OCD012

UNIVERSITY OF BOLTON

OFF CAMPUS DIVISION

WESTERN INTERNATIONAL COLLEGE

BENG (HONS) CIVIL ENGINEERING

SEMESTER ONE EXAMINATION 2024/2025

SUSTAINABLE CONSTRUCTION AND MATERIALS 1

MODULE NO: CIE4019

Date: Saturday, 11 January 2025 **Time: 10:00am – 11:30am**

INSTRUCTIONS TO CANDIDATES:

There are FIVE (5) questions on this paper.

Answer any THREE (3) questions.

Marks for parts of questions are shown in the brackets.

This examination paper carries a total of 75 marks.

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

Attach pages 3, 4 & 5 with the answer script.

University of Bolton
Off Campus Division – Western International College
BEng (Hons) Civil Engineering
Semester 1 Examination 2024/2025
Sustainable Construction and Materials 1
Module No: CIE4019

QUESTION 1

Your company, Skyline Developers Ltd., is planning to construct a high-rise office building in an urban area of Dubai. Before starting the project, a detailed site investigation is necessary to evaluate the land conditions, particularly in terms of soil properties, load-bearing capacity, and any underground utilities that may impact construction.

a) What are the primary objectives of conducting a site investigation for a construction project?

(5 marks)

b) Outline the stages of the site investigation that should be conducted for the new high-rise office building project.

(14 marks)

c) Explain the importance of testing soil samples for determining bearing capacity in construction projects.

(6 marks)

[TOTAL 25 MARKS]

University of Bolton
Off Campus Division – Western International College
BEng (Hons) Civil Engineering
Semester 1 Examination 2024/2025
Sustainable Construction and Materials 1
Module No: CIE4019

QUESTION 2

a) Describe the key functional requirements of a floor in a building, emphasizing the importance of strength and stability.

(9 marks)

b) **Figure 1** shows a typical concrete ground-bearing floor with structural edge insulation. Identify each component from the figure.

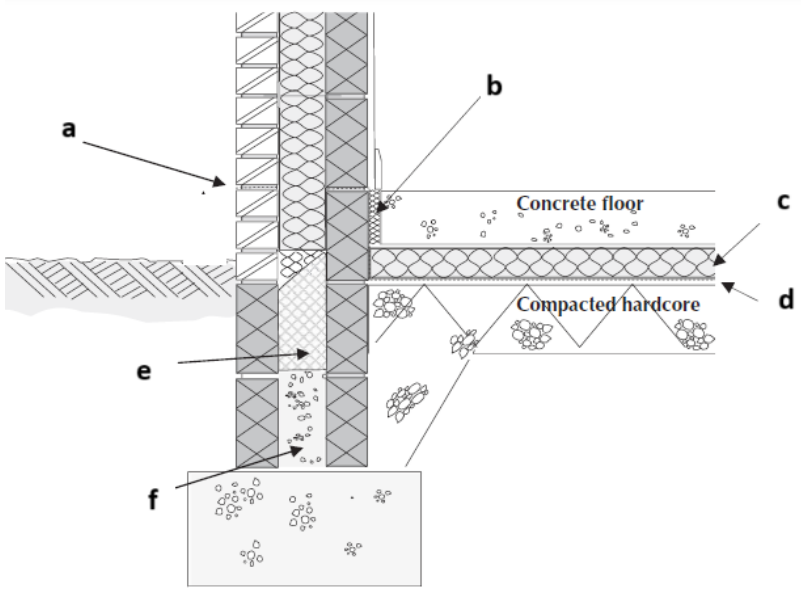

Figure 1: Concrete Ground-Bearing Floor with Structural Edge Insulation

(6 marks)

c) Describe the construction process of a solid ground floor in a domestic building. Why are hardcore and the damp-proof course important in the construction of a solid ground floor?

(10 marks)

[TOTAL 25 MARKS]

Please turn the page

University of Bolton
Off Campus Division – Western International College
BEng (Hons) Civil Engineering
Semester 1 Examination 2024/2025
Sustainable Construction and Materials 1
Module No: CIE4019

QUESTION 3

a) Briefly describe the different types of bricks, including commons, facing, engineering bricks and special bricks.

(8 marks)

b) **Figure 2** is an illustration of some typical (standard) specials bricks. Identify each brick from the figure.

