

UNIVERSITY OF BOLTON
SCHOOL OF ENGINEERING
BSC (HONS) CONSTRUCTION PROJECT
MANAGEMENT
SEMESTER ONE EXAMINATION 2022/2023
BUILDING AND ENVIRONMENTAL TECHNOLOGY
MODULE NO: CAS5010

Date: Tuesday 10th January 2023

Time: 14:00 – 16:00

INSTRUCTIONS TO CANDIDATES:

There are SIX questions.

Question 1 is compulsory

Answer any THREE questions from the remaining five.

All questions carry equal marks.

Marks for parts of questions are shown in brackets.

This examination carries a total of 100 marks.

All working must be shown where necessary.

Question 1: compulsory question

In the policy paper 'COP26 Energy Transition Council: 2022 strategic priorities', published in November 2021, the Energy Transition Council sets out its aims to make clean and sustainable power the most affordable and reliable option for countries to meet their power needs efficiently and accelerate their clean energy transition - moving away from coal and other fossil fuels - while ensuring a just transition and improved energy access for all. This policy is aligned with Sustainable Development Goal (SDG) 7 – Affordable and Clean Energy.

Consider this scenario:

The UK and its European neighbours is suffering an energy crisis; the causes are complex in origin but there is an accelerated need to transition away from fossil fuels and biomass towards cleaner renewable electricity. On a business park in occupation across approximately 2 hectares, the buildings have a variable energy demand. The site proposes to embark upon a phased energy transition away from national grid dependency, to on-site renewables. A management team is invited to contribute from initial scoping through to delivery. There is an adjacent undeveloped site that is earmarked for utilisation as a wind turbine or solar farm to support this on-site energy transition. Access to the site is good; it is relatively flat and not shaded by trees or adjacent buildings.

Your tasks:

- a. Appraise factors to be considered in this exercise, considering appropriate renewable technologies suitable for variable demand, geographic location and maintenance.
(10 marks)
- b. Explain how you would influence and lead the design team to ensure that this development 'meets the needs of the present without compromising the ability of future generations to meet their own needs'. Account for end of life and decommissioning.
(8 marks)
- c. Make the business case to the design and management teams for how the optimisation of 'plug in loads' across the built assets will save energy, carbon and money in the short and medium terms.
(7 marks)

Total 25 marks

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Part B: Answer any 3 questions from the following 5 questions

1. Mindful that cold water installation systems in public buildings may be direct or indirect, discuss possible causes of water contamination, and advise owners on potential protective measures

25 marks

2. Critically appraise the use of any two external facade techniques for multi-storey developments, in the context of meeting criteria such as environmental sustainability, thermal efficiency, aesthetic appearance and fire resistance.

25 marks

3. Modern commercial buildings need to be adaptable, as market fluctuations may often drive organisational change for end-users. Internal arrangements need to be flexible, and permit low-cost and sustainable adjustments over time. Discuss factors to be considered in the internal design of raised floors, internal partitions and suspended ceilings, that make such adjustments viable.

25 marks

4. A party wall on a three-storey Georgian building is showing signs of severe cracking due to foundation subsidence. The new owners of the property intend to underpin the party wall of the building. Explain the procedure that they should follow under the Party Wall etc Act 1996.

25 marks

5. An existing three storey city centre building with basement, comprises brick built external walls, timber floors and a pitched slate traditional roof. It is to be demolished to make way for a new modern multi-storey commercial development. There are no adjoining buildings. Discuss factors that need to be considered in demolition of the structure and removal of the basement, paying particular attention to how you will mitigate risks and potential hazards.

25 marks

END OF QUESTIONS