PRIFYSGOL ABERYSTWYTH UNIVERSITY

SEMESTER TWO 2026

COMPUTER SCIENCE

CS11010 : FUNDAMENTALS OF WEB DEVELOPMENT

Time allowed: **1 HOUR AND 30 MINUTES**

Answer **TWO** from **THREE** 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 concerns HTML, CSS and associated web standards and good practice.

a) Write a complete HTML5 document that includes the following:

- A `<!DOCTYPE>` declaration. This is a longer sentence that I want to check the wrapping on.
- A `<head>` section with a `<title>` that reads "My Web Page."
- A `<body>` section containing:
  - A level-1 heading (`<h1>`) that says "Welcome!"
  - A paragraph (`<p>`) that says "This is my HTML page."
  - An unordered list (`<ul>`) with three items: "HTML," "CSS," and "JavaScript."

Include a brief comment (one sentence) at the top of your code explaining what the `<!DOCTYPE>` declaration does. [15 marks]

b) Style, or presentation, is mainly controlled by the use of CSS (cascading style sheets). In fact, in most recent versions of the HTML family, including HTML5, style is not allowed to be included directly within the HTML, and the use of CSS is required in order to change the presentation of a web page.

Discuss why forcing web page developers to use CSS, rather than putting style directly into their pages, is a good thing. Be sure to address issues of consistency, usability, maintainability and accessibility in your answer. [15 marks]

c) Explain the structure of a CSS style rule, making sure you use the terms “selector”, “style declaration” and “property” in your answer. [10 marks]

d) Explain how, in CSS, pseudoclasses might enable a web link to take on different styles according to whether it has been clicked or not. How might this same principle apply to rows in tables? [10 marks]

2. This question is about client-side scripting on the web.

a) There are many scripting languages used on the web.

(i) On the client side, however, only one (JavaScript/ECMAScript) is widely used. Why do you suppose this is? [5 marks]

(ii) On the server-side, by contrast, there are many. Why the difference? [5 marks]

b) JavaScript knows about a few types, including `number`, `string` and `boolean`. It uses dynamic typing.

(i) What implications does dynamic typing have for this when I want to convert a variable from one type to another? [5 marks]

(ii) Why can this be a problem in certain circumstances, for example when concatenating a number with a string? [5 marks]

c) In JavaScript, it is considered good practice to declare variables explicitly using `let` or `var` rather than relying on implicit creation.

(i) Explain why it is important to declare variables explicitly. [4 marks]

(ii) Describe the key advantage of using `let` over `var`, and provide a brief code example to illustrate the difference. [6 marks]

d) Explain how the JavaScript method `getElementById` can be used to dynamically manipulate the contents of a web page, in conjunction with the `innerHTML` property. You may recall some code we saw during lectures which illustrated this, and may help you in your answer:

```
answerLocation=document.getElementById("answer");
answerLocation.innerHTML="You ordered a " + mydrink + " " + txt;
```

[10 marks]

e) Dynamic manipulation of a web page is triggered by events. Probably the most common of these are mouse events. Describe how this works in JavaScript, using a brief example. [10 marks]

3. This question covers semantic markup, the mobile web and image formats.

a) Web 3.0 is often referred to as “the semantic web”, a term coined by the acknowledged inventor of the WWW, Sir Tim Berners-Lee. Whether or not his vision of the semantic web are ever realised, semantic markup has become an important feature of HTML5.

(i) Consider the `<div>` element, and the HTML5 elements `<header>`, `<nav>`, `<main>`, `<article>` and similar. How do these HTML5 elements contribute to this vision? [10 marks]

(ii) We can consider element pairs such as `<b>` and `<strong>`, `<i>` and `<em>`, as illustrating the difference between presentational and semantic markup. Explain this. Why is it a good thing to use the semantic versions? In your answer, address accessibility issues. [10 marks]

b) A large percentage of web browsing these days is done on mobile devices. So it is vital to ensure that we do not alienate mobile users by designing our web pages only for standard computer monitors. Until relatively recently, the normal approach major web sites took to this was to produce a separate mobile site. But as mobile technology evolved that has become less and less satisfactory. Explain, in this context, how responsive design can solve the problem, giving an outline of how it works. [10 marks]

c) Choosing the right format for images you wish to display on the web is very important, not just because of the quality of the image, but more importantly because of download speed.

Under what circumstances would each of the following formats be the correct choice? [20 marks]

(i) jpeg (.jpg)

(ii) portable network graphics (.png)

(iii) graphics interchange format (.gif)

(iv) scalable vector graphics (.svg)

(v) WebP (.webp)

END OF PAPER