



9.3 The internet part 1

Name: _____

Class: _____

Date: _____

Time: **314 minutes**

Marks: **256 marks**

Comments:

Q1.

Both the Caesar and Vernam ciphers are symmetric ciphers, whereas a public and private key encryption system is an asymmetric cipher system.

Explain the difference between a symmetric and an asymmetric cipher system

(Total 1 mark)

Q2.

Between 2008 and 2010, a company that was gathering data for an online mapping system, using cars fitted with cameras and WiFi equipment, collected some information that was being transmitted on personal WiFi networks. The company apologised for doing this and an investigation found that a small number of software developers had been responsible for adding this functionality to the mapping system data collection software.

In the context of this example, discuss:

- how it was possible for this data to be collected.
- what steps the owners of the networks could have taken to prevent the data from being collected.
- what legal and ethical issues might have arisen as a result of collecting this data.
- what lessons the company might have learnt from the incident and how their practices might have changed as a result of it.

In your answer you will be assessed on your ability to follow a line of reasoning to produce a coherent, relevant and structured response.

(Total 12 marks)

Q3.

Put **one** tick (✓) on each row of the table below to classify each row as either a URL, a domain name, an IP address, a socket address or a protocol.

	URL	Domain name	IP address	Socket address	Protocol
Telnet					
192.168.10.23:80					
http://www.bbc.co.uk					

(Total 2 marks)

Q4.

To access an exam paper on the AQA website a student's computer might need to make use of a Domain Name System (DNS) query which is transmitted to a DNS server.

- (a) What is the purpose of a DNS server?

(1)

- (b) In some circumstances the student's computer will not need to contact a remote DNS server to access a resource.

Describe **two** situations when a DNS query will **not** be sent to a DNS server.

Situation 1 _____

Situation 2 _____

(2)

(Total 3 marks)

Q5.

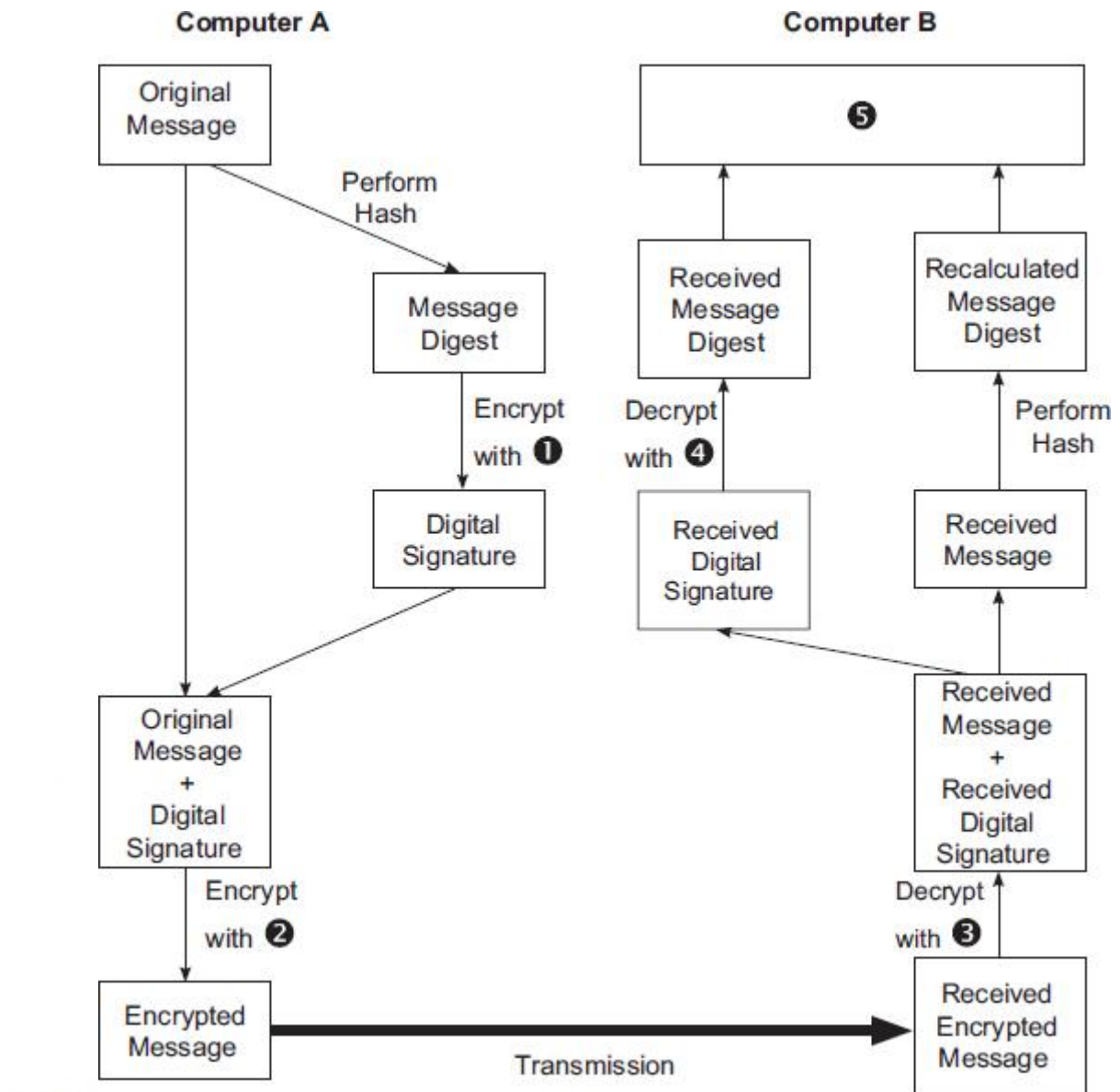
A message is to be transmitted from Computer A to Computer B. For security reasons, the message will be encrypted.

