

UNIVERSITY OF BOLTON

OFF CAMPUS DIVISION

WESTERN INTERNATIONAL COLLEGE

BENG(HONS) CIVIL ENGINEERING

TRIMESTER ONE EXAMINATION 2021/2022

SUSTAINABLE CONSTRUCTION AND MATERIALS 1

MODULE NO: CIE4019

Date: Thursday 6th January 2022

Time: 10:00 – 12:00

INSTRUCTIONS TO CANDIDATES:

There are FIVE questions on this paper.

Answer ANY FOUR questions.

Answer Section A and Section B questions in SEPARATE answer books.

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.

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Module No. CIE4019

SECTION A

Q1

a) A Commercial client has approached your Design and Build Company to undertake a project of their factory which is to be constructed with a foot print 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.

(20 marks)

b) Explain the different factors to be considered in bonding in wall construction. Illustrate your answer with the help of suitable diagrams of bonds (ANY ONE) used in wall construction.

(5 marks)

Total 25 marks

Q2

a) Piled foundations carry loads from a structure and transfer them into the ground, in such a manner as to avoid settlement of the structure and failure of the ground. Using well annotated sketches, discuss how load transfer system is achieved in frictional bearing piles and indicate the most applicable subsoil for this type of pile.

(10 marks)

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

(10 marks)

c) List the advantages of using truss rafter roof in the construction to a traditional cut roof for two storey houses.

(5 marks)

Total 25 marks

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Q3

- a) Compare two main types of ground floors used in domestic dwellings, solid floors and suspended slabs/floors. Describe in detail the main components of solid floor and illustrate your answer with annotated sketches.

(11 marks)

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

(8 marks)

- c) What are strip foundations? Explain the purpose and the situations wherein these foundations are preferred.

(6 marks)

Total 25 marks

Q4

- a) Discuss the concept of lintels in openings in buildings. Illustrate methods that you would use for proper insulation and moisture resistance.

(5 marks)

- b) How can shear failure be prevented in the foundation?

(5 marks)

- c) Draw a section through a brick / block cavity wall including 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

END OF SECTION A

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SECTION B

Q5

- a) Explain why full compaction of concrete is necessary.
(3 marks)
- b) Explain with diagram the indication of true slump, zero slump, collapse slump and shear slump in slump tests?
(8 marks)
- c) During the site investigation of Bermuda Villas, Quality Engineer observed segregation of concrete in the Beams and Columns. Explain segregation and suggest the remedies to overcome it.
(6 marks)
- d) A wire 2m long and 2mm in diameter, when stretched by weight of 8kg has its length increased by 0.24mm. where, $g = 9.8m/s^2$
Determine
- i) Stress generated and corresponding strain
(2 marks)
 - ii) The modulus of elasticity
(2 marks)
- e) What is the difference between cement grout and cement mortar and mention its applications?
(4 marks)

Total 25 marks

END OF SECTION B

END OF PAPER