

S.No. : 469

BCE 2603

No. of Printed Pages : 05

Following Paper ID and Roll No. to be filled in your Answer Book.

PAPER ID : 23158

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B. Tech. Examination 2021-22

(Even Semester)

DESIGN OF CONCRETE STRUCTURES-II

Time : Three Hours]

[Maximum Marks : 60

- Note :-**
- (i) Attempt all questions.
 - (ii) Assume missing data.
 - (iii) IS : 456-2000 is allowed.

SECTION – A

1. Attempt all parts of the following : 1 × 8 = 8
- (a) Discuss direct design method.
 - (b) What is the difference between drop and columnhead?
 - (c) Explain in short shrap footing.

[P. T. O.

- (d) What is toe and heel in retaining wall illustrates with the help of diagram?
- (e) Draw stress-strain curve of normal concrete.
- (f) Define shrinkage and creep.
- (g) Which method is more suitable for designing of water retaining structures?
- (h) Draw neat and clean sketches of overhead tank.

SECTION – B

2. Attempt any two parts of the following : $2 \times 6 = 12$
- (a) With the help of suitable example explain step by step procedure of designing a flat slab without any drop and column head.
 - (b) Design a square spread footing to carry a column load of 1400 KN from a 400mm square tied column containing 20mm bars as the longitudinal steel. The bearing capacity of soil is 100 KN/m². Consider base of footing 1 m below the ground level. The unit weight of earth is 20 kN/m³. Use $\sigma_{ck} = 25 \text{ N/mm}^2$, $\sigma_y = 415 \text{ N/mm}^2$ and load factor=1.5.

- (c) Design a open square water tank of size $6\text{m} \times 6\text{m} \times 4\text{m}$ deep resting on ground. Use M-20 concrete and fe 415 steel.
- (d) Differentiate between the following :
- (i) Pre-tensioning and post-tensioning
 - (ii) P. S.C. and R. C. C

SECTION – C

Note:- Attempt any two parts from each question. Each part carry equal marks. $8 \times 5 = 40$

3. (a) Design an interior panel of a flat slab for a line load of 4 KN/m^2 . The slab is provided with a floor finish of 1 kN/m^2 . The panels are $6\text{m} \times 6\text{m}$. Drop shall be provided. Use M-20 grade concrete and Fe-415 steel.
- (b) What is the difference between two way slab and flat slab? Define drop and column head. Also role of drop in flat slab.
- (c) Derive the expression for maximum torsional moment for a semi-circular beam supported on three supports.

[P. T. O.]

4. (a) Design a counter fort retaining wall if the height of wall above the ground level is 5.5m and angle of friction is 30° and unit weight of back fill is 18kN/m^3 , SBC of soil is 180 kN/m^2 . The spacing provided in counter fort is 3m. Use M-20 and Fe-415, coefficient of friction between wall and concrete is 0.5.
- (b) What is footing? Explain the different types of footings with neat sketch and in which conditions it may applicable. Also show the distribution of load to the soil.
- (c) With the help of suitable example explain step by step procedure of designing a R. C. cantilever retaining wall
5. (a) Explain various structural components of Intz tank with suitable diagram. Write the designing step for Intz tank.
- (b) Design a circular water tank with flexible base resting on ground to store 65,000 litres of water. The depth of tank is 5m. Use M-20 and Fe-415.
- (c) Give the design step of rectangular water tank resting on ground.

6. (a) A concrete beam $150\text{mm} \times 300\text{mm}$ is pre-tensioned by 7 wires of 7mm diameter at an initial stress of 1000N/mm^2 with their centroid located at an eccentricity of 50mm as shown in fig. Find loss of prestress due to elastic shortening of concrete, creep and shrinkage of concrete if there is a relaxation of 4% of steel stress. Use $\sigma_a = 40\text{N/mm}^2$ and creep coefficient = 1.6.
- (b) Briefly discuss about cable profile in pre-stressed concrete structures.
- (c) Write short notes on the following :
- (i) limiting eccentricities
 - (ii) Pressure line
