

**UNIVERSITY OF BOLTON**  
**SCHOOL OF ENGINEERING**  
**BENG (HONS) CIVIL ENGINEERING**  
**SEMESTER TWO EXAMINATION 2018/2019**  
**CONSTRUCTION & MATERIALS TECHNOLOGY 1**  
**MODULE NO: CIE4008**

Date: Wednesday 22<sup>nd</sup> May 2019

Time: 14:00 – 17:00

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**INSTRUCTIONS TO CANDIDATES:** There are FIVE questions. Answer ALL questions

Question ONE is COMPULSORY

All questions carry equal marks.

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### **Scenario**

A developer is considering purchasing a site (approximate size 2 hectare) and proposes to build forty, two storey detached houses on the site. The location of the site is Park Road Hale Trafford WA15 7AW. Access to the site is off Park road.

The site's current use is that of a market garden and currently contains a variety of single storey greenhouses scattered across the site. Tree's present on the land include a number Willow trees near a brook that runs through the centre of the site.

Borehole survey reveals that the ground consists of 500mm good top soil 300mm peat, 4000mm of firm clay 5000mm marl. The water table is 500mm below ground level.

The developer has requested that you investigate the issues 1- 5 below associated with the development as they are considering constructing two storey detached houses on the site.

### **Q1- Compulsory Question**

(a) Referring to the scenario above identify the main concerns that you would need to consider in relation to a site investigation.

**(10 marks)**

(b) Explain where you could obtain relevant information about the site's past history to help you make an informed decision about purchasing the site.

**(5 marks)**

(c) Analyse the information contained in the scenario above and draw an annotated section through a suitable foundation that could be used for all the buildings across the site.

**(10 marks)**

**Total 25 marks**

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**Q2**

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

**(15 marks)**

(b) Explain with the aid of sketches how you would provide lateral restraint to a cavity wall at the first floor, second floor and roof level to comply with current building regulations.

**(10 marks)**

**Total 25 marks**

**Q3**

(a) Explain the structural principles of a truss rafter. Draw a section through a truss rafter roof including the eaves detail annotating all component parts.

**(15 marks)**

(b) List the advantages and disadvantages of using a traditional cut roof compared to a truss rafter roof in the construction of the two storey houses on the development.

**(10 marks)**

**Total 25 marks**

**Q4**

Explain the advantages and disadvantages of using timber frame against brick and block to construct the two storey houses on the proposed housing estate.

**Total 25 marks**

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**Q5**

(a) Explain with the aid of sketches two types of drainage system that could be used as part of the development using one detached house as an example.

**(15 marks)**

(b) Explain with the aid of an annotated sketch how the drains can be tested prior to back filling with earth.

**(10 marks)**

**Total 25 marks**

**END OF PAPER**

PAST EXAMINATION PAPER