- (a) What is encryption?

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(1)

The message that is being transmitted will be encrypted and decrypted using public and private keys. The figure below shows the encryption and decryption processes. The symbols ❶ to ❹ in the figure represent the names of keys.



(b) State the names of the keys that are represented by each of the symbols 1 to 4.

Label	Key Name
1	
2	
3	
4	

(2)

(c) Describe the process that will take place at the position labelled 5.

(1)

(d) State **two** purposes of the addition of the digital signature to the message.

Purpose 1: _____

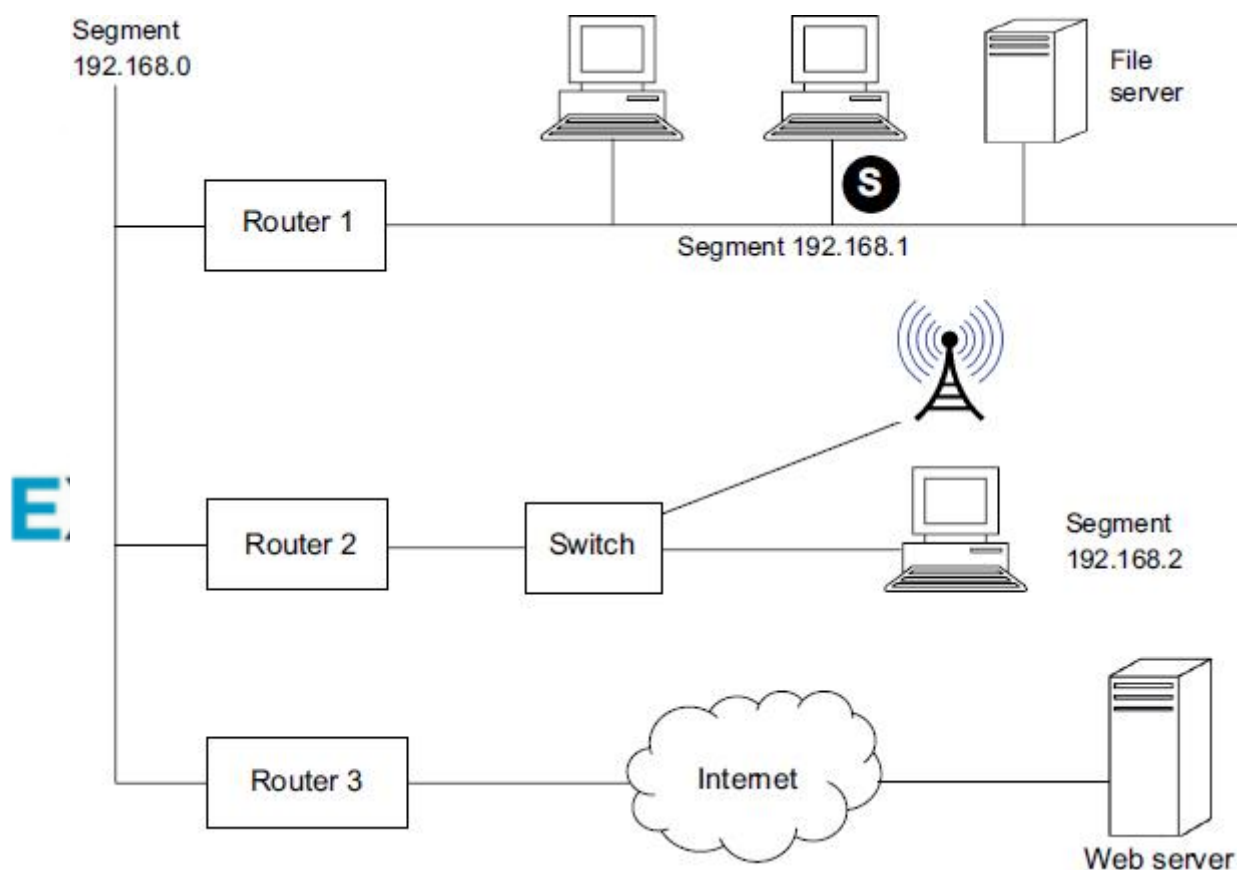
Purpose 2: _____

(2)
(Total 6 marks)

Q6.

A student is using her computer at school.

The diagram shows the physical topology of the Local Area Network (LAN) to which her computer is connected. The LAN is divided up into segments. It also shows a web server that her computer connects to through the Internet. The student is using the computer labelled **S**.



Write a detailed description of how one packet of data that the student is uploading to the web server will be routed from her computer in the UK to the web server that is located in Chicago in the USA. You may assume that the web browser software on the student's computer has already used a domain name server to look up the IP address of the web server.

Your description should cover:

- how the packet will be routed within the LAN from the student's computer to the

(6)

- (c) The system will be networked within the college. This network will then be connected to the Internet so that staff who are away from the college can log in and access the system. This connection has to use a gateway.

Why must the college use a gateway instead of a router to connect their network to the Internet?

