

TCE-601 200 Printed Pages : 5

Paper Code & Roll No. to be filled in your Answer Book

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B.Tech. (VI - Sem.)

Even Semester Examination - 2016

DESIGN OF REINFORCED CONCRETE STRUCTURE

[Time : 3 Hours]

[Maximum Marks : 100]

Note: Attempt All Questions. Use of IS-456 (2000) code and IS-3370 is permitted. Assume any missing data suitably.

Q 1. Attempt any four of the following : (5x4=20)

- (a) What do you understand by redistribution of moment? Explain briefly with neat sketch.
- (b) What is prestressed concrete? Write down its advantages.
- (c) Explain different types of joints in water tanks with neat sketch.
- (d) Write down the all essential condition for redistribution of moments.
- (e) Write down the difference between Pre-tensioning and post-tensioning ?

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(1)

[P.T.O.]

(f) What do you mean by pressure line? Explain with example.

Q2. Attempt any four of the following: (5x4=20)

(a) Draw the resultant stress diagram at the centre of the span of a prestressed concrete beam with a straight tendon having dimension 100mm wide and 300mm deep with a span of 8m.

(b) A rectangular beam 250 mm wide and 600mm deep, is prestressed by means of four 14mm dia bars located 200 mm from the bottom of beam. If the effective stress in the wire is 700N/mm^2 , what is the maximum bending moment that can be applied to the section without causing any tension at the bottom of beam.

(c) Why High strength concrete and high strength steel are used in prestress concrete ?

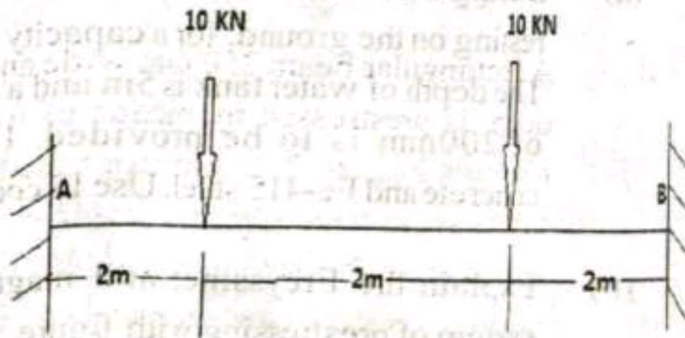
(d) What are the different parts of a T-beam bridge explain with neat sketch.

(e) How the seismic load and wind load is calculated for design of building ?

(f) What is the use of Pigeaud's and Courbon's method in design of a T- beam bridge ?

Q3. Attempt any two of the following : (10x2=20)

- (a) Draw actual Bending moment diagram, after maximum redistribution and bending moment envelope for the following system of load on a fixed beam and also show the position of point of contraflexure.



- (b) A prestressed concrete beam 300mm x 300mm is prestressed by 60 wires of 2mm diameter. The wires are uniformly distributed over the section. The wires are initially subjected to a pull of 250 kN. Find the final stress in concrete after all losses. Take $E_s = 2 \times 10^5 \text{ N/mm}^2$, $E_c = 3 \times 10^4 \text{ N/mm}^2$, Relaxation loss percentage = 5%, residual shrinkage strain = 1.9×10^{-4} creep strain = 28×10^{-6} .

- (c) Design a rectangular beam, continuous over four column support of effective span of 8m. The beam is subjected to an imposed load of 10 KN/m and live load of 18KN/m. Use M-20 concrete and Fe-415 steel.

Q 4. Attempt any two of the following : (10x2=20)

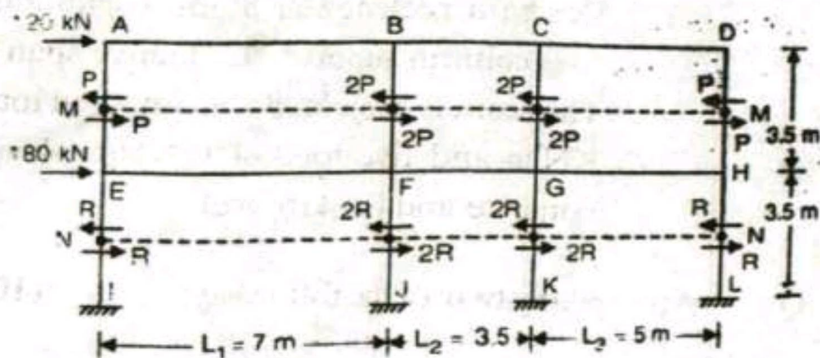
- (a) Design a circular water tank with fixed base, resting on the ground, for a capacity of 500 Kl. The depth of water tank is 5m and a free board of 200mm is to be provided. Use M-30 concrete and Fe-415 steel. Use IS code method.

- (b) Explain the Freyssinet and magnel blaton system of prestressing with figure.

- (c) A rectangular beam 250mm x 300mm is prestressed by a force of 540KN at a constant eccentricity of 60 mm. The beam supports a concentrated load of 68 KN at a centre of span of 3m. Determine the location of pressure line at the centre, quarter span and support sections of the beam. Neglect the self weight of beam.

Q 5. Attempt any two of the following : (10x2=20)

- (a) Analyse the building frame shown in the following fig. by portal meth



- (b) Analyse the same above problem with cantilever method assuming that all the columns have same area of cross-section.
- (c) Write short note on the following –
- Shrinkage loss in Prestress concrete
 - Creep loss in prestress concrete.
 - Substitution method.
 - Load balancing concept in prestress.