PRIFYSGOL ABERYSTWYTH UNIVERSITY

SEMESTER TWO 2026

COMPUTER SCIENCE

CS22220 : SOFTWARE ENGINEERING FOR THE WEB

Time allowed: **2 HOURS**

Answer **TWO** from **THREE** questions.

Answer **ONE** question from Section A, **ONE** question from Section B.

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.

SECTION A

Answer **ONE** from **ONE** question

1. The question explores the issue of assessing the ethical implications of your decisions.

A furniture manufacturer is concerned about the efficiency of stock deliveries to their retailers. Currently, drivers deliver furniture to retailers and upon delivery, record an electronic signature using a custom app. The app stores the signature on a server along with delivery time. You were the lead engineer responsible for the delivery app.

In a recent meeting, it becomes clear that management distrust the delivery teams and suspect some drivers are making detours (but they have no evidence for this). Management have asked you to extend the app to keep track of the delivery team at all times, recording driver location data on the server alongside delivery time(s) and signature(s). This must be done with no interaction required by the drivers. Indeed, drivers must not be aware that this extra data gathering is happening.

a) Identify a possible unethical situation that may occur when implementing this addition to the app. [10 marks]

b) How would you use the 5 tests for ethical behaviour to further analyse the issue you identified in question 1a) above? [20 marks]

c) How would you apply the BCS Code of Conduct to decide whether you have a problem here? [20 marks]

SECTION B

Answer **ONE** from **TWO** questions

2. This question is about quality assurance.

a) Why is recognised certification important to many companies in the software industry? [3 marks]

b) Outline the typical steps a software company must take to acquire certified status, for example ISO/IEC/IEEE 9001. [12 marks]

c) You are in a team of very talented and experienced software developers. Are quality assurance procedures and management necessary to ensure quality? Explain your answer. [15 marks]

d) There have been a number software systems that have failed due to a lack of quality assurance procedures. For example the London Ambulance Dispatch System failure was studied in lectures. Select an example of your choice and answer the following questions.

(i) Describe the system failure. [6 marks]

(ii) Explain which quality assurance improvements might have helped prevent the failure. [14 marks]

3. This question is about planning and testing in agile and plan-driven methodologies.

A team is developing a new online accounting system for small businesses.

a) The team is using a plan-driven methodology. The plan for the first stage of work includes a number of tasks, an estimate of the days needed and the dependencies between the tasks. Table 1 shows this information.

Task	Days Needed	Dependencies
T1	5	
T2	5	T1
T3	10	T1
T4	5	T2, T3
T5	5	T3
T6	10	T4
T7	15	T5
T8	15	T5
T9	5	T6, T7
T10	10	T8, T9

Table 1: Task list and dependencies for the software project

(i) Draw a task chart that shows this information. On the task chart, show the critical path and state the time needed for the critical path. [12 marks]

(ii) During development, a delay causes an additional 5 days of work for T4. Due to requirements changes, T7 will now take 5 days less and T8 will take an additional 10 days. Does this change the critical path? Explain your answer. [6 marks]

b) The team is considering changing to Scrum for future stages of the development.

(i) Discuss how the planning would be different for this team if it used Scrum instead of a plan-driven approach. As part of your answer, comment on the use of Stories, Sprints, and Scrum Events. [20 marks]

(ii) Explain what Test Driven Development (TDD) and Pair Programming are, and discuss two advantages these could provide for the team. [12 marks]

END OF PAPER