(1)

(Total 9 marks)

Q8.

The configuration file for a school's firewall contains the following three rules:

Rule 1	ACCEPT	80.1.12.100:22	[SSH]
Rule 2	ACCEPT	*.*.*.*:80	[HTTP]
Rule 3	DENY	*.*.*.*:23	[TELNET]

* represents all numbers from 0 - 255

- (a) Explain what is meant by an IP address.

(1)

- (b) (i) SSH, HTTP and Telnet are all protocols.

State what is meant by the term protocol.

(1)

- (ii) Explain why the school has set up the firewall so that HTTP requests are

accepted from any IP address but Telnet requests are denied.

(2)

- (c) David is a company's network manager who is away travelling for his summer holiday. Whilst he is on holiday, a security update is released for a critical piece of software running on one of his company's servers. The update can be downloaded from the FTP server at URL ftp.aqaservertools.com for which David has a username and password.

David has a laptop which has a telnet client and an FTP client installed on it.

On the company server, David has access to a Telnet server, an FTP server and an FTP client.

The figure below shows the situation.

Laptop	Security update server	Company server
IP: 12.23.56.78	ftp.aqaservertools.com	IP: 80.56.34.12
Telnet client	FTP server	Telnet server
FTP client		FTP client
		FTP server

David uses his laptop to connect to a local wireless access point.

Explain what is meant by the client server-model and describe the steps David would go through to apply the security update to the company's server.

In your answer you will be assessed on your ability to use good English and to organise your answer clearly in complete sentences using specialist vocabulary where appropriate.

(6)
(Total 10 marks)

Q9.

(a) Three important computer security procedures are:

- authentication
- authorisation
- accounting

The table lists two situations which involve the use of security procedures.

For each row in the table, place a tick in **one** column to indicate whether the **Situation and Procedure** is an example of **Authentication**, **Authorisation** or **Accounting**.

Situation and Procedure	Authentication	Authorisation	Accounting
A web server generating a log of the IP addresses of computers that have accessed it.			
Using a digital signature when sending an e-mail message.			

(2)

(b) Viruses and worms are both threats to computer security.

Explain what a virus is, and explain the difference between a virus and a worm.

(3)

- (c) A message is to be sent from Computer A to Computer B.

Describe the steps that would be involved in producing a digital signature for the message before it is transmitted by Computer A.



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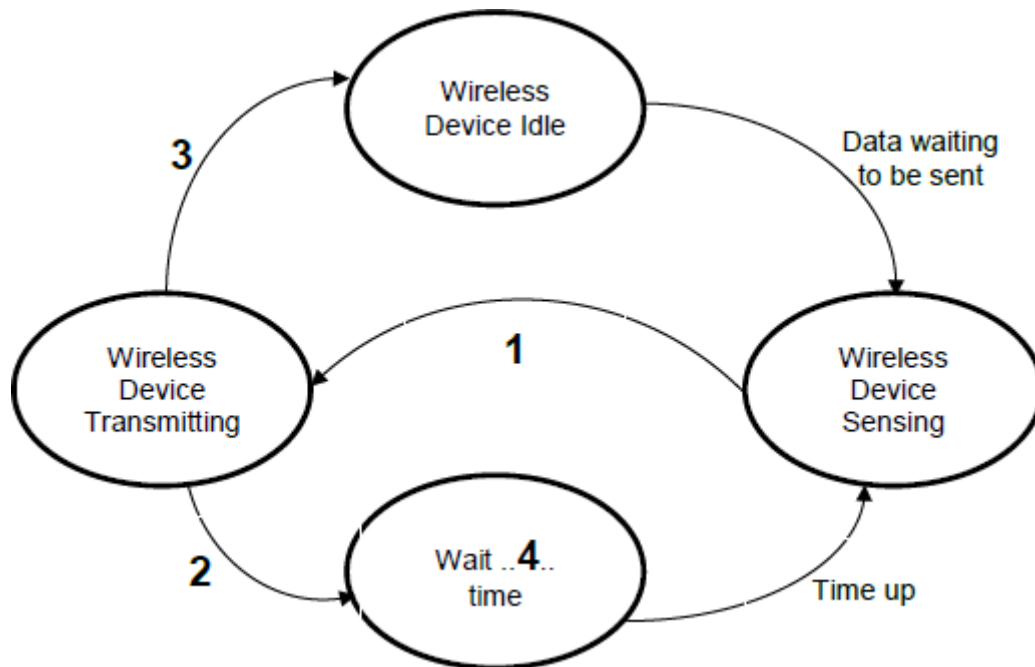
(4)

(Total 9 marks)

Q10.

Wireless networks make use of the carrier sense multiple access and collision avoidance (CSMA / CA) method when accessing a wireless network to transmit data.

The diagram below shows a simplified state transition diagram of the CSMA / CA wireless network access method without use of request to send / clear to send (RTS / CTS).



- (a) Complete the table by writing in the descriptions that should appear at positions **1** to **4** in the above diagram.

Label	Description
1	
2	
3	
4	

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- (b) Explain the role of a service set identifier (SSID) in wireless networking and why some network administrators turn off SSID broadcasting.

- (c) Explain why browsing the Internet might be slower at a public hotspot in a coffee shop than at home on a wireless network.

