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B. Tech 4th Semester (Civil) Examination,

May-2016

DESIGN OF CONCRETE STRUCTURES-I

Paper-CE-206 F

Time allowed : 3 hours]

[Maximum marks : 100

Note : • *Question No. 1 is compulsory.*

- *Students have to attempt five questions in total at least one question from each section.*
- *Assume any data if missing.*

1. (a) What are the factors affecting the durability of concrete ? 4
- (b) Write down the difference between limit state method and working stress method. 4
- (c) Discuss in brief basic assumption of straight line theory. 4
- (d) Explain the phenomena of load distribution in two way slab with diagram. 4
- (e) Write down IS 456 : 2000 recommendations for the longitudinal reinforcement of the column. 4

Section-A

2. Explain the following :

- (a) Grading of aggregate. 20
- (b) Shrinkage and creep.
- (c) Water cement ratio.

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3. Draw and explain the stress strain relationship of steel and concrete in detail. 20

Section-B

4. The floor of a hall measures 16 m × 6 m to the face of the supporting walls. The floor consists of three beams spaced at 4 m centre to centre, and the slab thickness is 120 mm. The floor carries a uniform distributed load of 5 kN/m², inclusive of the floor finish. Design the intermediate beam. Using M 20 concrete and Fe 415 steel. The support width may be assumed equal to 500 mm. 20
5. A simply supported beam 300 mm wide and 600 mm effective depth carries a uniform distributed load of 70 kN/m including its own weight, over an effective span of 6 m. The reinforcement consists of 5 bars of 25 mm diameter. Out of these, two bars can be safely bent at 1 m distance from the support. Design suitable shear reinforcement for the beam. Use m 20 concrete. $F_y = 250 \text{ N/mm}^2$. 20

Section-C

6. Draw and explain the beam, column junction detailing as per IS specifications in detail. 20

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7. Design a R. C. slab for room measuring 4 m × 5 m from inside. The slab carries a live load of 2000 N/m² and finished with 20 mm thick granolithic topping. Use M 20 concrete and Fe 415 steel. The slab is simply supported at all the four edges, with corners free to lift. 20

Section-D

8. Design a rectangular isolated footing of uniform thickness for RC column bearing a vertical load of 600 kN, and having a base size of 400 × 600 mm. The safe bearing capacity of the soil may be taken as 110 kN/m². Use M 20 concrete and Fe 415 steel. 20
9. Determine the reinforcement for a short column for the following data : 20
- Column size : 400 × 600 mm P_u : 2500 kN
 M_{ux} : 160 kN M_{uy} : 120 kN
 Use M 25 concrete mix and Fe 415 steel.