Seat No.

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MAR_APR 2026 SUMMER EXAMINATION

1154 B.Tech. CBCS

Sub. Name: Design of Concrete Structures-I

Sub. Code: 67558/83732/84012

Day and Date: Thursday ,14-05-2026 **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. **Figures to the right indicate full marks**
4. **Use of Scientific calculator is allowed**

Special Inst.: Use of IS 456:2000 is allowed.

Q1) Write short note **[12]**

a. Find Xmax, Pt,lim, and Mu,lim for Fe250 and M20 grade concrete **[6]**

b. Define the following **[6]**
i) Limit State of Collapse
ii) Limit State of Serviceability.
iii) Factored Load

Q2) Design a balanced reinforced concrete beam section for an applied moment of 48kN-m. **[12]**
The width of beam is limited to 150mm. Use M20 Concrete and Mild Steel Grade-I
OR
Find reinforcement required for a doubly reinforced beam section to the following data,
Width of beam -250mm
Depth of beam to the centre of compression steel -500mm
Effective cover to the centre of compression steel -50mm
Factored BM -180kN-m
Use M15 concrete & Fe250 steel.

Q3) A RC beam 230mm wide 450mm deep is reinforced with 3-16mmΦ of grade Fe415 on tension side with an effective cover of 50mm. Design the vertical shear reinforcement when full tension steel is available for ultimate SF of 80kN. **[11]**

Q4) Design a RC slab for a room measuring 5m x 6m size. The slab is simply supported on all four edges, with corners held down and carries a superimposed load of 3000N/m2, inclusive of floor finishes etc. Use M20 mix, Fe415 steel and IS Code method. **[12]**
OR
The overall dimensions of dog-legged stair are 4750mm × 2400mm with landing of

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1125mm . The landing slab spans in the same direction as the stair and are supported by the walls at the ends. Design the stair slab. Provide M20 grade of concrete and HYSD-Steel bars of grade Fe415. The stair is used inside a residential building.

Q5) A short RCC column 400mm × 400mm is provided with 8-16mmΦ. If the effective length of column is 2.25m. Find ultimate load for the column. Use M15 concrete Fe250 Steel. **[12]**

Q6) Design an isolated rectangular sloped footing for the column of size 230mm×650mm, reinforced with 6-20mmΦ and carrying an axial load of 1200kN. The bearing capacity of the soil is 300kN/m2. Use concrete grade M20 and steel grade Fe415. Effective cover for bottom steel is 60mm. take offset from the face of the column equal to 50mm. **[11]**

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 (84012) Design of Concrete Structures-I Part 4 SEM 7
2] (1154) B.Tech. CBCS (83732) Design of Concrete Structures-I Part 4 SEM 7
3] (101) Bachelor of Engineering (67558) Design of Concrete Structures-I Part 4 SEM 7

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