CODE NO: 07A50101 | R07 | SET - 1

III B.TECH - I SEMESTER EXAMINATIONS - MAY, 2011
DESIGN OF REINFORCED CONCRETE STRUCTURES
(CIVIL ENGINEERING)

Time: 3hours **Max. Marks: 80**

Answer any ONE question from part – A
Answer any THREE questions from part – B

- - -

NOTE : 1. Use of I.S. 456 – 2000, SP – 16 (Charts for columns only) is permitted.
2. Assume suitable data, wherever necessary.

PART – A (Marks : 32 X 1 = 32)

1. Design a T – beam for the following data.

Span	= 8 m , Ends are simply supported.
Spacing of the beams	= 3 m
Super imposed load	= 5 kN / m^2
Floor finish	= 0.75 kN / m^2
Thickness of the slab	= 125 mm
Weight of the wall on the beam	= 15 kN / m
Width of the web	= 230 mm
Total depth	= 680 mm

Use M 25 grade concrete and Fe 415 grade steel.
Design the beam for shear reinforcement also.
Check the design for all necessary conditions.
Draw to a suitable scale.
a) The longitudinal section showing the reinforcement details
b) The cross section of the beam at salient points, showing the reinforcement details.

2. Design a rectangular isolated sloped footing for a column of size 250 mm x 750 mm carrying an axial load of 2000 kN. The S.B.C. of the soil is 220 kN / m^2. Use M 20 grade concrete and Fe 500 grade steel
Draw to a suitable scale,
a) Plan of the footing
b) Sectional elevation of the footing showing the reinforcement details.

PART – B (Marks : 16 X 3 = 48)

3.a) Distinguish between working stress method and limit state method of analysis of R.C. structures.
b) Write short notes on water – cement ratio.

4. A R.C. beam 300 mm x 450 mm is reinforced with 3 Nos – 20 mm bars with an effective cover of 50 mm. The ultimate shear at the section is 140 kN. Design the shear reinforcement
a) using vertical stirrups only.
b) bending 1 bar at 45^0
Use M 20 grade concrete and Fe 250 grade steel.

5. Design an axially loaded tied column with an unsupported length of 3 m. The column is fixed at one end and pinned at the other end. The column has to carry a factored load of 2000 kN. Use M 25 grade concrete and Fe 415 grade steel. Sketch the reinforcement details.

6. Design a R.C. slab for a room measuring 4 m x 5 m. (inside) The slab carries a live load of 2 kN /m^2. The slab is simply supported at all the
4 edges with corners free to lift. The width of the supporting walls is 300 mm. Use M 20 grade concrete and Fe 500 grade steel.
Sketch the reinforcement details.

7.a) What are the various remedial measures for control of cracking ?

b) A doubly reinforced beam of rectangular section 250mm wide x550mm overall depth is reinforced with 4 bars of 20 mm diameter on the tension face and 2 bars of 16 mm diameter on the compression face. The effective cover is 50 mm. The beam spans over 8 m. Check the deflection control if Fe 415 steel is used. Use M20 concrete.

--ooOoo--

CODE NO: 07A50101 | R07 | SET - 2

III B.TECH - I SEMESTER EXAMINATIONS - MAY, 2011
DESIGN OF REINFORCED CONCRETE STRUCTURES
(CIVIL ENGINEERING)

Time: 3hours **Max. Marks: 80**

Answer any ONE question from part – A
Answer any THREE questions from part – B

- - -

NOTE : 1. Use of I.S. 456 – 2000, SP – 16 (Charts for columns only) is permitted.
2. Assume suitable data, wherever necessary.

PART – A (Marks : 32 X 1 = 32)

1. A hall of internal dimensions 5 m × 15 m has beams spaced at 3 m c/c and a slab of 125 mm thick. The beams are supported by walls around, 300 mm thick. The super imposed load on the slab is 5 kN / m^2. Design an intermediate T – beam for flexure and shear.
Use M 30 grade concrete and Fe 415 grade steel.
Check the design for all necessary conditions.
Draw to a suitable scale
a) The longitudinal section showing the reinforcement details
b) The cross section of the beam at salient points, showing the reinforcement details.

