PRIFYSGOL ABERYSTWYTH UNIVERSITY

SEMESTER ONE 2026

COMPUTER SCIENCE

CS37420 : E-COMMERCE: IMPLEMENTATION, MANAGEMENT AND SECURITY

Time allowed: **2 HOURS**

Answer **THREE** from **FOUR** questions.

All questions carry equal marks.

YOU MAY BRING THE FOLLOWING INTO THE EXAMINATION
UP TO 3 SHEETS OF NOTES ON A4 PAPER (WHICH MAY BE DOUBLE-SIDED). THERE ARE NO ADDITIONAL RESTRICTIONS ON CONTENT OR FORMATTING OF THESE NOTES. NO ELECTRONIC DEVICES.

CALCULATORS ARE NOT PERMITTED.

STUDENTS MAY SUBMIT ANSWERS TO THIS PAPER IN EITHER WELSH OR ENGLISH

Once seated, students may complete the front cover of the answer book(s) and the attendance slip ONLY.

DO NOT TURN THE EXAMINATION QUESTION PAPER OVER UNTIL INSTRUCTED TO DO SO.

1. This question is about e-commerce implementation strategies for small businesses.

A small family-owned electronics shop is located in a coastal town in the UK. The shop relied on in-store sales until the COVID-19 lockdowns seriously disrupted the business. In the past few years, "click-and-collect" has become popular with people shopping at other local stores.

The shop's website is currently just a product list with no transactional capability. The owner wants to preserve in-person advice as a unique selling point and begin reaching tourists, but cannot afford a large marketing budget. The staff team is small but dependable.

a) Identify and describe three e-commerce implementation strategies that the business could realistically consider in the next year. For each, clearly explain its main features. [9 marks]

b) For each strategy identified in part (a), analyse the main resources required (staff, technology, investment), specify likely risks or barriers to implementation, and indicate which drivers or barriers are most relevant for each. [9 marks]

c) For each strategy, propose one clear SMART objective that could be used to judge its success. For each objective, briefly explain how it meets all SMART criteria (Specific, Measurable, Achievable, Relevant, and Time-bound) in the business context. [6 marks]

d) Based on your analysis, recommend one of the strategies for immediate implementation. Justify your choice by discussing how it fits the company's strengths, addresses local market needs, and overcomes the main challenges. [9 marks]

2. This question is about selecting payment methods for digital subscription businesses.

A UK-based business sells digital subscriptions for educational resources to both individuals and schools. Currently, it relies on card payments and bank transfers. The business experiences a high percentage of customers who stop their individual monthly subscriptions, often due to failed payments. International expansion is planned for next year.

The business is considering introducing three payment options:

- PayPal
- Direct debit
- Digital wallets (Apple/Google Pay).

a) For each of the three proposed payment methods, briefly summarise its main features and discuss its suitability for both individual subscribers and institutional (school) clients. [9 marks]

b) Analyse how each payment method could impact payment reliability, customer retention, convenience, and trust. [9 marks]

c) Compare the expected costs, technical integration issues, and security/fraud considerations for each payment method from the business's perspective. [9 marks]

d) Based on your analysis, recommend which combination of payment methods the business should prioritise for successful international expansion. Briefly justify your selection in terms of balancing cost, customer adoption, retention, and operational complexity. [6 marks]

3. A company sells sports clothing and exercise equipment in the UK. It has stores in several towns and it has an online store. The online store was created by a web consultancy, which also hosts the online store. The online store is a WordPress site with an e-commerce plug-in. The store is used by customers who are mostly within 1 hour of one of the physical stores.

a) The company has decided to invest in the online store, with the aim of expanding to reach more customers across the UK and improved support for peak periods. The investment will include hiring a development team to build and maintain a new store.

The new online store will offer more products and customisation options, a regular blog with videos, improved customer service options and a loyalty scheme.

Discuss how this company could use cloud computing to create the new online store. Consider the relevance of SaaS, PaaS, IaaS as appropriate. [12 marks]

b) The company uses email as part of its marketing strategy. It has approximately 1,000 subscribers for the list. It sends out a monthly newsletter by email.

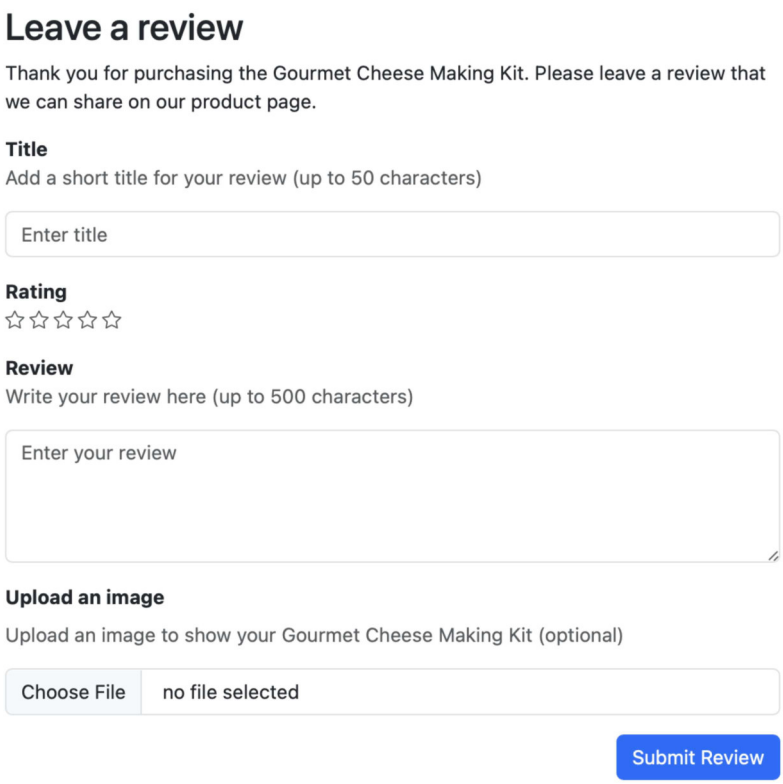
To subscribe, a person enters their email into a form on the website and submits the form. The company uses images in its emails for most graphical elements, background images for sections in the emails, and other styling.

(i) Discuss **two** possible problems with the existing setup for the email marketing, and how these could be improved. [8 marks]

(ii) The company has not monitored how successful these emails are at directing people to the online store. Discuss **two** techniques the company can use to improve this situation. [13 marks]

4. This question is about security issues for e-Commerce sites.

a) A company sells food gifts through its online shop. The development team has designed a new form for customers to leave product reviews, shown below. The reviews will be stored to a database and moderated by a member of the marketing team. Once the review is approved, it will be added to the relevant product page.



Discuss how this form could be vulnerable to code injection attacks. What should the development team do to protect the site from people using this form for a code injection attack? [13 marks]

b) The company has a user password system that stores user details and hashed passwords in its local database.

(i) Discuss **one** advantage and **two** disadvantages of using the existing password system. [6 marks]

(ii) The company is considering adopting an OpenID Connect authentication system or adopting Passkeys. Discuss what these two technologies are and how they can address the disadvantages in part (i). [14 marks]

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