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Total No. of Pages : 02

Total No. of Questions : 08

M.Tech Civil Engg. (2016 Batch) (Sem.-1)

ADVANCED STRUCTURAL DESIGN

Subject Code : MTCE-205

Paper ID : [74241]

Time : 3 Hrs.

Max. Marks : 100

INSTRUCTION TO CANDIDATES :

1. Attempt any FIVE questions out of EIGHT questions.
2. Each question carries TWENTY marks.

- Q1. How can we analysed the building frames subjected to lateral loading? Explain all the methods with neat sketches.
- Q2. a) What are the requirements of good reinforcement detailing?
b) Illustrate the curtailment of reinforcement operation in a simply supported beam.
- Q3. Design a cantilever retaining wall to support a bank of earth 5 m high above the earth level at the toe of the wall. A building is to be built on the backfill. Assume that a 4 m surcharge will approximate the lateral earth pressure effect. Given: Earth density = 17 kN/m^3 ; angle of internal friction (response) = 35° ; coefficient of friction between concrete and soil = 0.45; bearing capacity = 150 kN/m^2 . Use M30 mix and Fe 415 grade steel.
- Q4. a) Define Corbels. For what purposes we designed corbels? Explain with neat sketches.
b) Write the stepwise procedure to design the dome structures.
- Q5. A flat slab is supported on 600 mm dia circular columns spaced $8\text{m} \times 6\text{m}$ apart in both directions. The column head has a diameter of 120 cm. The live load on the flat slab is 10 kN/m^2 . Determine the moments in the flat slab along its 8m span and check the flat slab in shear at an edge column.
- Q6. Find the collapse load in a $5.5\text{m} \times 3.75\text{m}$ slab fixed at all edges for which the support moments are twice of the corresponding midspan moments in each direction. Assume $M_{px} = 0.5 M_{py}$. The yield lines bisect the corners at 30° with the short edges.
- Q7. a) What are the methods of yield line analysis of slabs? Explain with neat sketches.
b) Explain the Stepwise Procedure to analysis of one way slab.

Q8. Design a Counterfort retaining wall with the following data :

- a) Height of embankment above ground is 10m.
- b) Depth of foundation is 1.5 m and net bearing capacity of soil is 150 kN/m^2 .
- c) Weight of earth is 17 kN/m^3 and angle of repose is 30° .

Check stability of the wall. Design and sketch the reinforcement details in the

- (i) Toe
- (ii) Heel
- (iii) Vertical slab
- (iv) Counterforts

Design the ties to connect counterforts with vertical slab and heel slab.

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