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P.E.S. College of Engineering, Mandya - 571 401
(An Autonomous Institution affiliated to VTU, Belagavi)
Sixth Semester, B.E. - Civil Engineering
Semester End Examination; May / June - 2019
Design of Masonry Structures

Time: 3 hrs   *Max. Marks: 100*

Note: i) Answer **FIVE** full questions, selecting **ONE** full question from each unit.

ii) Use of IS 1905:1987 and SP:20 code of practice is permitted.

UNIT - I

1 a.	List out the engineering properties of a brick? Explain in detail the efflorescence test and compressive strength.	10
b.	List the factors affecting compressive strength of mortar and explain any two briefly.	10
2 a.	List the different factors considered for selecting of mortar. Briefly explain any two factors.	10
b.	List the requirements and properties of a good mortar. Explain; i) Water retentivity ii) Drying shrinkage	10

UNIT - II

3 a.	Discuss the effect of joint thickness on brickwork strength.	5
b.	Write a short note on; i) Effect of masonry height on compression strength ii) Influence of masonry bonding patterns on strength	10
c.	Write a short note on multi axis stress theory.	5
4 a.	Derive the formulae for brickwork strength based on elastic analysis.	12
b.	Write a short note on : i) Effect of curing ii) Workmanship.	8

UNIT - III

5 a.	Write a short note on increase in permissible compressive stress allowed for vertical and lateral loads with neat sketches.	10
b.	Write a short note on : i) Area Reduction factor ii) Shape modification factor.	10
6 a.	Explain the following terms : i) Permissible compressive stress ii) Permissible shear stress iii) Permissible tensile stress	6
b.	A brick masonry wall of single room building is 20 cm thick and is supported by 10 cm thick RCC slab at its top and bottom. The wall carries a vertical load (inclusive of its own weight) of 80 kN/m at the base at an eccentricity ratio of 0.10, the length of wall is 3 m between the cross walls. Storey height = 3 m. Determine the required crushing strength of bricks and type of mortar used. Use modular bricks.	14

UNIT - IV

7 a. List the design steps involved for the design of Masonry walls under gravity loads. 5

b. Explain the arching action in lintels. 5

c. A reinforced brickwork lintel is made of brick on edge having a total depth of 175 mm and breadth equal to 220 mm. The total reinforcement consists of 4 numbers of 6 mm ϕ mild steel bars placed at 25 mm from bottom face as shown in Fig. 7.1. The characteristic strength of brickwork and steel are 8 N/mm^2 and 250 N/mm^2 respectively. Determine the moment capacity of the lintel. 10
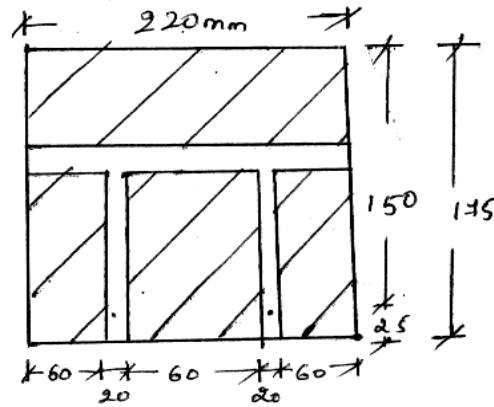

Fig 7.1.

8 a. Design an interior wall of a two storied building carrying 100 mm thick RCC slabs with 3 m ceiling height. The wall is unstiffened and it supports a 2.65 m wide slab. 15

b. Write a short note on load dispersion in masonry walls. 5

UNIT - V

9. Design a compound wall of height 1.8 m upto the top of the coping as shown in Fig. 9. Assuming wind pressure is 1000 N/m^2 distributed uniformly. The safe bearing capacity of soil = 120 kN/m^2. 20
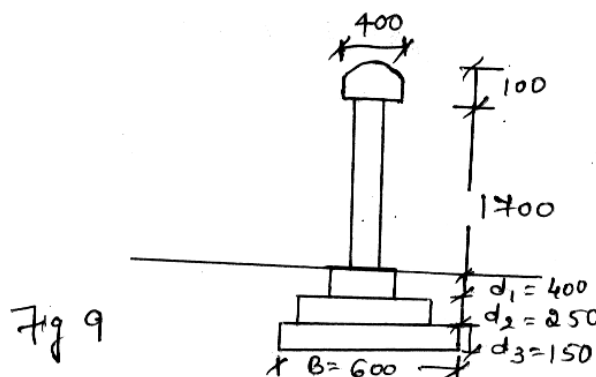

Fig 9

10. Write short notes on:

    i) In filled frames   ii) Free standing wall

    iii) Composite wall beam elements   iv) Wall with openings 20

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