Seat No.

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OCT-NOV 2025 WINTER EXAMINATION

1154 B.Tech. CBCS

Sub. Name: Design of Concrete Structures-II

Sub. Code: 67748/84745/84930

Day and Date: Monday ,08-12-2025 **Total Marks: 70**

Time: 10:30 AM To 01:00 PM

Instructions:
1. **All questions are compulsory**
2. **Assume suitable data wherever necessary and mention it boldly**
3. **Draw neat labelled diagrams wherever necessary**
4. **Figures to the right indicate full marks**
5. **Use of Scientific calculator is allowed**

Special Inst.: **Use of IS 456:2000, IS 3370, IS 1343:2012 is allowed.**

Q1) Determine the reinforcement required for rectangular beam section with following data, **[12]**
Width of section - 300mm
Depth of section – 500mm
Factored BM – 65kN-m
Factored Torsional Moment -40kN-m
Factored SF -70kN-m
Use M15 concrete and Fe415 grade steel.

Q2) A continuous RCC beam with simple support has two spans each of 6m, the beam supports dead load from brick wall equal to 10kN/m and live load 15kN/m. Design the critical section using Limit State Method and Sketch reinforcement details. Adopt M20 grade concrete and Fe415 grade steel. **[12]**

Q3) Design a Circular water tank to hold 5,50,000 liters of water. Depth of water is 4.5m. The joint between floor and wall of tank is not monolithic. Use M20 grade concrete and Fe250 grade steel. **[11]**

OR

Design a circular water tank with rigid base 5,00,000 liter capacity. The height of tank is 4m. The wall of tanks are free at top. Use M20 concrete and Fe415 grade steel.

Q4) A)Why high strength concrete and high strength steel is used prestressed concrete. **[12]**
B)Explain the basic principal of prestressing.

OR

A prestressed concrete I beam supports a live load of 4000N/m over a simply supported span of 8m. The beam has an overall depth of 400mm.The thickness of each flange and web are 60mm and 80mm respectively. The width of each flange = 200mm. The beam is to be prestressed by an effective prestressing force of 235kN. Applied at a suitable eccentricity such that resultant stress at the bottom of the

beam at the centre of the span is zero.

i. Find the eccentricity required for the prestressing force.
ii. If the tendon is concentric, what should be the magnitude of prestressing force for the resultant stress to be zero at the bottom fibre of the central section.

Q5) A prestressed concrete pile is 300mm x 300mm in section and is provided with 40 wires of 3mm diameter distributed uniformly over the section. Initially the wires are tensioned in the prestressing beds with a total pull of 450kN. Determine the final stress in concrete and the percentage loss of stress in the wires. **[12]**

Take Es =2.08 x 105N/mm2, Ec = 3.20 x 104N/mm2
Creep shortening = 32 x 10-6mm/mm per N/mm2 of stress
Total Shrinkage strain = 200 x 10-6
Relaxation loss of stress in steel = 4.50% of the initial stress.

Q6) Design a prestressed concrete beam to the following requirement, **[11]**

i. Span – 15m
ii. Superimposed load -34kN/m
iii. Cube strength of concrete at 28 days – 35N/mm2
iv. Safe stress in concrete at transfer of prestress – fr = 0.5fck
v. Safe stress in concrete due to final prestress –fc =0.4fck
vi. Total loss of prestress – 20%
vii. Allowable tensile stress in concrete – 0.219√fck
viii. Ultimate stress in steel – 1500N/mm2
ix. Safe stress in steel -60%of ultimate stress

End Of Question Paper

Important Note for Chief Exam Officer / SRPD Coordinator / Sr Supervisor/ Student -
This Question Paper may be distributed for following Subjects as common code.
सदरची प्रश्नपत्रिका खालील विषयांकरिता वितरित करता येईल.

1] (101) Bachelor of Engineering (67748) Design of Concrete Structure II Part 4 SEM 8
2] (1154) B.Tech. CBCS (84745) Design of Concrete Structures-II Part 4 SEM 8
3] (101) Bachelor of Engineering (84930) Design of Concrete Structures-II Part 4 SEM 8