

UNIVERSITY OF BOLTON

OFF CAMPUS DIVISION

WESTERN INTERNATIONAL COLLEGE

BENG (HONS) CIVIL ENGINEERING

SEMESTER ONE EXAMINATIONS 2022/2023

SUSTAINABLE CONSTRUCTION AND MATERIALS 1

MODULE NO: CIE4019

Date: Tuesday, 10 January 2023

Time: 10:00 – 12:00

INSTRUCTIONS TO CANDIDATES:

There are FIVE questions on this paper.

Answer any FOUR questions.

Marks for parts of questions are shown in the brackets.

This examination paper carries a total of 100 marks.

All working must be shown. A numerical solution to a question obtained by programming an electronic calculator will not be accepted.

Attach page 4 with the answer script.

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Q1

- a) Compare two main types of ground floors used in domestic dwellings, solid floors and suspended slabs/floors.
(11 marks)
- b) Explain with the help of a diagram how forces are distributed in strip foundations.
(7 marks)
- c) While excavating for the foundation of a G+8 building at Reem Island- Abu Dhabi, water was found at a depth of 5 m from the ground level. Suggest a technique for lowering the water level and explain with a detailed annotated sketch the procedure to achieve it.
(7 marks)

Total 25 marks

Q2

- a) A Commercial client has approached your Design and Build Company to undertake a project for their factory which is to be constructed with a footprint of 18m x 10m. The client wants it to be a lightweight structure. With the aid of well-annotated sketches, suggest the most appropriate type of construction for the superstructure of this warehouse and also describe the construction sequence that would entail specifying the important functions of each unit.
(18 marks)
- b) Explain the significance of concrete flat roof with the help of a well-annotated diagram of the concrete flat slab with asphalt covering.
(7 marks)

Total 25 marks

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Q3

a) Discuss the concept of lintels in the wall. With the help of a detailed annotated diagram explain the concrete lintel.

(6 marks)

b) Identify the type of brick bond in wall construction from **Figure Q3**.

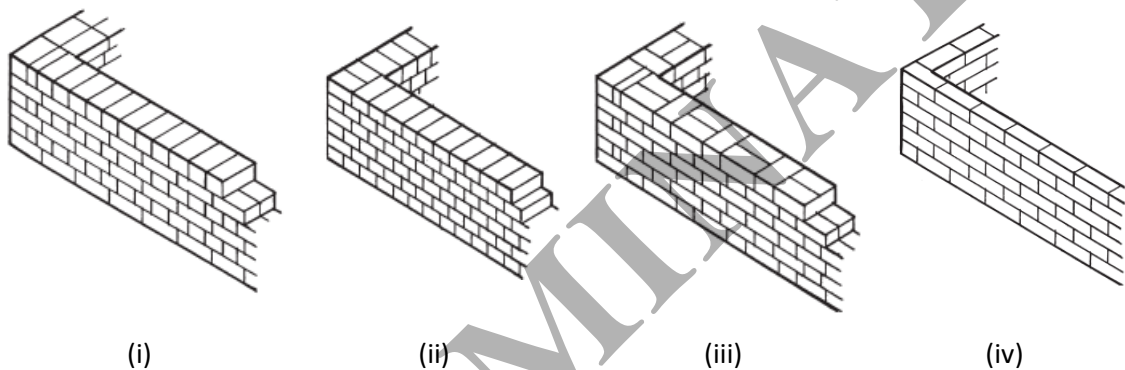


Figure Q3

(4 marks)

c) Draw a section through a brick / block cavity wall with a brief specification of the materials to comply with the latest Building Regulations. Explain the function of each component part of the wall.

(15 marks)

Total 25 marks

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Q4

a) Explain with steps the procedure of truss rafter roof in the construction for two storey houses.

(8 marks)

b) **Figure Q4** illustrates a gable and valley Roof. Annotate the diagram.

