

- Q1. (a) Write a piece of HTML code that produces the following unnumbered and numbered lists:

This is a list of bullet points:

- first bullet
- second bullet
- third bullet

This is a list of numbered points:

1. first item
2. second item
3. third item

Please use proper opening and closing tags. You do not need to write a full HTML page, just the code (to be embedded in the body) that produces the result above. You do not need to provide any CSS styling. [4]

- (b) What is the key characteristic of an empty HTML element? Give an example of such an element. [3]
- (c) In HTML, what is the difference between a block element and an inline element? Give an example of each of them. [3]
- (d) What is the difference between the following specifications of a particular field in an HTML form? [3]
- i. `<textarea name="Beer" rows="1" cols="20">Brains</textarea>`
 - ii. `<textarea name="Beer" rows="1" cols="20" placeholder="Brains"></textarea>`
- (e) What image format would be most appropriate for each of the following types of images and purposes? Choose between GIF, PNG, JPEG and SVG and explain your answer. [4]
- i. The design of the British flag, or the logo of McDonalds, when the purpose is to allow resizing the image without quality loss.
 - ii. A portrait of Her Majesty the Queen, or a photo of Cardiff Castle, when the purpose is to represent a natural (photographic) image in a space efficient way.
 - iii. A screenshot of an old 8-bit computer game (say PacMan or Space Invaders), when the purpose is to accurately represent pixel values in a space efficient way, despite the image containing sharp edges or abrupt changes of intensity.
 - iv. An animated emoji, or an animated avatar.
- (f) Using the anchor tag (`<a>`) give an example of using an absolute address and an example of a relative address. What is the advantage of using a relative address when compared to using an absolute address? [3]

20 Marks Question Total

- Q2. (a) Show (draw) what would the browser display when provided with the following HTML code fragment. Explicitly provide the dividing lines. [5]

```
<table border="1">
  <tr>
    <th colspan="2"> Name </th>
    <th> Country </th>
  </tr>
  <tr>
    <td> Carwyn </td>
    <td> Jones </td>
    <td rowspan="2"> Wales </td>
  </tr>
  <tr>
    <td> Leanne </td>
    <td> Wood </td>
  </tr>
  <tr>
    <td> Nicola </td>
    <td> Sturgeon </td>
    <td rowspan="2"> Scotland </td>
  </tr>
  <tr>
    <td> Ruth </td>
    <td> Davidson </td>
  </tr>
</table>
```

- (b) The appearance of an HTML document can be defined with an internal stylesheet, an external stylesheet, and with inline styles. What is the difference between these methods? Show, using appropriate code, how you would set the colour of one or more paragraphs to red, using each of the above methods. [6]
- (c) Give the English names for each of the following colours, which are written as hexadecimal values: [2]
- #ffffff
 - #000000
 - #0000ff
 - #00ff00
 - #ff0000
- (d) For each of the following tags, indicate whether this is in correct HTML5 notation and whether it is in correct XHTML notation. [2]
- <hr>
 - <hr />
- (e) Describe what the following HTML tag does: [3]

```
<meta http-equiv="refresh" content="5; url=http://google.co.uk/">
```

Question continues on the next page

(f) Briefly explain why one might use

```
<input type="password" name="secret" />
```

instead of

```
<input type="text" name="secret" />
```

in an HTML form. Does the former protect against screen snooping (against people looking over one's shoulder), network snooping (attackers intercepting network traffic), or both? [2]

20 Marks Question Total

- Q3. (a) A certain database has a table called *Officers*. The attributes (fields) in this table are: name, rank, position, missions, birthYear. The attributes name, rank, and position are of type VARCHAR(30), while missions and birthYear are of type INT. Here are some example rows from the table:

name	rank	position	missions	birthYear
James Kirk	Captain	Captain	104	2233
Spock	Lt Commander	Science Officer	98	2230
Pavel Chekov	Ensign	Navigator	56	2245
Montgomery Scott	Lt Commander	Engineer	76	2222
...

- i. Write an SQL query to get the names of the three youngest navigators who serve in the rank of Ensign. [2]
 - ii. Write an SQL query to find out the average number of missions accomplished by engineers (as recorded by the missions attribute). [2]
 - iii. Promote all officers who accomplished at least 100 missions: write an SQL command to change their rank to Admiral. [2]
- (b) Briefly explain what is meant by SQL injection. [2]
- (c) Explain what is meant by an asymmetric key, for purposes of encryption, and summarise the role of asymmetric keys in HTTPS (*i.e.* secure HTTP). [4]
- (d) Briefly outline how asymmetric encryption can be used as a method of assuring the non-repudiability of sending a message? [3]
- (e) Describe briefly the 5 layer protocol stack model. Describe the responsibilities of each layer and give examples where appropriate. [5]

20 Marks Question Total

- Q4. (a) Describe what sort of strings would match the following regular expressions and in each case give an example of any such string.

i. `/\$\d+\.\d{2}/` [2]

ii. `/(0?[1-9]|1[012]):[0-5][0-9]/` [3]

- (b) Consider the following HTML document with JavaScript code in it:

```

1. <!DOCTYPE html>
2. <html>
3. <head><title>CM1102 exam question</title></head>
4. <body>
5.   <script type="text/javascript">
6.     var table = document.createElement("table");
7.     table.id = "modules";
8.     var row = document.createElement("tr");
9.     for (var i = 0; i < 3; ++i) {
10.      var cell = document.createElement("td");
11.      var name = "CM110" + (i + 1) + " is easy!";
12.      var text = document.createTextNode(name);
13.      cell.appendChild(text);
14.      row.appendChild(cell);
15.    }
16.    table.appendChild(row);
17.    document.body.appendChild(table);
18.    var elt = document.getElementById('modules');
19.    elt.style.backgroundColor = "#00ff00";
20.  </script>
21.  <noscript>
22.    When is this message displayed?
23.  </noscript>
24. </body>
25. </html>

```

- i. Describe, step by step, what does the JavaScript code in lines 6–19 do. [6]
 - ii. Describe the appearance of the document after executing the above JavaScript code (draw a picture if you prefer). [3]
 - iii. Explain what is the purpose of the `<noscript>` tag (lines 21–23). [1]
- (c) Give two examples to illustrate how one can use web analytics to inform design decisions when building websites. [2]
- (d) Explain briefly the difference between B2C, C2C and B2B business models in the context of web applications and in each case provide an example. [3]

20 Marks Question Total