(2)
(Total 9 marks)

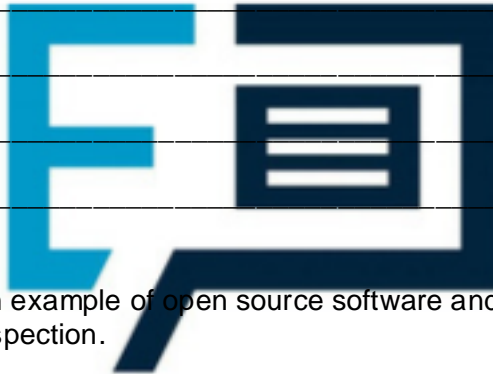
Q11.

The OpenSSL project is a collaborative effort to develop a general purpose cryptography software library for encrypting data transmissions.

In April 2014, a bug known as the 'Heartbleed Bug' was found in the OpenSSL software library. The bug allowed anyone on the Internet to access the memory of systems protected by the vulnerable versions of this OpenSSL software.

According to web server statistics, this bug could have affected around 66% of known web servers.

- (a) What is encryption?



(2)

- (b) OpenSSL is an example of open source software and so its source code is freely available for inspection.

Describe **two** benefits of having the source code of software publicly available.

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(2)

- (c) The 'Heartbleed Bug' was introduced into the code on December 31, 2011 but was only discovered in 2014.

State **one** reason why the bug took over two years to find.

(1)

- (d) Government agencies sometimes require that they are given copies of encryption keys. This allows these agencies to decrypt messages encrypted with these keys.

State **one** reason for and **one** reason against a government having the ability to decrypt any encrypted messages.

Reason for: _____

Reason against: _____

(2)

(Total 7 marks)

Q12.

Two computers, **A** and **B**, are involved in a secure communication that uses asymmetric encryption. **A** is sending a message to **B**.

Each computer has a public key and a private key.

- (a) Complete the missing words in the following paragraph.

A will encrypt the message using _____ key. The message
will be decrypted by **B** using _____ key.

(2)

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- (b) The security of the communication could be improved by the addition of a digital signature.

State **two** benefits of including a digital signature.

(2)

(Total 4 marks)

Q13.

- (a) **Figure 1** and **Figure 2** show two screenshots: identify the protocols being used in each.

Figure 1

```

1) **** NEW CONNECTION (127.0.0.1)
1) C --> HELO tarzan.synametrics.com
1) S <-- 250 localhost. Please to meet you
1) C --> MAIL FROM:<asdf>
1) S <-- 250 OK
1) C --> RCPT TO:<asdf@fas.com>
1) S <-- 250 OK
1) C --> DATA
1) S <-- 250 Message queued for delivery.
1) C --> QUIT
1) S <-- 221 Connection successfully closed
1) **** CONNECTION TERMINATED in 150ms.

```

Protocol _____

Figure 2

```

admin@moodle.someschool.org's password:
Last login: Mon Feb 10 17:04:17 2014 from cpc4-warw15-2-
0.cable.virginm.net
[admin@torvalds ~]$ ls
Desktop
drupal
httpd.log
mysqldump.sql
test
xibo-server.tar.gz
[admin@torvalds ~]$ unzip xibo-server.tar.gz
[admin@torvalds ~]$ reboot

```

Protocol _____

(2)

Figure 3 below shows part of the result of running a traceroute command on the URL <http://www.computingschool.org.uk>

