CBCS Scheme

USN | | | | | | | | | | | 15CV553

Fifth Semester B. E. Degree Examination _____

Masonry Structures

Time: 3hrs **Max Marks: 80**

Note: 1) Answer FIVE full questions, choosing one full question from each module.
2) Use of IS 1905-1987 is permitted.
3) Assume missing data if any, suitably.

Module - 1

1. a. Discuss different types of classification of bricks. (05 Marks)
   b. Explain in detail the properties of mortar. (05 Marks)
   c. Explain qualities of good building stones with required standard values. (06 Marks)

OR

2. a. State and briefly explain the factors affecting the compressive strength of masonry. (06 Marks)
   b. The typical floor plan of a building is shown in Fig Q2b.
   i) Floor to floor clear height is 3.0m ii) Slab thickness is 150mm
   Find the effective thickness, effective height, effective length and slenderness ratio for walls A, B and C. (10 Marks)

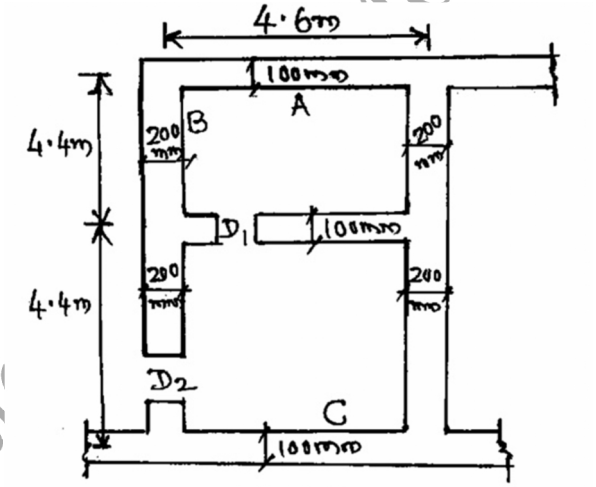

Fig.Q2(b)

Module - 2

3. a. Explain following terms as applied to masonry structures:
   i) Permissible compressive strength
   ii) Stress reduction factor
   iii) Shape reduction factor (06 Marks)
   b. Design an interior wall of a two-storey building to carry 100mm thick RCC slab with 3.0m ceiling height. The wall is unstiffened and it supports a 2.65 m wide slab.
   Live load on the roof = 1.5kN/m^2 Live load on floor = 2.0 kN/m^2
   Weight of terrace = 1.96 kN/m^2 Wt of floor finish = 0.8 kN/m^2 (10 Marks)

OR

4. a. With suitable values explain the following:
i) Effective height ii)Effective length iii) Effective thickness
iv) Slenderness ratio (08 Marks)

b. An interior solid cross wall of a two-storey building is 100mm thick with a ceiling height of 3.0m. It is constructed with a brick of compressive strength 10 N/mm^2 and M1 type mortar. The walls are fully restrained both at top and bottom. Determine:
i) Effective thickness ii) Effective height iii) Slenderness ratio
iv) Stress reduction factor assuming eccentricity e = 0 and v) Permissible compressive stress. (08 Marks)

Module – 3

5. a. Explain the steps involved in consideration of loads and design of masonry wall with openings. (06 Marks)

b. Design an interior solid wall of a two-storey building of storey height of each floor of 3.0m. The wall is stiffened by 100mm thick intersecting walls at 3.6m centre to centre. Also the wall has a door opening of size 900mm x 2000mm at a distance of 200mm from one of the walls. Assume the loading as follows:
i) Roof loading = 15 kN/m ii) Floor Loading = 12.5 kN/m (10 Marks)

OR

6. a. Briefly discuss the steps involved in the design of axially loaded solid wall. (08 Marks)

b. Design an interior cross wall of a two-storey building to carry 100mm thick RCC slab with 3m ceiling height. The wall is unstiffened and it supports a 2.65m wide slab. Live load on the roof = 1.5 kN/m^2, Live load on floor = 2 kN/m^2.
Weight of 80mm thick terrace = 1.96 kN/m^2, Weight of floor finish = 0.2 kN/m^2. (08 Marks)

Module - 4

7. a. What are in-filled frames? Explain in brief. (06 Marks)

b. A wall 20cm thick using modular bricks carries at the top a load of 80 kN/m, having a resultant eccentricity ratio of 1/12. Wall is 5m long between cross walls and is of 3.4m clear height between RCC slabs at top and bottom. What should be the strength of brick and grade of mortar? Assume the joints are not raked. (10 Marks)

OR

8. a. A wall 200mm thick carries an eccentric load of 90 kN/m at the top. The eccentricity ratio is 1/10. The wall is 5.0m long between the cross walls. The clear height between RC slabs is 3m. Design the masonry. (10 Marks)

b. Explain with neat sketches different modes of failure of in-filled walls. (06 Marks)

Module - 5

9. a. Explain the design criteria of walls subjected to transverse loading. (06 Marks)

b. Design a reinforced brick masonry lintel subjected to triangular loading for a window opening of span 1.8m The thickness of the wall is 220mm and the height of the brickwork above the lintel is 1.1m. Length of the wall on either side of the lintel is more than half the span of the lintel. Use brickwork having characteristic strength of 10 N/mm^2 and mild steel bars. (10 Marks)

OR

10. a. Give the assumptions and limitations of reinforced masonry. (06 Marks)

b. Design a compound wall for the data given below:
Ht of wall=1.7m Coping at top=400mm x 100mm
Assume the wind pressure is equal to 1000N/m^2 and is uniformly distributed. The SBC of soil is 120 kN/m^2. (10 Marks)