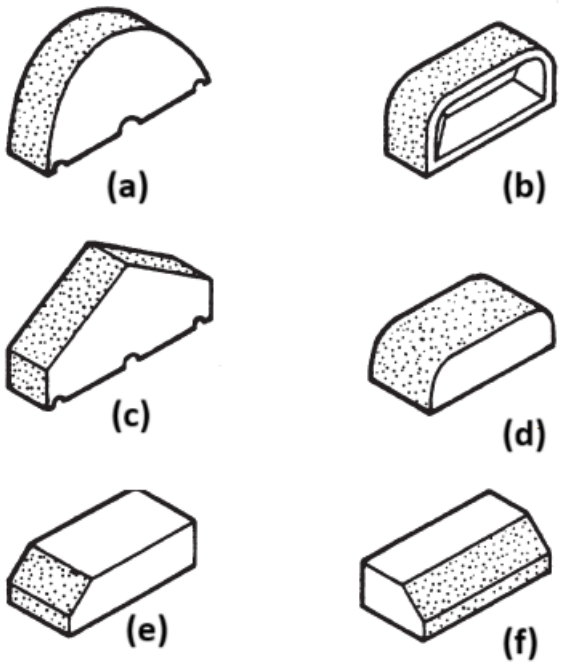

Figure 2: Specials Bricks

(9 marks)

Question 3 continued over the page…

University of Bolton
Off Campus Division – Western International College
BEng (Hons) Civil Engineering
Semester 1 Examination 2024/2025
Sustainable Construction and Materials 1
Module No: CIE4019

Question 3 continued…

c) With the help of a neat sketch compare the characteristics of English and Flemish bond in brick wall construction. What makes Flemish bond more aesthetically preferred for facing brickwork?

(8 marks)

[TOTAL 25 MARKS]

QUESTION 4

a) Sketch the typical details of a steel framed distribution warehouse, at foundation and the beam to column joint specifying the important functions of each unit

(10 marks)

b) **Figure 3** illustrates a gable and valley roof. Annotate the diagram.

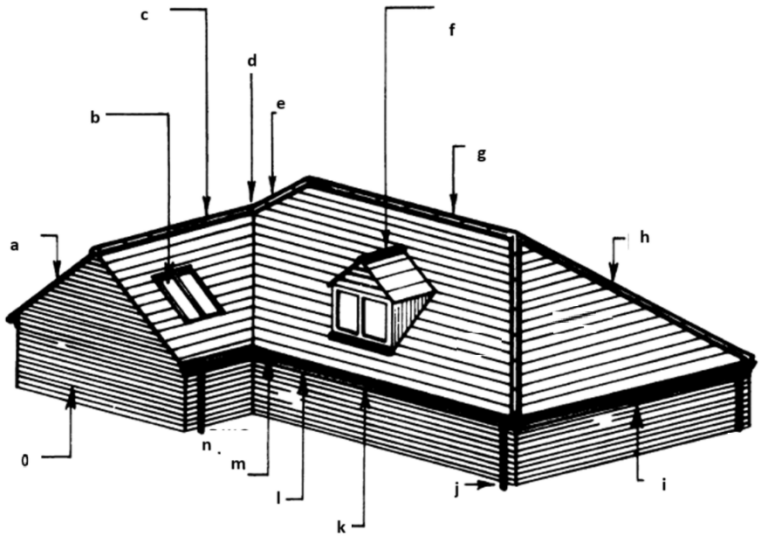

Figure 3: Gable and Valley Roof

(15 marks)

[TOTAL 25 MARKS]

Please turn the page

University of Bolton
Off Campus Division – Western International College
BEng (Hons) Civil Engineering
Semester 1 Examination 2024/2025
Sustainable Construction and Materials 1
Module No: CIE4019

QUESTION 5

a) Describe the slump test procedure for measuring the workability of concrete and include a sketch to illustrate the process.

(12 marks)

b) Explain why full compaction of concrete is necessary.

(6 marks)

c) A rod 150cm long and diameter of 2 cm is subjected to an axial pull of 20KN. If the modulus of elasticity of the material of the rod is 2×10^5 N/mm^2, Determine:

i) Stress generated and corresponding strain

(5 marks)

ii) The elongation of the rod

(2 marks)

[TOTAL 25 MARKS]

END OF QUESTIONS