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```

traceroute to http://www.computingschool.org.uk (129.12.3.236), 64
hops max
 1  10.0.1.1 (10.0.1.1) 2.352ms 1.572ms 3.359ms
 2  cpc4-warw15-2-0-gw.3-2.cable.virginm.net (81.111.110.1) 12.619ms
   12.300ms 10.466ms
 3  brhm-core-2b.network.virginmedia.net (213.105.114.89) 12.807ms
   11.505ms 16.987ms
 4  brhm-bb-1b.network.virginmedia.net (62.253.174.77) 16.039ms
   11.434ms 11.354ms

```

(b) What does URL stand for?

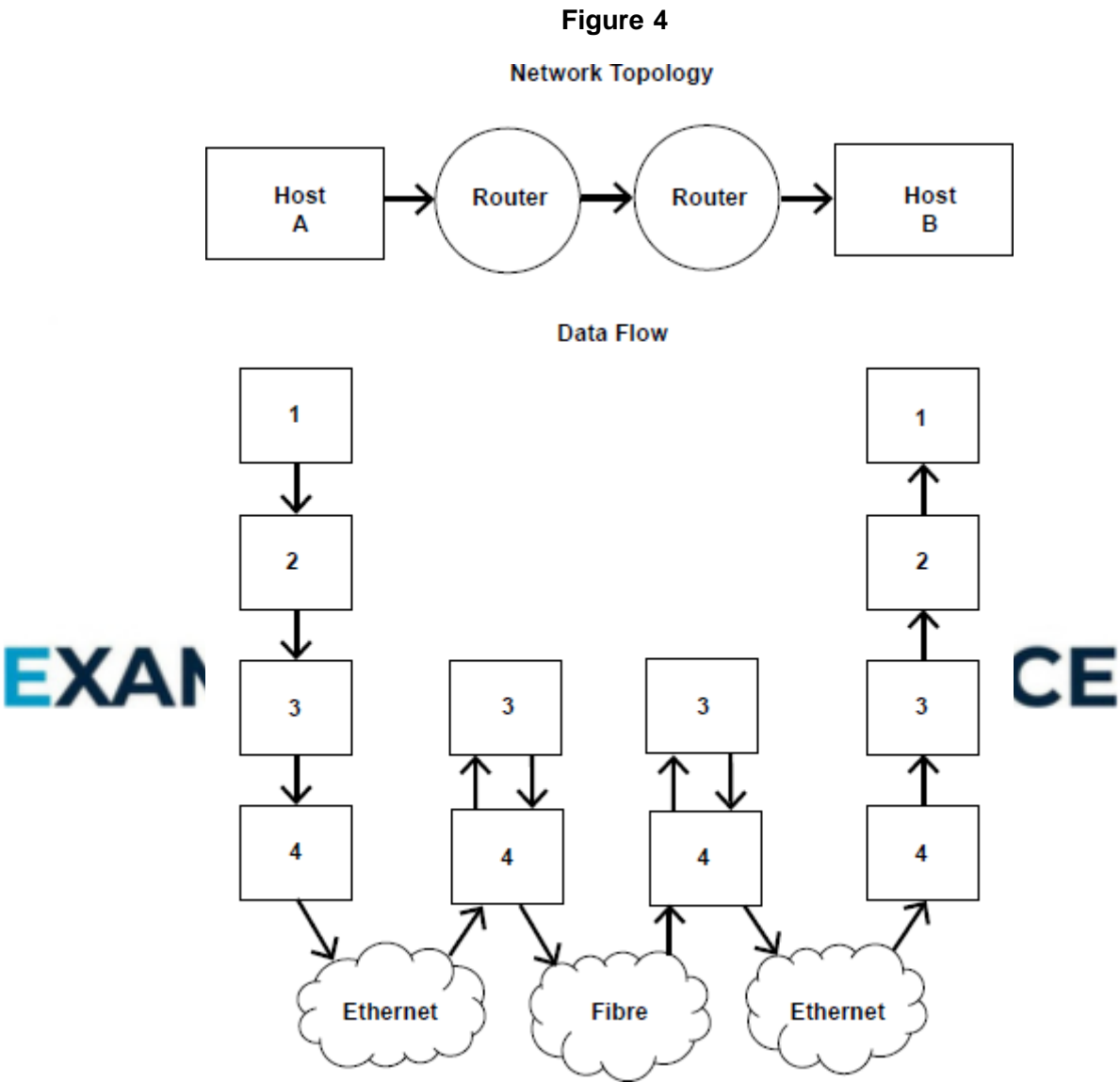
(1)

(c) State an IP address that appears in **Figure 3**.

- (d) The traceroute command shows the ‘hops’ taken to get from a computer to the requested address. Each hop identifies a router on the Internet.

Explain why traceroute might show different hops when run a second time with the same destination address.

Figure 4 shows the layers in the TCP / IP stack.



- (e) Complete the table below by naming the TCP / IP layers used in **Figure 4** above.

	Layer
1	

2	
3	
4	

(2)

- (f) **Figure 4** shows how a packet travels from **Host A** to **Host B** through two routers.

Describe, for a packet, the role of the two lower levels of the TCP / IP stack in the router.

(2)

(Total 9 marks)

Q14.

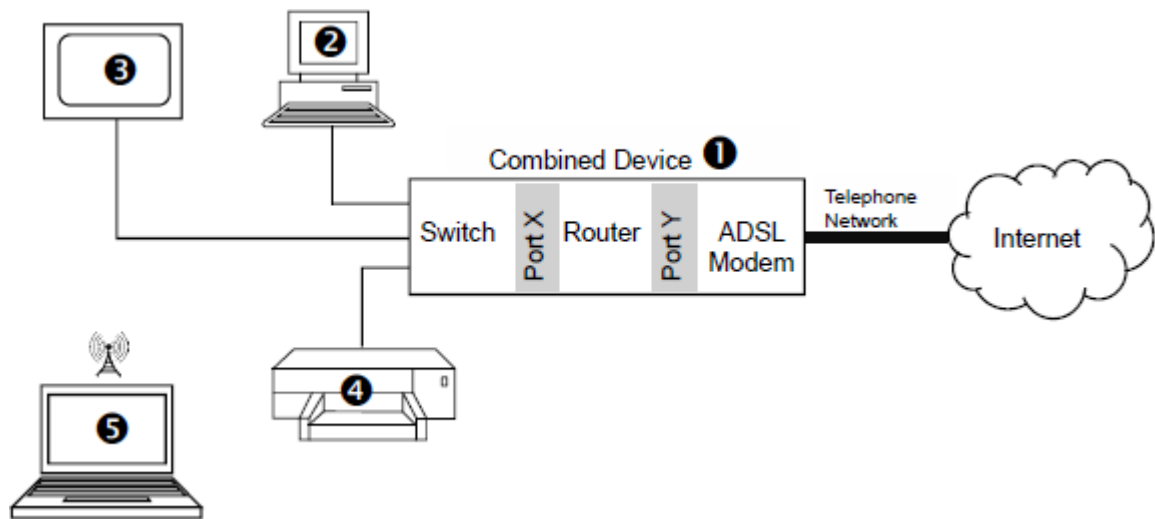
A student is configuring the Local Area Network (LAN) at her home.

The following five hardware devices are connected to the network:

- ❶ a Combined Device that includes a wireless access point, switch, firewall, router and ADSL modem for connection to the telephone network
- ❷ a desktop computer that is connected to the network by cable
- ❸ a smart TV that is connected to the network by cable
- ❹ a printer that is connected to the network by cable
- ❺ a laptop computer that can connect to the network wirelessly.

The diagram below shows the physical topology of the LAN and its connection to the Internet.

Some, but not all, of the components of the Combined Device are shown.



- **Port Y** of the router in the Combined Device has the IP address 82.73.12.9.
- The network adapter card in the desktop computer has been allocated the IP address 192.168.0.2.
- The subnet mask 255.255.255.0 has been programmed into devices 2 to 5

- (a) **Port X** is the router port, within the Combined Device, that allows devices on the LAN to access the Internet. Suggest a suitable IP address that could be allocated to **Port X** of the Combined Device.

(1)

- (b) What physical network topology has been used for the LAN?

(1)

- (c) The IP addresses allocated to the devices on the LAN are non-routable IP addresses. The IP address allocated to **Port Y** of the combined device is a routable IP address.

Explain why the devices connected to a LAN are usually given non-routable IP addresses.

(2)

- (d) The desktop computer is uploading a file to an FTP server on the Internet.

The FTP server has IP address 67.84.23.102

Explain how the desktop computer will use the subnet mask (255.255.255.0), that it has been programmed with, to determine that the data being sent to the FTP server must be sent to the combined device from where it will be transferred on to the Internet.

(3)

- (e) The combined device contains a firewall.

Describe how the firewall might control the data that flow between the LAN and the Internet.



(3)

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- (f) The ADSL connection to the Internet is broadband and the cabled connections within the LAN are baseband.

Explain the difference between a broadband connection and a baseband connection.

(1)

- (g) The smart TV is capable of being connected to the network wirelessly or using a cabled connection.

Explain why a cabled connection has been used.

(1)

(Total 12 marks)

Q15.

A student uses the following URL to download a copy of a previous year's COMP2 exam paper.

https://www.aqa.org.uk/gce/computing/2012comp2.pdf

A B C

- (a) (i) Describe the **three** labelled parts of this URL.

A _____

B _____

C _____

(3)

- (ii) State the top-level domain part in the URL.

(1)

- (b) To access the exam paper, the student's computer might need to make use of a Domain Name System (DNS) query which is transmitted to a DNS server.

- (i) What is the role of a DNS server?

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(1)

