

24197

**B. Tech. 4th Semester (Civil Engineering)**  
**Examination – May, 2011**

**DESIGN OF CONCRETE STRUCTURES - I**

Paper : CE-206-F

*Time : Three hours ]*

*[ Maximum Marks : 100*

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

*Note : (i) Attempt five questions in all.*

*(ii) Question No. 1 is compulsory.*

*(iii) Use any method of Design (working stress or limit state)*

*(iv) Draw neat sketch of your Design and Reinforcement detail.*

*(v) Use of I. S. code 456-2000 is permitted*

*(vi) Assume suitable data if missing or required.*

1. (a) Briefly state the physical requirements of Portland cement.

(b) What is Pozzolna and where is it used ?

(c) What are the types of cement admixtures ? Name any four.



- (d) State different grades of concrete as per IS code?
- ~~(e)~~ What anchorage length is required as per IS code? 13
- ~~(f)~~ What is minimum percentage of steel recommended for doubly reinforced beam and two way slab as per IS code?
- ~~(g)~~ State assumptions in theory of simple bending.
- ~~(h)~~ State limit state and characteristic of loads.
- ~~(i)~~ State provision of minimum share reinforcement as per IS code.
- ~~(j)~~ State the acceptability criteria of concrete as per code.  $10 \times 2 = 20$

### SECTION - A

- 2. (a) Show by means of neat diagrams the stress-strain relationship for concrete and steel.
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 (b) Explain with neat sketches what do you understand by bulking of sand.  $12 + 8 = 20$

3. Write short note on :

- ~~(a)~~ Partial safety factor and factored load.
- ~~(b)~~ Characteristic strength and characteristic load.
- ~~(c)~~ Design mix and nominal mix of concrete.

$$8 + 6 + 6 = 20$$

### SECTION - B

- ✓ ~~4.~~ (a) Explain briefly working stress method of designing R.C.C. structures.
- (b) Determine the max<sup>m</sup> superimposed load carried by a simply supported beam of size  $450^{\text{mm}} \times$



750<sup>mm</sup> with effective span of 5<sup>m</sup> and moment of resistance as 260 KN. m.

8 + 12 = 20

5. (a) Calculate the development length of 12<sup>mm</sup> dia bars in M20 concrete if Fe 250 bars are used. Bars tend to develop full tensile stress.

(b) A beam 200 mm × 450 mm size supports a total vdl of 20,000 kg. Calculate max<sup>m</sup>. Shear stress and spacing of 10 mm dia bar stirrups near supports. Assume Lever arm constant = 0.87. Use Fe 250 steel bars and M20 concrete.

8 + 12 = 20

### SECTION - C

6. (a) Discuss briefly Limit State Serviceability condition.

(b) Sketch the standard hooks for 90° bend angle of M. S. bar 12 mm  $\phi$ .

10 + 10 = 20

7. Design a two-way slab, with corners hold down, by 1.5 method for a room 4<sup>m</sup> × 5<sup>m</sup> size. Assume live load as 2000 N/mm<sup>2</sup> and finishing load as 500 N/mm<sup>2</sup>. Use M20 mix and Fe 415 bars as reinforcement.

20

### SECTION - D

8. (a) State the general notes on the design of foundations as per IS Code.

(b) An R.C. column is to carry an axial load of 100,000 kg. Using M 20 concrete and Fe 415 steel bar

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reinforcement. Determine the size of column, longitudinal reinforcement and lateral ties.

$$10 + 10 = 20$$

9. Design a cantilever retaining wall to retain earth 4<sup>m</sup> above ground level. The top of earth is to be level. The density of earth is 15 kN/m<sup>3</sup>. The angle of repose is 30°. The safe bearing capacity of soil is 200 kN/m<sup>2</sup> and coefficient of friction between soil and wall is 0.6. 20

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Ex 18.3