

BCS THE CHARTERED INSTITUTE FOR IT

BCS HIGHER EDUCATION QUALIFICATIONS
BCS Level 5 Diploma in IT

PRINCIPLES OF INTERNET TECHNOLOGIES

Friday 23rd March 2018 - Morning

Answer **any** FOUR questions out of SIX. All questions carry equal marks.
Time: TWO hours.

Answer any Section A questions you attempt in Answer Book A
Answer any Section B questions you attempt in Answer Book B

The marks given in brackets are **indicative** of the weight given to each part of the question.

Calculators are NOT allowed in this examination.

Section A
Answer Section A questions in Answer Book A

A1

Given the HTML Code

```
<form name="myform" onSubmit="calculateAverage();">

<p>
<label for="number1"> Input 1st mark here: </label>
<input type="text" size="10" name="number1"
id="number1"/>
</p>

<p>
<label for="number2"> Input 2nd mark here: </label>
<input type="text" size="10" name="number2"
id="number2"/>
</p>

<p>
<label for="number3"> Input 3rd mark here: </label>
<input type="text" size="10" name="number3"
id="number3"/>
</p>

<input type="submit" value="Calculate"/>

</form>
```

Continued on next page...

- a) Write a JavaScript function `calculateAverage()`, that will:
- read THREE numbers in from the HTML form as marks.
 - output the total mark.
 - output the average of the three marks.

The average mark must be output as a real number.

(15 marks)

- b) Why is JavaScript validation regarded as a potential security risk?
(4 marks)
- c) What measures and technologies could be put in place to mitigate this potential security risk?
(6 marks)

A2

- a) Describe how CSS allows separation of content and presentation for web pages?
(4 marks)
- b) Describe a CSS rule, and what it consists of. Give an example to support your answer.
(7 marks)
- c) What are modules in CSS3?
(4 marks)
- d) Describe TWO **disadvantages** of using CSS, from a designer's perspective.
(4 marks)
- e) What does the **Cascading** in CSS refer to?
(4 marks)
- f) Where on an HTML page should a reference to an external CSS be placed?
(2 marks)

A3

- a) What problem might be present with the **DOM** if **jQuery** is executed too early?
(2 marks)
- b) How could this be avoided? Provide sample JavaScript code to support your answer.
(4 marks)
- c) What is the difference between **well-formed** XML and **valid** XML?
(4 marks)
- d) In relation to **XML Data Modelling**:
- model a data source intended for a bank
 - model the account number, customer name, customer email address for each bank account that is to be held in the bank
 - provide XML mark-up for a bank account
- (10 marks)**
- e) What does **SOAP** stand for and how is it used with XML?
(5 marks)

Section B
Answer Section B questions in Answer Book B

B4

- a)** Expand each of the following acronyms:
- i) DNS.
 - ii) UDP.
 - iii) ARP.
 - iv) IP.
 - v) DHCP.
 - vi) SMTP.
- (6 marks)**
- b)** Map the SIX protocols given in part a) above to the layers of the TCP/IP model.
- (6 marks)**
- c)** TCP is described as a connection-oriented protocol.
- i) Expand the acronym TCP.
- (1 mark)**
- ii) What is meant by the term **connection-oriented** in reference to TCP?
- (2 marks)**
- iii) Draw a diagram that illustrates how TCP establishes a connection between a client and server. You must demonstrate the **three-way handshake** in your answer.
- (6 marks)**
- d)** Briefly describe the role of **DNS** in the operation of the Internet. A diagram may be helpful.
- (4 marks)**

B5

- a) Expand the acronym **HTTP**. (1 mark)
- b) Briefly explain the difference between **HTTP** and **HTTPS**. (2 marks)
- c) **HTTP** is described as a **stateless** protocol. In this context:
- i) Define what stateless means. (1 mark)
 - ii) Provide **THREE** examples of how a web application maintains state given that HTTP is stateless. (3 marks)
- d) Briefly describe what each of the following HTTP status codes represent, and why such a status code may be returned.
- i) 404
 - ii) 200
 - iii) 403
 - iv) 500
 - v) 401
- (10 marks)
- e) Read the following simplified HTTP response header, then answer the following questions

```
HTTP/1.1 200
Date: Mon, 02 Apr 2018 13:23:19 GMT
Server: Apache/1.3.29
Last-Modified: Sat, 31 Mar 2018
Content-Length: 38
Content-Type: text/html

<h1>BCS</h1>
<p>Welcome to the BCS</p>
```

- i) Briefly explain what the **Content-Length** field represents?
- ii) What is the **protocol and status code** of this HTTP response header?
- iii) The **Content-Type** field in this header is **text/html**. What would the header be if a portable network graphics image was the Content-Type?
- iv) A web browser made the request that generated this response. What would be displayed by the browser? (8 marks)

B6

- a) Explain the difference between a **packet switched** and a **circuit switched** network. In your answer, state which type applies to the Internet. **(5 marks)**
- b) **Internet Protocol (IP)** is the main protocol that operates on the Network Layer. One of the fields within the IPv6 header is 'hop limit'.
- i) Describe the reasons for including the **hop limit** field in the **IPv6** header. In your answer, include examples of where this field is put to effective use by network administrators for network diagnostics. **(6 marks)**
- ii) In the **IPv4** header, the **hop limit** field is called **TTL**. Describe what **TTL** stands for, and why the designers of **IPv6** renamed this field? **(2 marks)**
- c) Compare and contrast **IPv4** and **IPv6**. **(6 marks)**
- d) Explain the importance of **NAT**, and the role it plays in the context of **IPv4** addressing. **(4 marks)**
- e) Provide an example of a **private IPv4** address. **(2 marks)**

END OF EXAM