UNIVERSITY OF BOLTON

WESTERN INTERNATIONAL COLLEGE FZE

BENG (HONS) CIVIL ENGINEERING

SEMESTER TWO EXAMINATION 2018/2019

CONSTRUCTION AND MATERIALS TECHNOLOGY

MODULE NO: CIE4008

Date: Tuesday 21st May 2019 **Time: 10.00am to 01.00pm**

INSTRUCTIONS TO CANDIDATES:

There are FIVE questions in this paper

Answer ANY FOUR questions from Section A and ALL questions from Section B.

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

All questions carry equal marks.

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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SECTION A

Question 1

(a) Describe in detail the main components of ground bearing slabs used for domestic floor construction and illustrate your answer with annotated sketch.

(10 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)

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

(5 marks)

Total 20 marks

Question 2

(a) If a client wants to construct a basement for storage of building materials for a future business on a site where the water table is high, what procedures should be adopted during construction?

(5 marks)

(b) 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 each type of load transfer system is achieved and indicate the most applicable subsoil for each type.

(15 marks)

Total 20 marks

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Question 3

A Commercial client has approached your Design and Build Company to undertake a project of their industrial warehouse which is to be constructed with a foot print of 24m x 10m. With the aid of well annotated sketches, suggest the most appropriate type of construction for the superstructure of this warehouse and describe the construction sequence that would entail.

Total 20 marks

Question 4

(a) With regards to domestic house construction, explain the difference between Traditional brickwork/block work construction and Timber framed construction. Include the merits and limitations of both construction processes.

(12 marks)

(b) Sketch the typical details of domestic dwelling, using timber framed construction at the following location

i. Eaves detail at roof (8 marks)

Total 20 marks

Question 5

(a) Discuss the components of a typical wall in modern timber frame construction using annotated sketch. Discuss the importance of breather membrane and the various aspects to be considered during its installation.

(12 marks)

(b) Discuss the various parts of a staircase with the help of a sketch.

(8 marks)

Total 20 marks

END OF SECTION A

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SECTION B

Question 6

(a) A normal strength concrete of low to medium workability is to be used as base slab foundations. The concrete must achieve a compressive strength of 30N/mm^2 after 28 days, as stated in the contract specification. Three 150mm cube specimens have been prepared for compression test.

After 28 days of curing, three cubes have been tested under compression and the failure loads were 653, 657 and 665 kN. Does this concrete fulfil the requirements of the contract?

(4 marks)

(b) During the site investigation of Flemingo Villas, Quality Engineer observed segregation of concrete in the Beams and Columns. Explain segregation and bleeding and suggest the remedies to overcome it.

(6 marks)

(c) During the construction of a concrete strip footing, samples were taken for fresh concrete testing. The following data has been collected:

Table Q6: Degree of Compactability Test

Container				**Distance "s"***			
Height Mm	**Length mm**	**Width Mm**	**Weight g**	**s1 mm**	**s2 mm**	**s3 mm**	**s4 mm**
400	200	200	5650	43	42	38	39

* Distance "s" is the distance from the surface of the compacted concrete to the upper edges of the container.

(i) Using the data provided in **Table Q6**, calculate the degree of compactability for the fresh - concrete sample.

(4 marks)

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Question 6 continued over the page

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Question 6 continued.

(ii) If the weight of the container after compaction of concrete was 40.69 kg, calculate the wet density of the compacted concrete, expressed in kg/m^3.

(6 marks)

END OF PAPER