

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

February / March 2023 Semester End Main Examinations

Programme: B.E.

Branch: Civil Engineering

Course Code: 20CV5PEABM

Course: Alternative Building Materials and Technologies

Semester: V

Duration: 3 hrs.

Max Marks: 100

Date: 03.03.2023

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

UNIT - I

- 1 a) For the following materials discuss the concept of sustainability using the Venn diagram **10**
- Size stone
 - Lime pozzolana cement
 - Precast concrete elements
 - Structural steel members
- b) A store room needs to be constructed of the following dimensions 8m x12m with a ceiling height of 4.5m. It has a single door of dimension 1.5x2.5m. The contractor has given the following options for wall and roof systems. **10**
- Select the best combination of wall and roof system that can be considered based on their cumulative embodied energy. Also discuss the merits and demerits of the selected structural system.
- Use the following data:

| Options for wall (thickness) | EE (MJ/m ³) | Options for roof | EE (MJ/m ²) |
|------------------------------|-------------------------|------------------|-------------------------|
| CSEB wall (240mm) | 631 | RC Slab | 690 |
| Solid Concrete wall (150 mm) | 1997 | SMB filler Slab | 590 |
| Wire-cut brick wall (220 mm) | 2604 | CSEB vault roof | 300 |

UNIT - II

- 2 a) Compare the engineering properties for the masonry units **08**
- Laterite blocks
 - FalG blocks
 - Hollow Clay blocks
- b) With a flow chart discuss the production of stabilised mud blocks. Discuss the requirements to be satisfied by these blocks to be used as structural units. **12**

UNIT - III

- 3 a) List and discuss the agro wastes that can be incorporated in building construction as materials and components without compromising the requirements. Justify their applications. **10**
- b) Utilisation of C&D waste is the need of the hour. **10**
Justify the statement and options available for their utilisation.

OR

- 4 a) List and discuss the various industrial by products which can be utilised as a replacement to natural aggregates. **10**
- b) Compare lime-pozzolana cement and ordinary portland cement with respect to different criteria. **10**

UNIT - IV

- 5 a) Prepare the list of materials and their specification for the construction of ferro-concrete water tank. Provide a cross section of the ferro-concrete element. **10**
- b) Justify that the performance of fibre reinforced concrete is superior to that of conventional concrete. **10**

UNIT - V

- 6 a) Discuss any two alternate roofing options based on masonry units. **10**
- b) Mention some typical filler materials that can be used in a filler slab construction. Draw a typical cross-section of filler slab and discuss the mechanism. **10**

OR

- 7 a) Discuss any two alternate roofing options based on precast members **10**
- b) With diagrams, explain how lateral thrust can be handled in domes and vaults. **10**