- (ii) In some circumstances the student's computer will not need to contact a remote DNS server to access a resource.

Describe **two** situations when a DNS query will **not** be sent to a remote DNS server.

Situation 1 _____

Situation 2 _____

(2)

- (c) In the process of requesting a web page, a browser will generate an HTTP GET request.

- (i) In which layer of the TCP / IP stack is the browser operating?

(1)

- (ii) Explain why the student's computer might need to make several HTTP GET requests to display one web page.

(1)

- (iii) The HTTP GET requests are being sent to port 80 on the remote machine. The browser has been allocated a **client port number**.

What is meant by a client port number?

(1)

(Total 10 marks)

Q16.

A company wishes to use the unregistered domain name *learncomputing.co.uk* for a new website. They use a server which has the public IP address 123.45.67.100.

At present, the server only has an operating system and Telnet server software installed. The Telnet server allows the company to connect remotely to and control the server.

The company intends to upload files to the server using FTP (File Transfer Protocol).

Explain the steps the company will need to take so that a customer using the Internet can browse the company's new website *http://www.learncomputing.co.uk*.

You may wish to make reference to the following in your answer:

Website creation, Domain Name Server (DNS), Web server, FTP server, Ports, Telnet, Internet Registrar

In your answer you will be assessed on your ability to use good English and to organise your answer clearly in complete sentences, using specialist vocabulary where appropriate.

(Total 6 marks)

Q17.

A school has recently launched a 'Parent Portal' which is a website that provides information from the school. By logging on to the portal a parent can access the information that is stored about their son or daughter. This information includes academic reports, discipline records and other personal data.

- (a) A parent recently contacted the school because he was concerned that when he logged on to read his daughter's report he could access the reports of all the other students.

The school should immediately look into this concern as a law has been broken. State the **full name** of the law that has been broken.

_____ (1)

- (b) Which principle of the law identified in your answer to part (a) has been broken?

_____ (1)

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- (c) State another principle of the law identified in your answer to part (a).

_____ (1)

- (d) A parent also noted that the website was using HTTP (HyperText Transfer Protocol).

Why should the school be concerned about the use of this protocol and which protocol would you recommend that the school should use instead?

Why concerned _____

_____ (1)

Suggested protocol _____

(2)

- (e) The process of writing reports and then allowing access to these reports via the parent portal involves the use of many different categories of software.

Below is a list of different categories of software:

Operating system, Utility program, Special purpose application software, Bespoke application software, General purpose application software

Complete **Table 1** by writing the correct category from the list above in the **Category** column next to the appropriate **Software**.

You should **not** use a category more than once.

Table 1

Software	Category
Word processor used to write the pupil reports	
The parent portal web application which was programmed for this school	
The web server software run by the school	

(3)

(Total 8 marks)

Q18.

- (a) (i) What does *HTML* stand for?


(1)

- (ii) What does *CSS* stand for?

(1)

- (b) **Figure 1** shows a web page that has been displayed in a web browser.

Figure 1

RoboEddy Homepage	
<p style="text-align: center;"><i>Welcome to RoboEddy</i></p> <p>RoboEddy is an educational robot with the following features:</p> <ul style="list-style-type: none"> • Fast microprocessor • Two motor channels • 8 analogue inputs 	

- 8 digital I / O ports

Figure 2 shows the HTML and CSS code that was used to create the web page shown in **Figure 1**. Some of the code has been replaced with the numbers ① to ⑧.

Figure 2