2. Design a rectangular isolated sloped footing for a column of size 400 mm × 600 mm carrying an axial load of 1800 kN. The S.B.C. of the soil is 210 kN / m^2. Use M 20 grade concrete and Fe 500 grade steel.
Draw to a suitable scale,
a) Plan of the footing
b) Sectional elevation of the footing showing the reinforcement details.

PART – B (Marks : 16 X 3 = 48)

3.a) What are stress block parameters? Derive the expressions for the same from first principles.
b) What are the advantages and the limitations of the concrete as a building material?

4. A R.C. beam 300 mm x 450 mm is reinforced with 3 Nos – 20 mm bars with an effective cover of 50 mm. The ultimate shear at the section is 150 kN. Design the shear reinforcement
a) using vertical stirrups only.
b) bending 1 bar at 45^0
Use M 20 grade concrete and Fe 250 grade steel. Sketch the reinforcement details.

5. Design an axially loaded tied column with an unsupported length of 3 m. The column is fixed at one end and pinned at the other end. The column has to carry a factored load of 1900 kN. Use M 20 grade concrete and Fe 415 grade steel. Sketch the reinforcement details.

6. Design a R.C. slab for a room measuring 4 m x 6 m. (inside). The slab carries a live load of 2 kN /m^2. The slab is simply supported at all the four edges with corners free to lift. The width of the supporting walls is 300 mm. Use M 25 grade concrete and Fe 500 grade steel. Sketch the reinforcement details.

7.a) What are the various remedial measures for control of cracking ?

b) A doubly reinforced beam of rectangular section 250mm wide x500mm overall depth is reinforced with 4 bars of 20 mm diameter on the tension face and 2 bars of 16 mm diameter on the compression face. The effective cover is 50 mm. The beam spans over 8 m. Check the deflection control if Fe 415 steel is used. Use M25 concrete.

--ooOoo--

CODE NO: 07A50101 | R07 | SET - 3

III B.TECH - I SEMESTER EXAMINATIONS - MAY, 2011
DESIGN OF REINFORCED CONCRETE STRUCTURES
(CIVIL ENGINEERING)

Time: 3hours **Max. Marks: 80**

Answer any ONE question from part – A
Answer any THREE questions from part – B

\- - -

NOTE : 1. Use of I.S. 456 – 2000, SP – 16 (Charts for columns only) is permitted.
2. Assume suitable data, wherever necessary.

PART – A (Marks : 32 X 1 = 32)

1. A T – beam consists of a flange 1100 mm wide and 120 mm deep. The depth of the beam is 600 mm upto the centre of steel and width of the web is 275 mm. Design the T – beam completely for an ultimate moment of 520 kN.m.
Use M 25 grade concrete and Fe 415 grade steel.
Design the beam for shear reinforcement also.
Check the design for all necessary conditions.
Draw to a suitable scale
a) The longitudinal section showing the reinforcement details
b) The cross section of the beam at salient points, showing the reinforcement details.

2. Design a rectangular isolated sloped footing for a column of size 300 mm × 600 mm carrying an axial load of 2100 kN. The S.B.C. of the soil is 250 kN / m^2 Use M 20 grade concrete and Fe 500 grade steel.
Draw to a suitable scale,
a) Plan of the footing
b) Sectional elevation of the footing showing the reinforcement details.

PART – B (Marks : 16 X 3 = 48)

3.a) Explain the balanced, under-reinforced and over-reinforced sections as per Working Stress and Limit State Methods.
b) What are the basic requirements of structural design?

4. A R.C. beam 300 mm x 450 mm is reinforced with 3 Nos – 20 mm bars with an effective cover of 50 mm. The ultimate shear at the section is 190 kN. Design the shear reinforcement
a) Using vertical stirrups only.
b) Bending 1 bar at 45^0
Use M 20 grade concrete and Fe 250 grade steel. Sketch the reinforcement details.

