

Seat No.	
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B.E. (Civil) (Semester - VII) (New)
Examination, April - 2016
DESIGN OF CONCRETE STRUCTURES - I
Sub. Code : 47901

Day and Date : Friday, 29-04-2016

Total Marks : 100

Time : 3.00 p.m. to 6.00p.m.

- Instructions :
- 1) Answer any three questions from each Section.
 - 2) Figures to the right indicate full marks.
 - 3) Use of non programmable calculator is permitted.
 - 4) Assume suitable data, if necessary and state this clearly.
 - 5) Use of IS 456-2000 is permitted.

SECTION - I

- Q1) a)** Showing neat diagrams, explain what is meant by under, over and balanced singly reinforced rectangular sections. **[6]**
- b) A RC singly reinforced beam of rectangular section 230 mm × 450 mm overall in mild exposure condition is reinforced with 4 bars of 16 mm diameter. Determine ultimate moment of resistance of the section if M20 mix grade concrete and Fe-415 steel is used. **[11]**
- Q2)** Find ultimate moment of resistance of L-beam with following data.
 $bf = 1200$ mm, $d = 600$ mm, $D_f = 125$ mm, $b_w = 300$ mm, $A_{st} = 4$ Nos. of 25 mm diameter, $f_{ck} = 20$ N/mm², $f_y = 415$ N/mm². **[16]**
- Q3) a)** Find ultimate moment of resistance of a doubly reinforced section for following data. **[12]**
Section 230 × 500 mm overall, $A_{st} = 3$ Nos, of 20 mm diameter, $A_{sc} = 3$ Nos. of 20 mm diameter, $f_{ck} = 20$ N/mm², $f_y = 250$ N/mm², Cover 35 mm both sides.
- b) Write a note on bond and development length. **[4]**

P.T.O.

- Q4)** Design a singly reinforced beam with shear reinforcement for following data.
Simply supported span = 5.75 m, Total working load on entire span = 48 kN/m, Width of beam = 230 mm, Use steel of grade Fe-415 and concrete grade M20.
Draw the reinforcement details with curtailment in shear reinforcement. [17]

SECTION - II

- Q5)** Design a simply supported one way RC slab in moderate exposure condition for following data. [16]
Width of support = 300mm,
Clear Span = 4.0 m,
Live load = 2.0 kN/m², Floor finish = 1.0 kN/m².
Use M20 mix grade concrete and Fe-415 steel.

- Q6)** Design a flight of dog legged RC staircase for following data. [17]
Floor to floor height = 3.0 m. Consider landing 1.2 m on both sides. Span of flight consists of both landings.
Use Live load = 3.0 kN/m², Use suitable rise and tread as per residential requirements. Use M20 mix grade concrete and Fe-415 steel.

- Q7)** a) Explain IS 456 clauses by showing plan and longitudinal section of RC column, towards longitudinal and transverse reinforcement. [6]
b) Design a short axially loaded RC column to carry ultimate axial load of 3000 kN. Use M20 mix grade concrete and Fe-415 steel. [10]

- Q8)** Design an isolated square RC footing with uniform thickness for following data. [17]
Column size = 300 × 450 mm.
Working axial load on column = 2000kN.
Safe Bearing capacity of soil = 250 kN/m²
Use M20 mix grade concrete and Fe - 415 steel.

