



P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Eighth Semester, B.E. - Civil Engineering

Semester End Examination; June - 2017

Alternative Building Materials and Technologies

Time: 3 hrs

Max. Marks: 100

- Note:** i) Answer **FIVE** full questions, selecting **ONE** full question from each unit.
 ii) Missing data, if any may be suitably assumed.
 iii) Use of IS 1905-1987 is permitted.

UNIT - I

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|------|---|----|
| 1. a | Discuss the importance of energy in building materials and building and also list the energy content per unit for typical building materials. | 10 |
| b. | Discuss the environmental issues related to building materials. Explain how to mitigate the environmental problems. | 10 |
| 2 a. | List out the different blocks used as the masonry units. | 4 |
| b. | List out the factors which are considered for selecting the building blocks. Briefly explain any one. | 5 |
| c. | Explain the various stages of production of stabilized mud block and discuss about the problems and remedies during production. | 11 |

UNIT - II

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|------|---|----|
| 3 a. | Define pozzolana and explain the different types of pozzolana. | 9 |
| b. | What are the important properties of fibres? Mention their broad classification. | 6 |
| c. | Mention the various materials used for matrix and reinforcement in fibre reinforced polymer composites. | 5 |
| 4 a. | Explain the manufacturing process of lime pozzolana cement. | 10 |
| b. | Which are the industrial wastes? How these wastes are converted into building components. | 10 |

UNIT - III

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|------|---|---|
| 5 a. | With neat sketch, explain the construction of Rat-Trap bond. | 6 |
| b. | Define water retentivity. How the water retentivity affect the strength of mortar? | 8 |
| c. | What are the factors to be considered for selection of mortar? Briefly explain any one. | 6 |
| 6 a. | What is ferro-cement and ferro-concrete? Mention the applications of ferro-cement and ferro-concrete. | 6 |
| b. | Explain the slip form construction technique for the construction of masonry vaults. | 6 |
| c. | Explain with neat sketch, the concept and construction procedure of filler slab roof. | 8 |

UNIT - IV

- 7 a. How the moisture absorption and thickness of mortar joint affect the compressive strength of masonry? 10
- b. How the mortar bond strength is obtained? Explain with sketch. 10
- 8 a. Explain the design procedure of masonry wall under vertical gravity loads. 10
- b. Design an interior wall of a two storeyed building carrying concrete slabs with a storey height of 3 m. The wall is stiffened by 100 mm thick intersecting walls at 3.6 m c/c. Also, the wall has a door opening of size 900 x 2000 mm located at a distance of 200 mm from one of the intersecting walls. Assume all inclusive loads on roof and floor to be 15 kN/m and 12.5 kN/m respectively. 10

UNIT - V

- 9 a. What do you understand by stress reduction, area reduction and shape modification factor? 6
- b. External wall of a single storeyed house is 20 cm. thick and has door and window openings as shown in Fig Q.9 (b). Plinth level is 1.2 m above the top of the foundation footing and floor to ceiling height is 2.80 m. One way RCC slab of 3 m clear span bears on the wall and is 10 cm thick. Determine the maximum stress in the wall and calculate the strength of bricks and grade of mortar required for the wall. There is 200 m thick parapet wall of 0.8 m height above the roof slab wall and parapets are plastered on both sides. 14

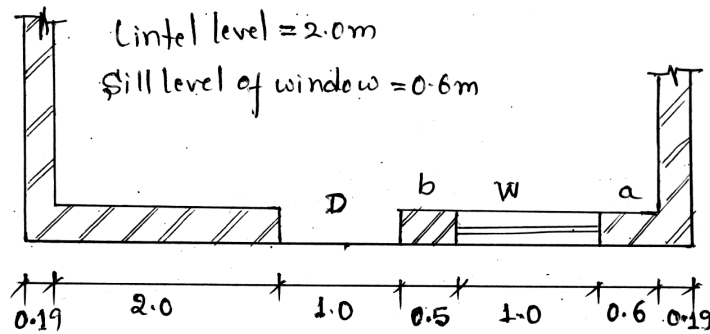


Fig Q. 9 (b) (All Dim in metres)

- 10 a. What are the various boundary conditions and effective height of walls in the design of brick walls? 10
- b. What is the cost effective building design? Explain the cost savings techniques in design and construction. 10

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