

Industrial Sustainability

24WSD602

Semester 2, 2024-25

In-Person Exam paper

This examination is to take place in-person at a central University venue under exam conditions. The standard length of time for this paper is **2 hours**.

You will not be able to leave the exam hall for the first 30 or final 15 minutes of your exam. Your invigilator will collect your exam paper when you have finished.

Help during the exam

Invigilators are not able to answer queries about the content of your exam paper. Instead, please make a note of your query in your answer script to be considered during the marking process.

If you feel unwell, please raise your hand so that an invigilator can assist you.

Answer **ALL FOUR** questions.

Questions carry the marks shown.

Calculators are **NOT** permitted.

1. Consider the case of a medium sized, UK-based clothing manufacturer. Whilst the garments are sewn and finished in the UK, the company uses cotton fabric that was woven in Sri Lanka, with the cotton thread having been produced in India.
 - a) The company is intending to reduce the environmental impacts of their business, and to do this may either choose to embed corporate social responsibility (CSR) practices or choose to establish an environmental management system (EMS) across the organisation. Compare and contrast the different approaches (CSR and EMS) the company may take. [10 marks]
 - b) Assume the company decides to implement an EMS. Suggest an aspect, an associated impact and a SMART objective that the company may define to include in their environmental management program. The aspect should relate specifically to the company's core manufacturing activity. [5 marks]
 - c) Explain how the 'Act' phase of the EMS would consider the performance of the company against your defined SMART objective and how this would feed into the next iteration of the EMS. [5 marks]
2. A manufacturer of industrial heating systems is planning to deliver an advanced service as part of its business offering.
 - a) Describe why it would be useful for the company to undergo a process of vertical integration, explaining two particular benefits that such a change would have on the delivery of the advanced service. [6 marks]
 - b) Assume that the advanced service being delivered is of the 'functional result' type. Identify and justify two reasons why this might lead to a reduction in environmental impacts in comparison to a pure product offering. [4 marks]
3. Industry 4.0 concepts are seen as key enabler to achieve global food security and to improve the overall productivity and sustainability of the UK food manufacturing industry.
 - a) Briefly describe four core principles of Industry 4.0. [8 marks]
 - b) With the aid of examples, explain how these core principles could be used to improve the overall sustainability of the UK food manufacturing industry. [12 marks]

4. Manufacturing companies are increasingly forced to adopt sustainable business models (SBM).
- a) Describe what is meant by SBM and provide two reasons why these have become so important for the long-term viability of manufacturing companies. [6 marks]
- b) Identify four key characteristics of SBM. [4 marks]

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