



ROLL NO:

**PRESIDENCY UNIVERSITY, BENGALURU**  
**SCHOOL OF ENGINEERING**

Weightage: 20 %

Max Marks: 40

Max Time: 1 hr.

Saturday, 22<sup>nd</sup> September, 2018

**TEST – 1**

Odd Semester 2018-19

Course: **CIV 211 Design of RC Elements.**

V Sem. Civil

**Instruction:**

- (i) Read the question properly and answer accordingly.
- (ii) Question paper consists of 3 parts.
- (iii) Scientific and Non-programmable calculators are permitted.
- (iv) IS 456 -2000 code book is permitted

**Part A**

(3 Q x 4 M = 12 Marks)

1. What is the necessity of doubly reinforced sections?
2. What is meant by limit state? Discuss the different 'limit states' to be considered in reinforced concrete design.
3. Explain the following
  - i) Partial safety factor for loads and materials
  - ii) Characteristics load
  - iii) Characteristic strength

**Part B**

(2 Q x 8 M = 16 Marks)

4. A rectangular reinforced concrete section having a breadth of 350mm is reinforced with 2 bars of 28mm and 2 bars of 25mm diameter at an effective depth of 700 mm. Adopting M-20 grade concrete and Fe-415 HYSD bars determine the ultimate moment of resistance of the section.
5. Determine the minimum effective depth required and the area of reinforcement for a rectangular beam having width of 300mm to resist an ultimate moment of 175 KN-m, using M-20 grade concrete and Fe-415 HYSD bars.

**Part C**

(1 Q x 12 M = 12 Marks)

6. Design the flexural reinforcement for the beam, located inside a building in a town, and it is simply supported on two 230mm thick masonry wall and having effective length of 6m. The beam has to carry, in addition to its own weight, a distributed live load of 10 KN/m and a dead load of 5 KN/m. The size of beam is limited to 250mm X 400mm, and that it has to carry, in addition to the loads already mentioned, a concentrated dead load of 30 KN placed at the mid-span point. Assume that the beam is subjected to moderate exposure conditions.

**Design stresses at specified strains for a) Fe 415 grade steel and b) Fe 500**

Fe 415	
Strain	Stress (Mpa)
0.00000	0.0
0.00144	288.7
0.00163	306.7
0.00192	324.8
0.00241	342.8
0.00276	351.8
≥ 0.0038	360.9

Fe 500	
Strain	Stress (Mpa)
0.00000	0.0
0.00174	347.8
0.00195	369.6
0.00226	391.3
0.00277	413.0
0.00312	423.9
≥ 0.00417	434.8



PRESIDENCY UNIVERSITY,  
BENGALURU

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TEST 2

Odd Semester: 2018-19

Course Code: CIV 211

Course Name: Design of RC Elements

Branch & Sem: CIV & V Sem

Date: 24 November 2018

Time: 1 Hour

Max Marks: 40

Weightage: 20%

**Instruction:**

- (i) Read the question properly and answer accordingly.
- (ii) Question paper consists of 3 parts.
- (iii) Scientific and Non-programmable calculators are permitted.
- (iv) IS 456 -2000 code book is permitted

**Part A**

Answer **all** the Questions. **Each** question carries **six** marks.

(2x6=12)

1. Explain the following types of shear failures in beam
  - a) Diagonal compression failure
  - b) Diagonal tension failure
  - c) Flexural shear crack
2. A reinforced concrete beam has a support section with a width of 300mm and effective depth of 600mm. The support section is reinforced with 3 bars of 20mm at an effective depth of 600mm. 8mm diameter 2 legged vertical stirrups of spacing 200mm is provided as shear reinforcement near supports using M-20 Grade concrete and Fe-415 HYSD bars, estimate the shear strength of the support section.

**Part B**

Answer **all** the Questions. **Each** question carries **eight** marks.

(2x8=16)

3. Design the shear reinforcements in a beam of rectangular section a having width of 300mm and effective depth of 600mm. The ultimate shear at the section is 100 kN. Use  $f_{ck} = 20 \text{ N/mm}^2$  and  $f_y = 415 \text{ N/mm}^2$ . The beam is reinforced with 4 bars of 25mm diameter in the tensile zone.
4. A circular R.C.C. girder has a rectangular section with a width of 500mm and overall depth of 1000mm. At a particular section, the factored values of bending and torsional moments are 150 and 30 kN .m respectively. The ultimate shear force at the section is 150 KN. Analyze the design moment and shear for which the beam has to be designed.

### Part C

Answer the Question. Question carries **twelve** marks.

(1x12=12)

5. A Tee-beam has the following dimensions

Width of the flange = 2000mm

Thickness of the flange = 150mm

Width of rib = 300mm

Effective depth = 1000mm

M-20 grade concrete and Fe-415 HYSD bars.

Calculate the limiting moment capacity of the section and corresponding area of tension reinforcement

Roll No. 

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**PRESIDENCY UNIVERSITY  
BENGALURU**

**SCHOOL OF ENGINEERING**

**END TERM FINAL EXAMINATION**

**Odd Semester:** 2018-19

**Course Code:** CIV 211

**Course Name:** Design of RC Elements

**Programme & Sem:** CIV & V Sem

**Date:** 27 December 2018

**Time:** 2 Hours

**Max Marks:** 80

**Weightage:** 40%

**Instructions:**

- (i) Read the question properly and answer accordingly.
- (ii) Question paper consists of 3 parts.
- (iii) Scientific and Non-programmable calculators are permitted.
- (iv) IS 456 -2000 & SP 16 code books are permitted

**Part A**

Answer **both** the Questions. **Each** question carries **five** marks.

(2Qx5M=10)

1. What is development length? Obtain an expression for development length in tension.
2. A cantilever beam having a width of 200mm and effective depth 300mm supports a uniformly distributed load and is reinforced with 4 bars of 16mm diameter. If the factored total load is 80 kN, Calculate
  - a) The anchorage length required
  - b) If the anchorage length provided is 800 mm, the average bond stress will be?Assume M20- grade steel and Fe 415 Hysd bars

**Part B**

Answer **both** the Questions. **Each** question carries **twenty** marks.

(2Qx20M=40)

3. Design a short circular column of diameter 400 mm to support a factored axial load of 900 kN, together with a factored moment of 100 kN-m. Adopt M20 grade concrete and Fe 415 grade steel. Sketch the details of reinforcement
4. Design a simply supported RCC slab for an office floor having clear dimensions of 4m by 10m with wall 230 mm wall around. Adopt M20 Grade concrete and Fe 415 grade Hysd bars. Take live load = 4 kN/m<sup>2</sup> and floor finish = 1.5 kN/m<sup>2</sup> and sketch the details of reinforcement

### Part C

Answer the Question. Question carries **thirty** marks.

(1Qx30M=30)

5. Design an isolated footing for a square column, 450 mm X 450 mm, reinforced with 8 bars of diameter 25 mm, carrying a service load of 2300 kN. Assume soil with a bearing capacity (gross) of  $300 \text{ kN/m}^2$  at a depth of 1.5 m below ground. Assume M20 grade concrete and Fe 415 grade steel for the footing, and M25 grade concrete and Fe 415 steel for the column. Sketch the details of reinforcement