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Total number of pages: [2]

B.Tech. || CE || 6th Sem

Design of concrete Structure-II

Subject Code: BTCE-601 (RP)

Paper ID: M/18

(2011-2014 batch)

Time allowed: 3 Hrs

Max Marks: 60

Important Instructions:

- All questions are compulsory
- Assume any missing data

PART A (10x 2marks)

Q. 1. Short-Answer Questions:

- (a) What are the common causes of failure of foundation.
- (b) What are the different types of stairs.
- (c) What is meant by effective length of a column.
- (d) Explain the stability criteria of a Retaining wall.
- (e) Give two examples of curved beam? Discuss the type of stress resultants encountered in these beams.
- (f) What are dome structures? State its uses.
- (g) What is continuous beam? why it is preferred over simply supported beam.
- (h) Under what circumstances, trapezoidal footing is preferred in RCC construction.
- (i) Describe at least two function of Shear Key.
- (j) What is the basic design criteria followed for the design of water tank.

PART B (5x8marks)

- Q. 2. A straight staircase is made of structurally independent tread slabs, CO1 cantilevered from a reinforced concrete wall. Given that the riser is 170mm and the tread is 280mm and width of flight is 1.8m, design a typical tread slab. Apply the live load specified in the IS loading code liable to be overcrowded. Use M20 concrete and Fe415 steel. Assume mild exposure conditions.

OR

Design a (waist slab type) dog-legged staircase for an office building, given CO1 the following data.

- Height b/w floor = 3.2m
- Riser = 150mm, Tread = 300mm
- Width of flight = landing width = 1.5m
- Live load = 5.0 kn/m^2
- Finishes load = 1 kn/m^2

Assume the stairs to be supported on 250mm thick masonry walls at the outer edges of the landings, parallel to the riser. Use M20 conc. and Fe415 steel. [The no. of steps in one flight = 9].

- Q. 3. Design the reinforcement for a short axially loaded square column of size 450mm*450mm to support a load of 1200kn. Use M20 conc. & Fe415 steel CO2

OR

Design a continuous rectangular beam of span 7m to carry a dead load of 12kn/m and a live load of 16kn/m. The beam is continuous over more than 3 spans & is supported by columns. Use M20 conc. & Fe415 steel. CO2

- Q. 4. Design a Square footing for a short axially loaded column of size 400mm*400mm carrying 800kn load. Use M20 conc. & Fe415 steel. SBC of soil is 180kn/m². Sketch the details of the reinforcement. CO3

OR

Design a Reinforced concrete combined Rectangular slab footing for two columns located at 5m apart. The overall sizes of the columns are 300mm*300mm and 500mm*500mm and they are transferring 400kn and 800kn resp. The centre of the lighter column is 0.3m from the property line. The SBC of soil is 150kn/m². Use M20 conc. & Fe415 steel. Sketch the reinforcement details.

CO3

- Q. 5. Design a cantilever retaining wall to retain an earth embankment with a horizontal top 4.0m above ground level. Density of earth = 18kn/m³. Angle of internal friction $\phi = 30^\circ$, SBC of soil is 220kn/m². Take coefficient of friction b/w soil and concrete 'u' is 0.5. Adopt M25 conc. And Fe415 steel. CO4

OR

Design a counterfort retaining wall, if the height of the wall above the ground level is 5.0m, SBC of soil is 200kn/m², Angle of friction is 30° and unit weight of backfill is 18kn/m³. Keep spacing of counterforts as 3m. Coefficient of friction b/w the soil and the concrete 'u' is 0.5. Adopt M20 conc. & Fe415 steel. CO4

- Q. 6. Design a circular water tank with flexible base resting on the ground to store 40,000 litres of water. The depth of tank may be kept 3.5m. Use M25 conc. & Fe415 steel. CO1

OR

Design an open rectangular tank of size 4m*10m*4m deep resting on the firm ground. Use M25 grade of conc. & Fe415 steel. Approximate method may be used for the following analysis. CO4