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| Seat No. | |
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**B.E. (Civil Engineering) (Semester-VII) (New) (Revised)
Examination, May - 2017**

DESIGN OF CONCRETE STRUCTURES-I

Sub. Code : 67558

Day and Date : Monday, 15-05-2017

Total Marks : 100

Time : 2.00 p.m. to 5.00 p.m.

- Instructions :**
- 1) All Questions are Compulsory.
 - 2) Figures to the right indicate full marks.
 - 3) Assume any suitable data wherever necessary.
 - 4) Use of non-programmable calculator and relevant I.S. 456:2000 are allowed.

SECTION-I

- Q1) a)** Compare Working Stress Method and Limit State Method of RC design. [6]
- b)** Find $X_{u, \max}$, $P_{t, \lim}$, and $M_{u, \lim}$ for Fe 415 steel and M20 concrete. [6]
- c)** Explain the following [4]
- i) Characteristic Strength
 - ii) Partial Safety Factors
- Q2) a)** State the assumptions made in design of limit state of collapse in flexure. [4]
- b)** Determine the moment of resistance of the rectangular RC beam of size 250mm wide and 450mm deep to the centre of tensile reinforcement. It is reinforced with 2 bars of 16mm diameter as compression reinforcement at an effective over of 50mm and 4 bars of 25mm diameter as tensile steel. use M15 concrete and Fe 250 steel. [13]

OR

- a)** Explain the necessity of doubly reinforced sections. [4]
- b)** Find the moment of resistance of a T-beam section having following data. [13]
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|---|-----------------------------------|
| Width of flange: 800mm | Thickness of slab: 120mm |
| Width of rib: 200mm | Effective depth: 400mm |
| Tensile steel area: 3500mm ² | Use M15 concrete and Fe 250 steel |

P.T.O.

- Q3) a) Explain in brief the IS recommendations to control cracks. [4]
- b) A simply supported reinforced concrete beam is 250mm wide 500mm deep to the centre of tensile reinforcement and is reinforced with 4 bars of 20mm diameter as tensile steel. If the beam is subjected to a factored shear of 95kN at the support. Design the shear reinforcement consisting of stirrups. Use M15 concrete and Fe 415 steel. [13]
- Show reinforcement details.

SECTION-II

- Q4) Design a simply supported one way slab provided over a clear span of 3.30m. It carries a live load of 4kN/m² and floor finish of 1kN/m². Width of supporting wall is 230mm. Use M20 concrete and Fe 415 steel. Assume moderate environment. [17]

OR

Design a dog-legged staircase for a building in which the vertical distance between the floor is 3.6m. The stair hall measures 3.5m × 5m. The live load may be taken as 3000N/m². Use 15 concrete and Fe 415 steel. Show reinforcement details. [17]

- Q5) a) Write a note on $P_u - M_u$ interactions diagrams. [6]
- b) Design a short axially loaded column, 500mm × 500mm for a service load of 2000kN. Use M20 concrete and Fe 415 steel [10]
- Q6) Design a rectangular isolated footing of constant depth for RC column of size 400mm × 600mm bearing a vertical load of 800kN. The safe bearing capacity of soil may be taken as 120kN/m². Use M20 concrete and Fe 415 steel. [17]

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