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Paper Id: 231757 **Roll No.** | | | | | | | | | | |

B.TECH.
(SEM V) THEORY EXAMINATION 2022-23
ADVANCED CONCRETE DESIGN

Time: 3 Hours ***Total Marks: 100***

Note: Attempt all Sections. If require any missing data; then choose suitably.
All relevant codes are allowed.

SECTION A

1. Attempt *all* questions in brief. 2 x 10 = 20

(a) Mention the important factors that must be considered while designing a RCC tank.
(b) Define conical dome.
(c) Define Sliding Joint with figure for Tanks.
(d) What Loads acted on Bottom Conical dome in Intze Tank?
(e) IS 3370:2009 (Part 2) where it is used?
(f) Define Circular Prestressing.
(g) What do you understand by Load Balancing Concept?
(h) Why high strength concrete is needed for prestressing?
(i) List the various types of tensioning devices used in prestressed concrete.
(j) Write the advantages of prestressed concrete

SECTION B

2. Attempt any *three* of the following: 10 x 3 = 30

(a) Design a Circular Tank with a flexible base for a tank of 1,00, 0000 litre Capacity . The depth of water in tank is 6mtr. Use M25 concrete and Fe415 steel. Take unit weight of water as 10 kN/m^2 . Draw the sketch also.
(b) A spherical cover dome is to be provided for a circular water tank with inner diameter of 6m. choose the rise for the dome as I m. Live load as the dome is $1kN/m^2$. Design the cover dome and its supporting ring girder.
(c) Compare the loss of prestress due to elastic shortening in pretensioned and post tensioned members.
(d) Write Short Notes on the following (i) Freyssinet System of Prestressing (ii) losses in Prestress
(e) A pretensioned beam 200 mm wide and 350 mm deep is prestressed with 12 wires of 7 at mm diameter, initially stressed to 1200 N/mm2. The centroid of the prestressing wires is located 100 mm above the soffit.Assuming the loss due to relaxation as 5%, calculate the total loss or prestress as per IS 1343-1 980.E_s = 210 KN/mm^2 ,E_c = 35 KN/mm^2 , Relaxation of steel stress = 5% of the initial stress . Shrinkage of concrete = 300 x 10^{-6} , Creep coefficient = 1.6

SECTION C

3. Attempt any *one* part of the following: 10 x 1 = 10

(a) Define the following for Elevated Water Tank (i) Top Dome (ii) Top RingBeam (iii) Cylindrical Wall
(b) Design a rectangular water tank of size 2mx5mx3m resting on the ground. Use M25 concrete and HYSD bars use Approximate Method.

4. Attempt any *one* part of the following: 10 x 1 = 10

(a) Mention the important factors that must be considered while designing a RCC tank.
(b) What are conditions under which the walls of underground water tanks designed?

5. Attempt any *one* part of the following: 10 x 1 = 10

(a) How the prestressing to transform concrete into an elastic material and Prestressing for combination of high strength steel and concrete? Explain
(b) Determine the percentage of total loss of prestress in a simply supported pretensioned beam of size 150 mmx300mm , having 8 wires of 6mm diametersubjected to an initial prestress of 1000 N/mm^2 at an eccentricity of 50 mm , Takethe following data for calculation of losses. Creep Coefficient =1.6, Loss due to Relaxation = 5% Use M40 concrete.

6. Attempt any *one* part of the following: 10 x 1 = 10

(a) Explain the stress distribution Diagram in a Prestressed beam at intial and finalstage i.e. before and after the Prestress.
(b) A rectangular concrete 250mm wide and 600mm deep. Is prestressed by means of four 14mm diameter high tensile bars located 200mm from the soffit of the beam. If the effective stress in the wires is 700N/mm2 . , what is the maximum bending moment that can be applied to the section without causing tension at the soffit of the beam?

7. Attempt any *one* part of the following: 10 x 1 = 10

(a) Explain different methods of post tensioning systems.
(b) A Prestressed concrete of span 20 mtr is provided with a parabolic tendon whose central dip is 0.25 mtr . The cable has no eccentricity at the ends. If the stress in the tendons at the ends is 1025 N/mm 2 , Find the loss of stress from ends to the centre . Take μ= 0.35, and k=.0015 /m