

24378

B. Tech. 6th Semester (Civil Engg.)

Examination, May-2013

DESIGN OF CONCRETE STRUCTURE-II

Paper-CE-302-F

Time allowed : 3 hours]

[Maximum marks : 100

Note : Attempt five questions in all. Question No. 1 is compulsory. Attempt one question from each section. Answer the question by either working stress-method or limit-state method. Use of IS 456-2000 is permitted.

1. Write notes on : 5×4=20
- (a) Calculation of bending moment and shear force in continuous beams.
 - (b) Pile foundations.
 - (c) Losses in pre-stressed concrete
 - (d) Stiffness of members in frame.

Section-A

2. Design a continuous beam of 3 spans supported on stone masonry piers 300 mm by 300 mm. Clear span between the supports = 8m
- Spacing of continuous beams = 2.75 c/c
- Self weight of floor finish = 0.6 kN/m²
- Live load on office floor = 4kN/m².

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[P.T.O.]

Concrete of M-20 grade and Fe-415 steel are available for use.

Design the reinforcements for the critical sections.

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3. Design an interior panel of a flat slab for a live load of 5000N/metre^2 . Drops shall be provided. All panels are $6\text{m} \times 6\text{m}$. Use M20 concrete and mild steel reinforcement.

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Section-B

4. Design a rectangular slab footing to support two columns transmitting 515 kN and 990 kN load. The columns are each 450 mm square and are spaced at 2.5m centres. The lighter column is at a clear distance 300 m from an existing building. Design the footing using M15 concrete and HYSD bars if the safe bearing capacity of soil is 175 kN/m^2 .
5. Design a circular tank 12 metre diameter and 4 metre high. The tank rests on firm ground. The walls of the tank are restrained at the base. Use M20 concrete and mild steel reinforcement. Adopt safe stresses.
- $C = 70\text{ kg/cm}^2$, $t = 1000\text{ kg/cm}^2$.

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Section-C

6. A prestressed concrete beam $500 \text{ mm} \times 750 \text{ mm}$ in section has a span of 8m and is subjected to a uniformly distributed load of 17.50 kN/m including the weight of the beam. The prestressing tendons are located at the lower third point of the section and provide an effective prestressing force of 1500 kN . Determine the extreme stresses in concrete for the mid span section. 20
7. The roof of a 8m wide hall is supported on an portal frame spaced at the 4m intervals. The height of the portal frame is 4m . The continuous slab is 120 mm thick. Live load on roof is 1.5 kN/m^2 . The columns are connected with a plinth beam and the base of the column may be assumed as fixed. Design the column of the portal frame. Use M-20 grade concrete and F-415 HYSD bars. 20

Section-D

8. A rectangular slab measuring $6\text{m} \times 10\text{m}$ is subjected to an uniformly distributed load of 10 kN/metre^2 . If the maximum moment resisting capacity of slab in sagging and hogging is 25 kNm/m run and 31.25 kNm/m run . Find the load factor which will cause failure of the slab by yield line theory.

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[P.T.O.]

9. A singly supported two way slab having dimension $3\text{m} \times 4\text{m}$ is subjected to a uniform distributed load of $10\text{kN}/\text{metre}^2$. Find the collapse load factor using yield line theory.