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Total Number of Pages: 2

B.Tech
PCCI4301

5th Semester Regular / Back Examination 2016-17
DESIGN OF CONCRETE STRUCTURES

BRANCH: CIVIL

Time: 3 Hours

Max Marks: 70

Q.CODE: Y238

Answer Question No.1 which is compulsory and any five from the rest.

Use of IS 456:2000 is allowed.

The figures in the right hand margin indicate marks.

Q1 Answer the following questions: (2 x 10)

- a) Draw the stress block for a RCC rectangular beam under flexure and show the lever arm.
- b) How can you distinguish between mild steel and tor steel through physical observation?
- c) One way slab is designed as a beam of 1 m width. Is the statement true ? Explain.
- d) What is the advantage of providing a T beam instead of normal rectangular beam?
- e) In what situation, doubly reinforced section is opted instead of singly reinforced section.
- f) State the different ways of providing shear reinforcement in a beam.
- g) Draw the cross section of a rectangular column and show the point of action of compressive loading, which will lead to bi-axial bending for the column member in addition to compression.
- h) Distinguish between one way slab and two way slab with respect to main reinforcement provision.
- i) Differentiate between a *restrained slab* and a *simply supported slab*.
- j) Why, some minimum cover to reinforcement is provided for RCC members?

Q2 (a) Draw the stress-strain curves for Fe250 and Fe415 showing the special features in one figure in the same plot. (5)

(b) Define *bond stress*. Compare the bond stress variation of deformed bars in tension and compression with respect to plain bars as per IS coadal provisions. (2+3)

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- Q3** A RCC beam of bxd size , 250 mmx 400 mm carries an udl of 12 **(10)**
kN/m excluding the self weight of the beam over an effective span of 7
m. The tension reinforcement provided is 3, 20 mm dia at middle zone
and 2, 20 mm dia at support zone. Design the shear reinforcement
considering only vertical stirrups. Show the reinforcement detailing.
- Q4** A simply supported beam of span 8 m of overall size 250 mm x 400 **(10)**
mm carries a factored moment of 280 kNm at centre. Check, whether
the beam satisfies the deflection criteria as per IS codal provisions.
- Q5** Design an isolated footing for a square column , 250 mm x 250 mm **(10)**
carrying a working load of 800 kN. Assume the safe bearing capacity
of soil as 280 kN/sqm at a depth of 1 m below the ground level. Use
M20 concrete and Fe415 steel. Consider the depth based on bending
moment criteria only. Show the reinforcement detailing.
- Q6** Design a circular column with spiral reinforcement to carry a working **(10)**
load of 1000 kN. Show the reinforcement detailing. The effective
depth of column is 5 m. Use M25 concrete and Fe415 steel.
- Q7** Design an one way slab simply supported slab of size 4m by 7 m if **(10)**
two adjacent edges are discontinuous. The service load is 3.5 kN/sq m
and floor finish is 1 kN/sq m. Use M20 concrete and Fe415 steel.
Show the reinforcement detailing.
- Q8** Write short answer on any **TWO**: **(5 x 2)**
- a) one way shear and two way shear
 - b) Under reinforced section and over reinforced section
 - c) Torsional reinforcement in slabs
 - d) Uniaxial bending and bi axial bending of columns
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