```

<①>
  <head>
    <title> ② </title>
    <style>
      #toptitle { text-align: center; font-size: 18pt;
        ③ : italic; }
      .paratext { font-size: 12pt; font-family: Arial; }
    </style>
  </head>
  <body>
    <div id="⑤">Welcome to RoboEddy</div>
    <p ⑥="paratext">RoboEddy is an educational robot with
    the following features:</p>
    <⑦>
      <li>Fast microprocessor</li>
      <li>Two motor channels</li>
      <li>8 analogue inputs</li>
      <li>8 digital I/O ports</li>
    </⑦>
    <⑧>
  </body>
</html>

```

Write the missing code from **Figure 2** in **Table 1** below, next to the number that indicates where it should appear. The first one has been done for you.

Table 1

Number	Code should be
①	html
②	
③	
④	
⑤	
⑥	

7	
8	

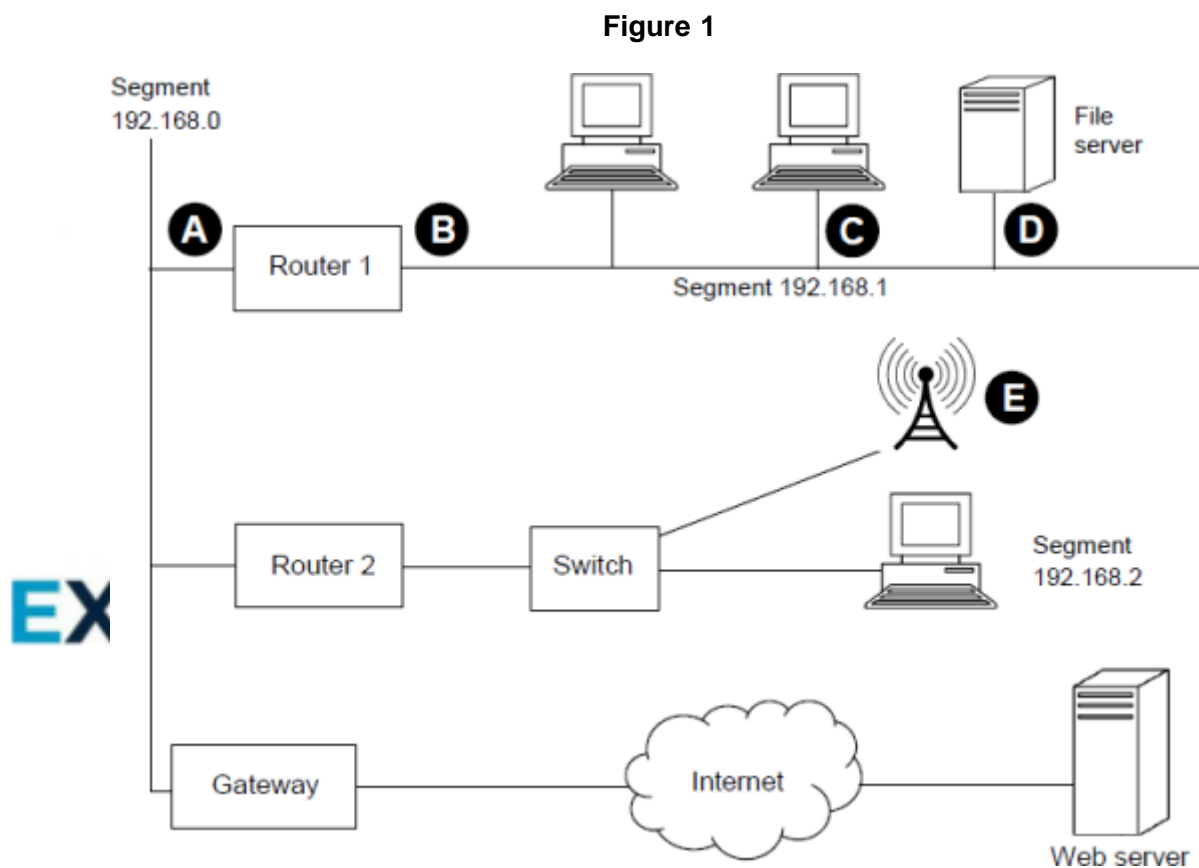
(6)
(Total 8 marks)

Q19.

A student is using her computer at school.

Figure 1 shows the physical topology of the Local Area Network (LAN) to which her computer is connected. The LAN is divided up into segments. It also shows a web server that her computer connects to through the Internet.

The student is using computer **C**.



(a) Suggest suitable IP addresses for:

- (i) the "Router 1" port labelled **A** _____
- (ii) the "Router 1" port labelled **B** _____
- (iii) the network adapter card in the student's computer, labelled **C**

(3)

- (b) What physical network topology is used within segment 192.168.1?

(1)

- (c) When the computers in segment 192.168.1 were configured on the network, they were programmed with a subnet mask.

What subnet mask would have been used?

(1)

- (d) The student has been accessing data from the file server computer that is labelled **D** on **Figure 1**. This file server uses a server operating system.

Explain what a *server operating system* is.

(1)

- (e) Some other students using laptops are connected to the LAN by Wi-Fi through the Wireless Access Point that is labelled **E** on **Figure 1**. Wireless communication is less secure than communication using cables.

- (i) Describe **one** measure that could be implemented by the Wireless Access Point to improve the security of the network.

