

- Q1. (a) Give an example of each of the following types of HTML elements:
- i. an empty element [1]
 - ii. an inline element [1]
 - iii. a block element [1]
- (b) Setting sizes in CSS can be done using different units, for instance in em or pt. Briefly explain the difference between these two. [2]
- (c) If the width property of an element is set to 120px and the margin and padding are each set to 10px, what is the total width of the space occupied by the element? [2]
- (d) What is the difference between the <div> tag and the tag? Briefly describe the meaning of these tags. [2]
- (e) Suppose you want to include a drawing on your website, made using a computer graphics program such as Xfig, GIMP, or MS Paint. Your drawing consists of just two colours (black and white, with no shades of grey in between) and of mostly geometric shapes. When saving the file, you have the option to save it in either GIF or JPEG format. Of these two, what would be the most appropriate format? Explain your answer. [2]
- (f) Describe (with the aid of a diagram, if necessary) the structure of an HTTP request, distinguishing clearly the main sections of the request and indicating the types of data that may be included in each section. [4]
- (g) Give three examples of information that is typically put in the HTTP headers. You do not need to specify the exact syntax; a brief description is sufficient. [3]
- (h) In the context of a search engine, what is a *spider* (also known as *crawler*)? [2]

20 Marks Question Total

Q2. (a) Consider the following HTML document:

```
<!DOCTYPE html>
<html>
<head> <title>Louis van Gaal</title> </head>
<body>
<p>Before his international career as a coach,
<em class="person">Louis van Gaal</em> was a PE
teacher at the <em id="dbs">Don Boscoschool</em>
in Amsterdam East.<br/>This was not far from the
<em id="cwi">CWI</em> where <em class="person">
Guido van Rossum</em> invented the Python programming
language.</p>
<p>Some of the clubs where he has been coach:</p>
<ul>
  <li>Ajax <em>Amsterdam</em></li>
  <li>Barcelona</li>
  <li>Bayern M&uuml;nchen</li>
  <li>Manchester United</li>
</ul>
</body>
</html>
```

What pieces of text would be selected by the following CSS selectors? (Write down "nothing" in case the selector does not select any text.)

- | | |
|-------------------------|-----|
| i. .person | [1] |
| ii. .cwi | [1] |
| iii. #person | [1] |
| iv. #cwi | [1] |
| v. ul>em | [1] |
| vi. li>em | [1] |
| vii. em:nth-child(3) | [1] |
| viii. em:nth-of-type(3) | [1] |

- (b) The expression ü is an HTML entity that displays ü (u with *umlaut*). Give two other examples of such HTML entities, and write down what they display. (Do not choose any entity that also involves an *umlaut*.) [2]
- (c) One can send form data to the server using either GET or POST HTTP requests.
- Describe the differences between them. [2]
 - Give an example of a scenario when using GET request is justified. [2]
 - Give another example of a scenario when POST is more appropriate. [2]
- (d) Give an example of when it is useful to apply hidden form fields in an HTML form. No HTML code is necessary, a short but clear description is sufficient. [2]
- (e) Give two advantages of using an XML Schema instead of a Document Type Definition (DTD). [2]

20 Marks Question Total

- Q3. (a) Describe briefly the 5 layer protocol stack model. Describe the responsibilities of each layer and give examples where appropriate. [5]
- (b) Determine the classes of networks (A, B, or C) to which the following IP addresses belong:
- i. 192.168.3.112 [1]
 - ii. 131.251.120.14 [1]
 - iii. 10.14.4.42 [1]
- (c) What is the purpose of a Domain Name Server (DNS)? [2]
- (d) 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). [2]
- (e) What is a Uniform Resource Locator (URL) and what are they for? Describe the basic syntax for URLs. [3]
- (f) A certain database has a table called `Fleet`. The attributes (fields) in this table are: `name`, `class`, `crew`, `maxWarp`. The `name` and `class` are of type `VARCHAR(30)`, and `crew` and `maxWarp` are of type `INT`. Here are some example rows from the table:

name	class	crew	maxWarp
Enterprise	Constitution	430	8
Excalibur	Ambassador	260	9
Farragut	Constitution	420	9
Prokofiev	Andromeda	100	6
...

- i. Write an SQL query to find the names of the ships of "Andromeda" class capable of travelling at warp speed 8 or above (as recorded by the `maxWarp` attribute). [1]
 - ii. Write an SQL query to get all available information about the four slowest ships in the fleet. [1]
 - iii. Write an SQL query to determine the names of the ships with lower than average crew complement (as recorded by the `crew` attribute). [1]
- (g) Describe what sort of strings would match the following regular expressions and in each case give an example of any such string.
- i. `/#([0-9A-Fa-f]{2}){3}/` [1]
 - ii. `/(\d*\.)?\d+\/` [1]

20 Marks Question Total

Q4. (a) Consider the following HTML document with JavaScript code in it:

```

1.  <!DOCTYPE html>
2.  <html>
3.  <head><title>CM1102 exam question</title>
4.  <script type="text/javascript">
5.      function myfunction() {
6.          var para = document.getElementById("mypara");
7.          para.style.fontSize = "24pt";
8.          para.style.color = "#FF0000";
9.          para.innerHTML = "Indeed so.";
10.     }
11. </script>
12. </head>
13. <body>
14.     <script type="text/javascript">
15.         var new_para = document.createElement("p");
16.         new_para.id = "mypara";
17.         new_para.onclick = myfunction;
18.         var text = document.createTextNode("CM1102 is easy!");
19.         new_para.appendChild(text);
20.         document.body.appendChild(new_para);
21.     </script>
22.     <noscript>
23.         When is this message displayed?
24.     </noscript>
25. </body>
26. </html>

```

- i. Describe, step by step, what does the JavaScript code in lines 14–21 do. [6]
 - ii. Describe the appearance of the document after executing lines 14–21. [1]
 - iii. On what condition will the function `myfunction` be executed? [1]
 - iv. Describe, step by step, what does the JavaScript code in lines 4–11 do (the function `myfunction`) [4]
 - v. Describe how code in lines 4–11 affects the appearance of the document. [1]
 - vi. Explain what is the purpose of the `<noscript>` tag (lines 22–24). [1]
- (b) Give three examples to illustrate how one can use web analytics to inform design decisions when building websites. [3]
- (c) 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