(7 marks)

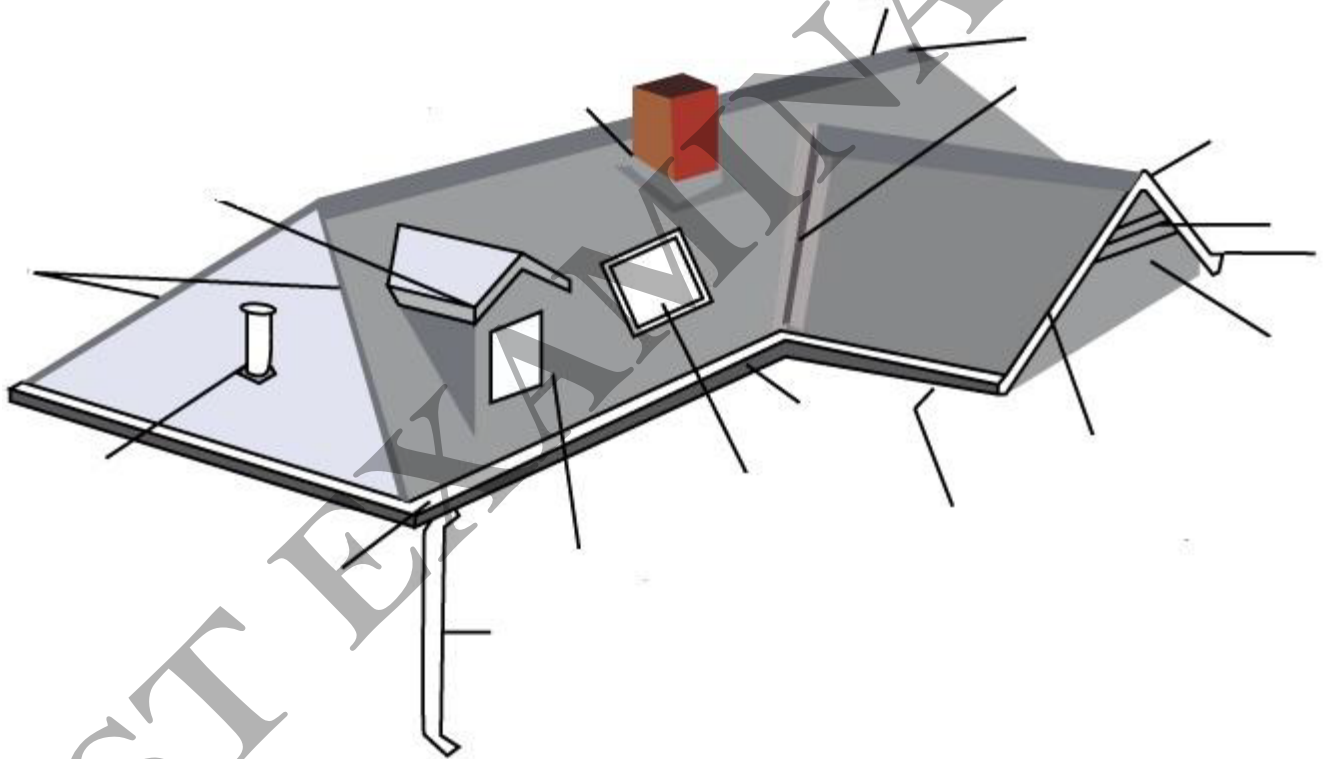


Figure Q4

c) Draw a section through a truss rafter roof at the eaves level annotating all the component parts.

(10 marks)

Total 25 marks

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Q5

- a) What are the factors that affect the consistency of concrete?
(4 marks)
- b) Describe the wet manufacturing process of Portland cement with a neat flow diagram.
(10 marks)
- c) What are the properties of fresh concrete, Explain any two properties of concrete.
(6 marks)
- d) A Steel column is 3 m long and 0.4 m in diameter. It carries a load of 50 MN. The modulus of elasticity is 200 GPa, calculate the compressive stress and strain and determine how much the column is compressed.
(5 marks)

Total 25 marks

END OF PAPER