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24197

B. Tech (Civil Engg.) 4th Sem.
Examination – May, 2012

DESIGN OF CONCRETE STRUCTURE -I

Paper : CE-206-F

Time : Three hours]   *[Maximum Marks : 100*

Before answering the question, candidates should ensure that they have been supplied the correct and complete question paper. No complain in this regard, will be entertained after examination.

Note : Attempt *five* questions in all. Question No. **1** is *compulsory*. Use any method of design (working stress or limit state). Draw neat sketches of your design and reinforcement details. Use of IS code 456 -2000 is permitted. Assume suitable data if missing or required.

1. (a) State the principal compounds of Portland cement.

   (b) State the factors which affect the properties of concrete

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(c) State assumptions in theory of simple bending.

(d) What is Balanced Section ?

(e) What is the effect of varying percentages of steel on the moment of resistance of RCC sections?

(f) What is diagonal tension?

(g) How vibration is controlled?

(h) Differentiate between Anchorage Band and Deflection Bond.

(i) Is it always that we have to provide minimum shear reinforcement in a beam section?

(j) Explain max m. depth of neutral axis $10 \times 2 = 20$

SECTION – A

2. Write short notes on :

   (a) Batching, curing, mixing

   (b) Role of admixture and reinforcement in concrete

   (c) Bulking of sand

   (d) Creep and shrinkage $4 \times 5 = 20$

3. (a) Why limit state design is considered more rational than working stress method

(b) What do you understand by acceptability criteria of concrete as per is code. $12 + 8 = 20$

SECTION – B

4. (a) Describe local bond stress and Average Bond stress.

   (b) A beam 250mm X 600mm is to resist a Bending Moment of 80K N. M. Determine area of steel on compression and tensile areas of the beam using steel beam theory. $8+12=20$

5. (a) State assumptions made in working stress Method.

   (b) A simply supported beam 200 mm X 400 mm is loaded with U.D.I of 20 K N/M. It has a clear span of 4 m. Check the beam for shear reinforcement if tension steel is provided as 4 bars of 20 mm diameter (Fe 415) and concrete used is M20. $8 + 12 = 20$

SECTION – C

6. (a) Discuss the requirement of good detailing of reinforcement.

   (b) Detail out the spacing of reinforcement with help of neat sketches as applicable to rectangular beam

(single reinforced) and one way slab. Assume beam of size 40cm × 60cm with 5m clear span and slab of size thickness 10cm. Use 20mm ϕ bars 4 nos in beam and 12mm ϕ base in slab. 8 + 12 = 20

7. Design a two way slab, with corners of slab not held down, for a room having clear dimensions of 4m × 5m. Assume superimposed load as 2000 N/m² and finishing load 500 N/m². Use M15 mix of Fe 250 bars as reinforcement. 20

SECTION – D

8. Design a short column of reinforced concrete to carry an axial load of 1100 K N. use M20 concrete and assume 5sc = 190 N/mm². 20

9. Design a counterfort retaining wall to retain earth 4m above ground level. The top of earth is to be level. The density of earth is 15 KN/m². The angle of internal friction of soil is 30°. The safe bearing capacity of soil is 200 KN/m² and coefficient of friction between soil and wall is 0.6. 20

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