

Total No. of Printed Pages:2

**SUBJECT CODE NO:- H-1003**  
**FACULTY OF SCIENCE AND TECHNOLOGY**  
**T.Y. B.Tech. (Civil) (Sem-VI)**  
**Design of Structure-II**  
**[Old]**

[Time: Three Hours]

[Max.Marks:80]

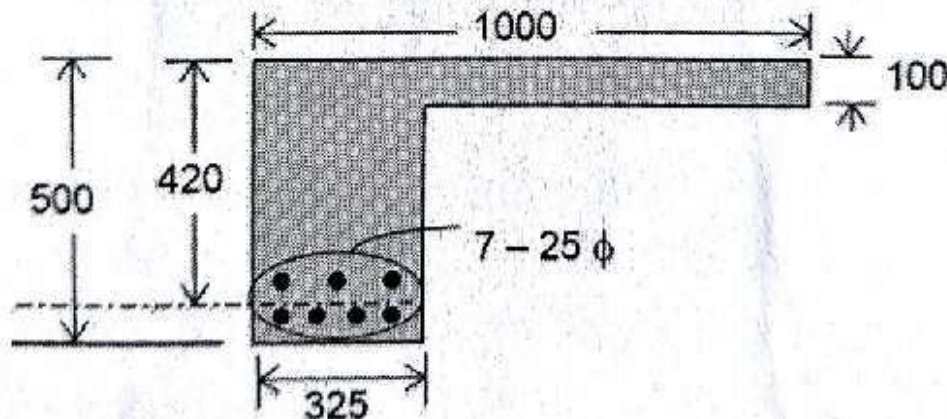
Please check whether you have got the right question paper.

**N.B**

- i) Use of IS 456:2002 is allowed.
- ii) Question No.1 and 6 are compulsory.
- iii) Attempt any two questions from each section from remaining.

**Section A**

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|-----|--|--------------|
| Q.1 | Explain the following terms,<br>a) Doubly Reinforced beam<br>b) Shear Reinforcement<br>c) Modes of failure<br>d) Durability of concrete<br>e) Load combinations in RCC design  | 10           |
| Q.2 | a) Write a note on short term deflection.<br><br>b) An R.C.C beam is required to resist a bending moment of 120KNm. Design a beam for flexure. Use of M20 grade of concrete & Fe415 steel.   | 05<br><br>10 |
| Q.3 | a) Write a note on crack width calculation.<br><br>b) Determine the ultimate moment of resistance of the doubly reinforced beam section, $b = 300\text{mm}$ , $D = 600\text{mm}$ , $A_{st} = 3054\text{sqmm}$ , $c_c = 25\text{mm}$ $f_y = 415\text{MPa}$ and $f_{ck} = 20\text{ MPa}$ . | 05<br><br>10 |
| Q.4 | Assuming M25 concrete and Fe415 steel, compute the ultimate moment of resistance of the L-beam section shown in the following figure Fig.1(all dimensions are in mm)   | 15           |



- Q.5 a) Write down the recommendations of code for shear reinforcement. 05
- b) Design shear reinforcement for a cantilever beam fixed at one end having a point load of 15kN at the unsupported end and a UDL of 20kN/m. The grade of concrete is M25 & grade of steel is Fe500 & the percentage of main steel is 1.2%. 10

### Section B

- Q.6 Explain the following terms, 03
- a) Critical sections for shear in footing 03
- b) Torsional reinforcement in slabs 04
- c) Reinforcement in stair case (with diagram) 03
- Q.7 a) IS code specifications for compression members. 05
- b) Design a column of size 380×450mm and having 3.5m unsupported length. The column is subjected to a load of 2000KN and is effectively held in position but not restrained against rotation. 10
- Q.8 a) What are the types of staircase? Draw suitable diagram. 05
- b) Design the staircase slab. The stairs are simply supported on beams provided at the first riser and at the edge of the upper landing. Assume a finish load of 0.8kN/sqm and a live load of 5kN/sqm. Use M20 concrete and Fe415 steel. R=150mm, T=300mm, Effective span = 4.5m in which landing is 1.5m wide. Assume mild exposure conditions. 10
- Q.9 a) What are the different types of footing? 05
- b) Design an isolated footing for a square column, 450mm×450mm, reinforced with 8-25  $\phi$  bars, and carrying a service load of 2300 kN. Assume soil with a safe bearing capacity of 300 kN/sqm at a depth of 1.5 m below ground. Assume M 20 grade concrete and Fe 415 grade steel for the footing, and M 25 concrete and Fe 415 steel for the column. 10
- Q.10 a) What is the difference between one way slab and two way slab reinforcement. 05
- b) Design a simply supported slab to cover a room with internal dimension 4.0 m × 5.0m and 230 mm thick brick walls around. Assume a live load of 3kN/sqm and a finish load of 1 kN/sqm. Use M20 and Fe500. Assume mild exposure conditions. 10