5. Design an axially loaded tied column with an unsupported length of 3 m. The column is fixed at one end and pinned at the other end. The column has to carry a factored load of 1800 kN. Use M 20 grade concrete and Fe 500 grade steel. Sketch the reinforcement details. Assume moderate exposure condition.

6. Design a R.C. slab for a room measuring 4.5 m x 6 m. (inside). The slab carries a live load of 2 kN /m^2. The slab is simply supported at all the four edges with corners free to lift. The width of the supporting walls is 300 mm. Use M 20 grade concrete and Fe 415 grade steel.
Sketch the reinforcement details. Assume mild exposure condition.

7.a) What are the various remedial measures for control of cracking ?

b) A doubly reinforced beam of rectangular section 250mm wide x550mm overall depth is reinforced with 4 bars of 25 mm diameter on the tension face and 2 bars of 16 mm diameter on the compression face. The effective cover is 50 mm. The beam spans over 8 m. Check the deflection control if Fe 415 steel is used. Use M25 concrete.

--ooOoo--

CODE NO: 07A50101 | R07 | SET - 4

III B.TECH - I SEMESTER EXAMINATIONS - MAY, 2011
DESIGN OF REINFORCED CONCRETE STRUCTURES
(CIVIL ENGINEERING)

Time: 3hours **Max. Marks: 80**

Answer any ONE question from part – A
Answer any THREE questions from part – B

- - -

NOTE : 1. Use of I.S. 456 – 2000, SP – 16 (Charts for columns only) is permitted.
2. Assume suitable data, wherever necessary.

PART – A (Marks : 32 X 1 = 32)

1. Design an L – beam for the following data.
Flange width = 1000 mm
Flange thickness = 120 mm
Width of the rib = 250 mm
Total depth = 750 mm
Effective cover = 70 mm
Ultimate B.M. = 800 kN.m.
Use M 25 grade concrete and Fe 500 grade steel.
Design the beam for shear reinforcement also.
Check the design for all necessary conditions.
Draw to a suitable scale
a) The longitudinal section showing the reinforcement details
b) The cross section of the beam at salient points, showing the reinforcement details.

2. Design a rectangular isolated sloped footing for a column of size 350 mm x 650 mm carrying an axial load of 1900 kN. The S.B.C. of the soil is 210 kN / m^2. Use M 25 grade concrete and Fe 415 grade steel.
Draw to a suitable scale,
a) Plan of the footing
b) Sectional elevation of the footing showing the reinforcement details.

PART – B (Marks : 16 X 3 = 48)

3.a) Sketch the stress – strain curves for Concrete, Mild steel and HYSD steel. Briefly explain them.
b) What are the various stages in the design of R.C. structures?

4. A R.C. beam 300 mm x 450 mm is reinforced with 3 Nos – 20 mm bars with an effective cover of 50 mm. The ultimate shear at the section is 210 kN. Design the shear reinforcement
a) using vertical stirrups only.
b) bending 1 bar at 45^0
Use M 20 grade concrete and Fe 250 grade steel. Sketch the reinforcement details.

5. Design an axially loaded tied column with an unsupported length of 3 m. The column is fixed at one end and pinned at the other end. The column has to carry a factored load of 1700 kN. Use M 30 grade concrete and Fe 415 grade steel. Sketch the reinforcement details.

6. Design a R.C. slab for a room measuring 4 m x 5.5 m. (inside) The slab carries a live load of 2 kN /m^2. The slab is simply supported at all the 4 edges with corners free to lift. The width of the supporting walls is 300 mm. Use M 20 grade concrete and Fe 500 grade steel.
Sketch the reinforcement details. Assume moderate exposure condition.

7.a) What are the various remedial measures for control of cracking ?

b) A doubly reinforced beam of rectangular section 250mm wide x550mm overall depth is reinforced with 4 bars of 20 mm diameter on the tension face and 2 bars of 16 mm diameter on the compression face. The effective cover is 50 mm. The beam spans over 7 m. Check the deflection control if Fe 415 steel is used. Use M25 concrete.

--ooOoo--