SHANTILAL SHAH ENGINEERING COLLEGE, BHAVNAGAR
APPLIED MECHANICS DEPARTMENT

PDDC (Civil Engineering) Semester – 5th

Subject Code: 2950603	**Name of Subject: Design of Structures (RCC)**
Date: 30.07.2020	**Assignment No: 01**

INTRODUCTION

#	Questions
1	**Define:** i. Limit State ii. Design Strength iii. Characteristic Strength iv. Characteristic load v. Partial Safety factors vi. Design Load
2	Differentiate between working Stress & Limit State methods
3	Draw the stress Strain Curve of Concrete and explain all assumptions.
4	Explain limit State of Collapse & Limit State of Serviceability in details.
5	Calculate the followings: i. Design Strength of Fe-250 & Fe-415 ii. Tensile Strength of M20 iii. Modulus of Elasticity of M25
6	List down the criterion for the following along with the relevant Clause numbers in IS 456: 2000 Maximum diameter of reinforcement bars, Maximum spacing of the bars and Minimum Reinforcement.

Name of faculty	Prof D P Advani
Date of Submission	07/08/2020

SHANTILAL SHAH ENGINEERING COLLEGE, BHAVNAGAR
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PDDC (Civil Engineering) Semester – 5th

Subject Code: 2950603	**Name of Subject: Design of Structures (RCC)**
Date: 20/08/2020	**Assignment No: 02**

Analysis & Design of Singly & Doubly RC Beam

#	Questions
1	Sketch neatly the Design Stress and Strain Block Parameters and derive equation for Depth of Neutral Axis and Moment of Resistance for a balanced beam section.
2	Differentiate between: Under reinforced, Balanced and Over reinforced Section.
3	For a limiting section of 300 X 500 mm effective calculate the followings. Use M 15 and Fe-250 grades of materials. i. Maximum Compressive and tensile stresses in materials ii. Lever Arm iii. Total tension and compression force.
4	A reinforced concrete rectangular beam 325 mm x 625 mm deep is subjected to a uniformly distributed load 35 kN/m over a simply supported span of 6m. Design the beam for flexure using M:20 and Fe-415. Assume effective cover as 40 mm
5	A singly RC beam of size 250 X 500 mm effective is reinforced with 0.76 % of steel for Fe-500 grade and M 20 for concrete. Calculate (i) Depth of Neutral Axis (ii) Required Numbers of 18 mm φ bars (iii) Moment of resistance.
6	Design a rectangular RC beam having width of 250 mm and it is simply supported with effective span 5.0 m. it is loaded with UDL of 20 kN/m including self-weight. Use M 20 and Fe-415 Grades of materials. Check the beam for Minimum and maximum steel and also for deflection.
7	Find the Moment of Resistance of a singly reinforced concrete beam of 230 mm width and 450 mm effective depth, reinforced with 4 bars of 12 mm diameter of Fe-415 and M20 concrete. If span length is 3.5 m. find out safe working UDL on beam take effective cover as 50 mm.
8	Differentiate between Singly & Double RC beam.
9	An R. C. C. beam of size 300 wide and 500 mm deep is reinforced by tension bars as 4 nos. of 25 mm dia. and compression bars as 2 nos. of 16 mm dia. Calculate the moment of resistance of beam if the clear cover is 30 mm on both the sides.
10	Design a doubly reinforced section for a rectangular beam having an effective span of 4.0 m. The superimposed load is 40 kN/m and size of beam is 230 mm X 450 mm. Assume the suitable data. Design for the M:25 and fe-415 grades of materials

Name of Faculty: Prof D P Advani **Date of Submission: 05/09/2020**

SHANTILAL SHAH ENGINEERING COLLEGE, BHAVNAGAR
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B.E. (Civil Engineering) Semester – 5th

Subject Code: 2950603	**Name of Subject: Design of Structures (RCC)**
Date: 28/08/2020	**Assignment No: 03**

Analysis & Design of Flange Sections (T-Beams)

#	Questions
1	Calculate the width of flange of a T beam using following data: a. Depth of flange =125 mm b. Width of rib = 425 mm c. Effective span = 7.5 m
2	An R. C. C. T-beam has breadth of flange as 1100 mm, thickness of flange 120 mm, effective depth 600 mm and width of web 230 mm. It is reinforced by 4 – 25 mm dia bars. Calculate the ultimate moment of resistance for the same.
3	Find out the Moment of resistance for the T beam with following details a. Flange = 2000 mm X 120 mm b. Rib = 250 X 430 mm c. Steel in Tension 7 – 25 mm dia bars d. Effective cover = 50 mm e. M-15 & Fe-415 grades of materials.
4	Design the T beam and find out the area of tensile steel required for the ultimate moment of 300 kNm. Following details are available: a. Flange = 1250 mm X 100 mm b. Width of Web = 250 mm c. Effective cover = 50 mm d. Overall depth = 600 mm e. M-20 & Fe-415 grades of materials.

