assumed 15%. Calculate.
- a) The minimum possible depth of beam
 - b) For section producing minimum pre-stressing force and corresponding eccentricity.