

**BCS THE CHARTERED INSTITUTE FOR IT**  
**BCS HIGHER EDUCATION QUALIFICATIONS**  
**BCS Level 5 Diploma in IT**  
**PRINCIPLES OF INTERNET TECHNOLOGIES**

Friday 13<sup>th</sup> November 2020 - 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 <b>NOT</b> allowed in this examination.
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**Section A**  
**Answer Section A questions in Answer Book A**

**A1.**

a) Examine the following HTML Code:

```
<form name="myform" onSubmit="readMark();" >
<p>
<label for="mark"> Enter your mark: </label>
<input type="text" size="10" name="mark" id="mark"/>
</p>
<input type="submit" value="Submit"/>
</form>
```

Write a JavaScript function `readMark()` to output the following classification based on the mark entered:

70+	<b>Distinction</b>
60 – 69	<b>Commendation</b>
40 – 59	<b>Pass</b>
0 – 39	<b>Fail</b>

Your JavaScript function must also do the following:

- i) Check to see if the mark entered is a number or not. If it is not a number, then an appropriate error message must be outputted.
- ii) If the mark is outside the range of 0 to 100 then the user must be told to enter in a number between 0 and 100.

**(15 marks)**

b) In regard to the JavaScript library **jQuery**:

i) What is the difference between **jquery.js** and **jquery.min.js**? **(3 marks)**

ii) When should a web developer use **jquery.js** and when should a web developer use **jquery.min.js**? **(3 marks)**

c) In the context of JavaScript, outline what **dynamic types** are and provide a suitable example. **(4 marks)**

**A2.**

- a)
- i) Why are front-end frameworks such as **Bootstrap** so widely used by web developers?  
(6 marks)
  - ii) What would a front-end framework such as **Bootstrap** contain?  
(4 marks)
- b) State **TWO** advantages of using **HTML5** in a web page.  
(6 marks)
- c) What is the difference between **client-side** and **server-side scripting**? Provide **ONE** example of **client-side scripting** and **ONE** example of **server-side scripting** in your answer.  
(4 marks)
- d) State **TWO** reasons as to why it is important to make your web site as **accessible** as possible.  
(5 marks)
- e) What is the difference between a **native mobile app** and a **web app**?  
Provide **ONE** disadvantage of designing for a **native mobile app** and **ONE** disadvantage of designing for a **web app**.  
(5 marks)

**A3.**

- a) State **TWO** reasons why a web developer would prefer to use **JSON** than **XML**.  
(4 marks)
- b) What does **DOM** stand for and what is its main purpose?  
(4 marks)
- c) What is **XSL** and what is it used for in the context of **XML**?  
(4 marks)
- d) State **THREE** basic rules for writing an **XML** document.  
(6 marks)
- e)
- i) Provide **TWO** reasons why you would run a usability test on your website.  
(4 marks)
  - ii) List **THREE** questions you would ask in such a usability test.  
(3 marks)

[Turn Over]

**Section B**  
**Answer Section B questions in Answer Book B**

**B4.**

a) Given the following TCP/IP model:

Application Layer
Transport Layer
Internet Layer
Network Access/Physical Layer

Map the following **SIX** protocols to the TCP/IP model and expand the acronyms:

- i) UDP;
- ii) FTP;
- iii) TCP;
- iv) IPsec;
- v) ICMP;
- vi) MAC.

Place your answers in a table within your exam answer booklet. An example table layout is given below:

TCP/IP Layer	Protocol	Expanded name
<i>Application Layer</i>	HTTP	<i>Hypertext Transfer Protocol</i>
...	...	...
...	...	...
...	...	...

**(12 marks)**

b) ARP is an important protocol seen on the Network Access Layer of the TCP/IP model.

i) Expand the acronym 'ARP'.

**(1 mark)**

ii) Draw a diagram to illustrate how ARP works in a local network. Clearly demonstrate the importance of ARP using appropriate labels.

**(4 marks)**

iii) A possible attack against ARP is 'ARP poisoning' or 'ARP cache poisoning'. Briefly discuss what ARP poisoning is and the implications of such an attack.

**(4 marks)**

c) A network administrator is attempting to diagnose latency issues within their network. Name **TWO** Windows or Unix-based command line tools they can utilise with a brief description of their purpose.

**(4 marks)**

**B5.**

Smart IoT devices allow access to information such as 'smart energy meters' that monitor energy usage within a home.

- a) Draw a diagram to illustrate your design of a home automation system to enable ubiquitous access for the monitoring and control of devices within a domestic home. **(7 marks)**
  
- b) Evaluate the technologies chosen in a). **(6 marks)**
  
- c) Specify **FOUR** wireless communication technologies that can be used to connect nodes in an IoT system. In addition to a brief explanation of the communication technology, provide **ONE** advantage and **ONE** disadvantage. **(12 marks)**

**[Turn Over]**

**B6.**

a) *Wireshark* is a popular and free packet capture tool.

i) As a network analyst, explain why *Wireshark* is popularly used.

**(3 marks)**

The following image is a capture from *Wireshark*:

Time	Protocol	Length	Info
6.204622	TLSv1.2	166	Application Data
6.231284	TCP	66	443 → 37022 [ACK] Seq=399 Ack=727 Win=37
6.231313	TCP	74	443 → 43032 [SYN, ACK] Seq=0 Ack=1 Win=2
6.231346	TCP	66	43032 → 443 [ACK] Seq=1 Ack=1 Win=29312
6.232757	TLSv1.2	583	Client Hello
6.282236	TCP	74	443 → 43034 [SYN, ACK] Seq=0 Ack=1 Win=2
6.282284	TCP	66	43034 → 443 [ACK] Seq=1 Ack=1 Win=29312

ii) What is the TCP **source** port number?

**(2 marks)**

iii) What is the significance of this port number?

**(3 marks)**

iv) Inspect the packet capture and note the SYN and ACK. What do these abbreviations represent and what is their significance?

**(8 marks)**

v) If the abbreviation [FIN] was displayed in the above packet capture, what would it indicate?

**(3 marks)**

b) VLANs are popular and frequently used on switched networks.

i) Expand the acronym 'VLAN'.

**(2 mark)**

ii) Briefly explain and justify why you would recommend a VLAN to a client.

**(4 marks)**

**End of Examination**