Faculty: Prof D P Advani
Date of Submission: 08/09/2020

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B.E. (Civil Engineering) Semester – 5th

Subject Code: 2950603	**Name of Subject: Design of Structures (RCC)**
Date: 15/09/2020	**Assignment No: 04**

Analysis & Design of Axially Loaded Short Columns

#	Questions
1	What is difference in behaviour of short and long compression members?
2	Enumerate the difference between short and slender columns. State the IS-456 code specifications for: (a) Minimum eccentricity for design of columns; (b) Longitudinal reinforcement; (c) Lateral ties.
3	Determine the ultimate load carrying capacity of circular column of 400mm diameter reinforced with 6 nos of 25 mm dia + 2 nos of 20 mm dia bars. Consider M 20 & Fe-415. Assume emin is less than 0.05D.
4	Determine the ultimate load carrying capacity of rectangular column 450 X 650 mm reinforced with 6 nos of 28 mm dia bars. Consider M 25 & Fe-415. Assume emin is less than 0.05D.
5	Design the reinforcement and size of square column to support axial load of 1000 kN. Use M 20 & Fe-415 grades of materials. Take unsupported and effective length of the column is 3 m. sketch the details.
6	Design a circular column of diameter 400 mm with helical reinforcement subjected to a working load of 1200 kN. Use M 25 and Fe-415 grades. The column has unsupported length of 3 m and is effectively held in position but not restrained against rotation.
7	Design a short rectangular column to carry an axial load of 455 KN. Take M:20 grade of concrete and Fe- 415 grade of steel. Apply the check for the eccentricity. Unsupported length of column is 3 m.
8	Design a short circular column with helical reinforcement column to resist a factored axial load of 2400 KN. Provide all necessary checks and detailed sketch. Use M:25 and Fe-415.

Faculty: Prof D P Advani
Date of Submission: 24/09/2020

SHANTILAL SHAH ENGINEERING COLLEGE, BHAVNAGAR
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PDDC (Civil Engineering) Semester – 5th

Subject Code: 2950603	**Name of Subject: Design of Structures (RCC)**
Date: 30/09/2020	**Assignment No: 05**

Design of Shear Reinforcement

#	Questions
1	A R. C. C. beam 250 mm X 500 mm effective is reinforced with 4 Nos - 16 mm diameter of Fe-415. The beam carries factored shear force of 55 KN. Find the spacing of 8 mm diameter - 2 legged – Fe-250 stirrups. Use M:20
2	A Simply R. C. C. beam of 250 mm X 500 mm effective size is supported on 5 m span and subjected to UDL of 20 kN/m over entire span and reinforced by has 4 nos. 22 mm diameter bars of Fe-415. Design the shear reinforcement if 2 nos of 22 mm dia bars are bent up at 45 degree at ends. Use M 20 grade of concrete.
3	A Simply R. C. C. beam of 300 mm X 500 mm overall size has 4 nos. 20 mm diameter bars of Fe-415 at an effective cover of 30 mm. The beam is subjected to Shear Force of 150 kN. Design the shear reinforcement. Use M-20 grade concrete & 8 mm diameter stirrups of Fe-250.

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Date of Submission: 08/10/2020

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PDDC (Civil Engineering) Semester – 5th

Subject Code: 2950603	**Name of Subject: Design of Structures (RCC)**
Date: 08/10/2020	**Assignment No: 06**

Design of RCC Slabs

#	Questions
1	Design a simply supported slab for an effective span of 3 m to carry total factored load of 9 kN/m^2. Use M 20 & Fe-250 grades of materials. Do check for shear, cracking and deflection with all details of drawing.
2	Design a simply supported slab of clear span 3 m X 4 m supported on 300 mm thick walls on all four sides. Assume live load 4 kN/m^2 and floor finish of 0.5 kN/m^2 Use M 20 & Fe 250. Corners are not held down.

Faculty: Prof D P Advani

Date of Submission: 18/10/2020

SHANTILAL SHAH ENGINEERING COLLEGE, BHAVNAGAR
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PDDC (Civil Engineering) Semester – 5th

Subject Code: 2950603	**Name of Subject: Design of Structures (RCC)**
Date: 13/10/2020	**Assignment No: 07**

Design of Isolated Column Footing

#	Question
1	Design an isolated pad footing for a square column of 320 mm X 320 mm for axial load of 700 kN. Use M 20 & Fe – 250. Take SBC of Soil as 140 kN/m^2

Faculty: Prof D P Advani
Date of Submission: 18/10/2020