USN ⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚ **18CV735**

Seventh Semester B.E. Degree Examination, June/July 2024
Masonry Structures

Time: 3 hrs.   Max. Marks: 100

Note: 1. *Answer any FIVE full questions, choosing ONE full question from each module.*
2. *Use of IS1905 : 1987 is permitted.*
3. *Consider 15mm thickness for plastering, each side.*
4. *Assume missing data (if any) suitably.*

Module-1

1   a. List different types of bricks, blocks and stones used as masonry material. **(04 Marks)**
    b. Discuss the commonly observed workmanship defects in masonry. **(06 Marks)**
    c. List the factors influencing performance of masonry and explain any four in detail. **(10 Marks)**

OR

2   a. Mention the properties imparted by constituent materials of a good quality burnt brick. **(04 Marks)**
    b. What are the desirable properties of masonry mortar? Explain its influence on performance of masonry. **(08 Marks)**
    c. With the help of neat sketches, represent types of crack in masonry. **(08 Marks)**

Module-2

3   a. With help of a neat sketch, briefly describe the arching action in masonry. **(05 Marks)**
    b. Write a short note on permissible tensile and shear stresses in masonry. **(06 Marks)**
    c. Discuss in detail consideration for stress reduction factors, Area reduction factor and shape modification factor. **(09 Marks)**

OR

4   a. Using schematic representation, describe the load dispersion mechanism in masonry. **(05 Marks)**
    b. Highlighting the considerations, discuss effective heights effective length and effectives' thickness in masonry. **(06 Marks)**
    c. Highlighting the difference, explain working stress, permissible stress and basic compressive stress in masonry. **(09 Marks)**

Module-3

5   a. Design axially loaded 200mm thick unstiffened wall of a two storeyed building, carrying 125mm thick RCC slabs of effective span 3.40m, with 3.2m ceiling height. The wall is fully restrained at top and bottom. Live load on floor is 2.1kN/m^2, live load on roof is 1.8kN/m^2, load of floor finishes 0.2 kN/m^2 and load of terrace coat is 1.25kN/m^2. **(10 Marks)**
    b. Design an interior cavity wall with cross wall for a 3-storeyed building, with ceiling height of 3.0m. The wall is stiffened by intersecting walls of 200mm thickness at 3500mm C/C. Assume loading from roof as 14.25kN/m and from each floor 17.3kN/m. Consider unit size of 400 × 200 × 100mm. **(10 Marks)**

OR

6 a. A solid wall of thickness 300mm, continuous at both ends, is adequately bonded by piers. Height of wall is 3.8m and distance between centre of piers is 4.6m wall is fully restrained at top and bottom. Width and thickness of pier is 300mm and 600mm respectively, Design the wall considering roof load as 40kN/m. **(10 Marks)**

   b. Design the ground floor wall of a three storey building having clear floor height 3.2m. Wall is stiffened by cross walls of 200mm thickness, spaced at 3.5m C/C. Dead load from each floor /roof is 11.25kN/m. Live load on floor is 2.0kN/m^2 and an roof is 1kN/m^2. Load of floor finishes 0.4kN/m^2 and terrace coat 1kN/m^2. Bricks of size 230 × 105 × 75mm is available for construction. **(10 Marks)**

Module-4

7 a. Explain the consideration for design of masonry with openings. **(10 Marks)**

   b. Two load are acting on a masonry wall of 200mm thickness. An axial load of 12kN/m and an eccentric load of 25kN/m at an eccentricity of 75mm. If the slenderness ratio is 14, What is the brick strength and mortar grade required? Also design the masonry for slenderness Ratio of 16. **(10 Marks)**

OR

8 a. Derive and represent stress distribution in masonry under eccentric loading for eccentricity ratio of $\frac{1}{12}$ and $\frac{1}{3}$. **(08 Marks)**

   b. Design an exterior wall of a workshop building, stiffened by piers, with a spacing of 4.5m c/c. Wall is 3.6m in height and is securely tied at roof and floor level. Wall is carrying steel truss at top. Consider reaction from roof truss as 30kN and load from roof as 7kN/m. $t_p = w_p = 0.4m$, $t_w = 0.2m$. **(12 Marks)**

Module-5

9 a. Discuss the behavior and design criterion of shear walls. **(10 Marks)**

   b. With neat sketch, discuss the significances of reinforced masonry wall, reinforced masonry lintel and reinforced masonry clab. **(10 Marks)**

OR

10 a. Design an exterior wall of a single storey warehouse of 3.5m height. Wall has vertical loading of 25kN/m from roof and wind pressure of 860kN/m^2. The wall is tied with metal anchor at floor and roof level. **(10 Marks)**

   b. With neat sketch, explain different modes of failures observed in, in filled frames. **(10 Marks)**

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