Hall Ticket No | | | | | | | | | | | Question Paper Code: ACEB42

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)
Dundigal-500043, Hyderabad

B.Tech VII SEMESTER END EXAMINATIONS (REGULAR) - FEBRUARY 2022
Regulation: R18

DESIGN OF CONCRETE STRUCTURES-II

Time: 3 Hours **(CE)** **Max Marks: 70**

Answer FIVE Questions choosing ONE question from each module
(NOTE: Provision is given to answer TWO questions from any ONE module)
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

MODULE – I

1. (a) Why shear check is essential in flat slab? Explain the step-by-step procedure in doing shear check. **[7M]**

   (b) Design an interior panel of a flat slab 4.5m x 6.0m without drop or column head. The storey height above and below the slab is 4m. Consider the live load as 4kN/m^2. The size of column is 300mm x 400mm. Use M20 and Fe 415. Assume suitable missing data. **[7M]**

2. (a) Explain the IS code specifications regarding the column head and drop provided in a flat slab. **[7M]**

   (b) A flat slab is supported on 400 mm dia circular columns spaced 6m x 7m apart in both directions, the column head has a diameter of 100 cms . The live load on the flat slab is 4 kN/m^2. Determine the bending moments in a flat slab along its 7 m span. Consider floor height as 4.0m, M 20 and Fe 415. Assume suitable missing data. **[7M]**

MODULE – II

3. (a) Explain about Jansens theory and mention the assumptions involved in it. **[7M]**

   (b) Design the side walls of a 3m x 3m square bunker to store 300kN of coal. Density of coal is 9 kN/m^3 and angle of repose is 30^o. Adopt M20 grade concrete and Fe 415 HYSD bars. **[7M]**

4. (a) Write a note on stiffeners used in bunkers. Explain in detail about the structural elements present in a bunker. **[7M]**

   (b) Design a circular bunker to store 20 tonnes of coal. Density of coal is 9 kN/m^3. Angle of repose is 30^o. Adopt M20 grade and Fe 415 HYSD bars. **[7M]**

MODULE – III

5. (a) Determine an expression for temperature stresses in horizontal reinforcement of a R.C. chimney. **[7M]**

   (b) A reinforced concrete chimney 50m high above ground level has an outside diameter of 4m. The thickness of the shell is 20 cm at the top and it is increased to 25 cm and 30 cm at 18 m and 30m from the top. Vertical steel bars are equal to 1% of the cross section area throughout. The total wind load above the section at 18m from top may be taken as 93kN. Find the stresses developed due to wind and dead loads at the section 18m from the top of the chimney. Assume that modular ratio m is 13. **[7M]**

6. (a) What are the design factors to be considered during the design of a chimney? Explain them in detail. **[7M]**

   (b) A concrete chimney of height 80m with the external diameter of the shaft being 4m at top and 5m at bottom is required in a place where the wind intensity is 1.5 kN/m^2. Thickness of fire brick lining is 10cm, temperature difference between the inside and outside the shaft is 75^{o}C and permissible bearing pressure on the soil at site is 150 kN/m^2. Adopting M25 grade concrete mix and Fe 415 steel grde. Design base section and foundation for the chimney. **[7M]**

MODULE – IV

7. (a) Explain in detail various types of intz tanks and their usage in public works. **[7M]**

   (b) An intz shape water container of 700 m^3 capacity is supported on RC staging of 8 columns with horizontal bracings of 300 x 600 mm at three levels. Material grade confirms to M30 and Fe415, respectively. Density of concrete is 25kN/m^3. Design the top dome, top ring beam and tank walls. **[7M]**

8. (a) Explain the design procedure for the bottom spherical dome of the intze tank. **[7M]**

   (b) Design a rectangular water tank resting on ground having base area of 3m x 5m. The height of water tank is 3.5 m and keeps a free board of 0.2m. Use M30 concrete and Fe 415 steel. Assume appropriate data and clearly state the assumptions. **[7M]**

MODULE – V

9. (a) What is the function of shear keys in the design of retaining walls? Explain in detail about punching shear in designing of the footings. **[7M]**

   (b) Design a counter fort type retaining wall to retain 5 m high horizontal backfill above ground with 60 kPa live load on it. The unit weight of backfill, angle of internal friction, coefficient of friction, spacing of counterforts and soil bearing capacity are 18 kN/m^3 , 0.62, 3.0 m and 200 kPa, 30° respectively. **[7M]**

10. (a) Explain the stability requirements in retaining walls and mention the components of cantilever type of retaining wall. **[7M]**

    (b) Design a cantilever retaining wall has to retain earth 5m high above ground level. The density of earth is 20 kN/m^3 and its angle of repose is 35^0. The earth is horizontal at top. The safe bearing capacity of soil is 190 kN/m^2 and coefficient of friction between soil and concrete is 0.47. **[7M]**

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