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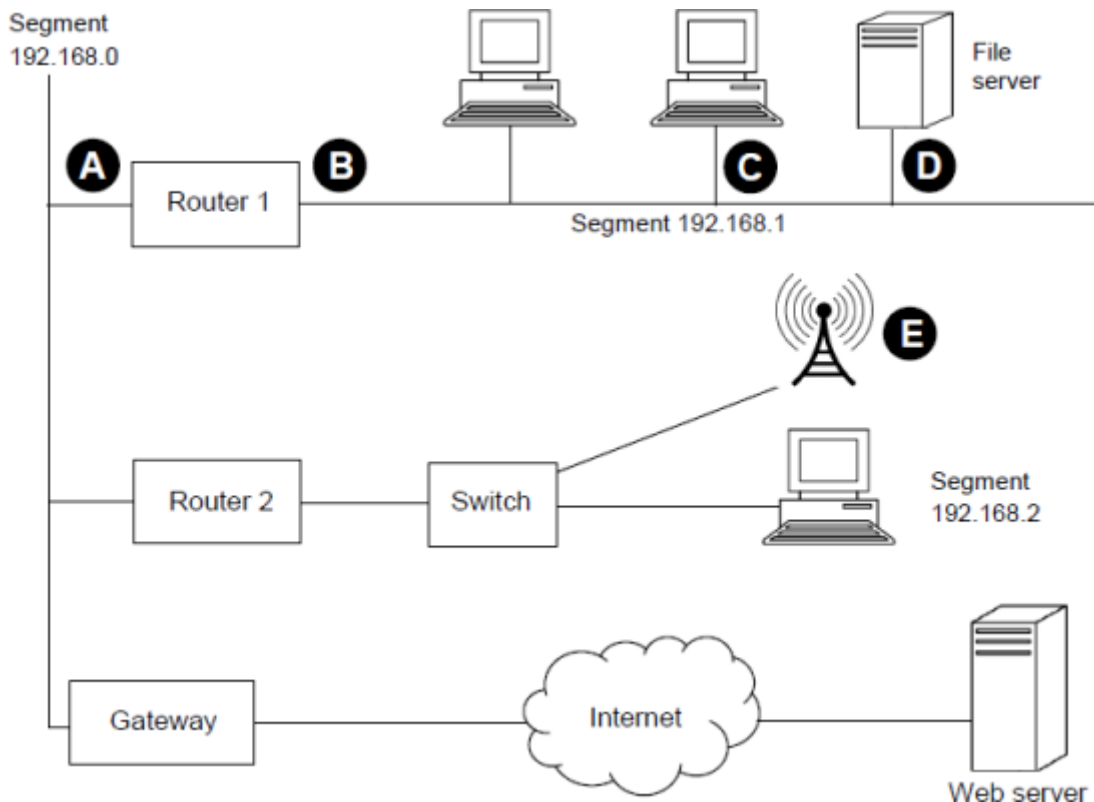
(1)

- (ii) Explain why Wi-Fi has been chosen for this connection rather than Bluetooth.

(1)

Figure 1 is repeated below so that you can answer question part **(f)** without having to turn back in the question paper booklet.

Figure 1(repeated)



The student now uploads a file from her computer to a web server over the Internet.

- (f) Write a detailed description of how one packet of data that the student is uploading to the web server will be routed from her computer in the United Kingdom to the web server that is located in Chicago in the United States of America. You may assume that the web browser software on the student's computer has already looked up, using a domain name server, the IP address of the web server.

Your description should cover:

- how the packet will be routed within the LAN from the student's computer to the gateway and
- how, once it has reached the gateway, the packet will be routed across the Internet to the web server that the data is being uploaded to.

In your answer you will be assessed on your ability to use good English, and to organise your answer clearly in complete sentences, using specialist vocabulary where appropriate.

(8)

- (g) The web server has a routable IP address.

The student's computer has a non-routable IP address.

Explain **two** differences between routable and non-routable IP addresses.

Difference 1: _____

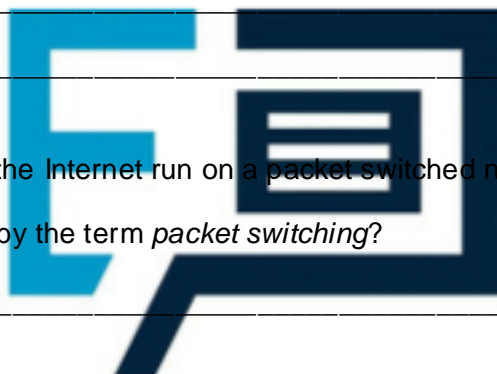
Difference 2: _____

(2)
(Total 18 marks)

Q20.

- (a) Explain the differences between the World Wide Web and the Internet.

- (b) Major parts of the Internet run on a packet switched network.
What is meant by the term *packet switching*?



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- (c) A packet being sent across the Internet may contain the details of a socket, for example 12.23.45.89:80.

Complete the table below to explain what each part of the socket in the table represents.

Part	Represents
12.23.45.89	
80	

(2)
(Total 8 marks)

Q21.

Figure 1 shows the HTML (Hypertext Markup Language) for a web page.

Figure 1

```
<html>
  <head>
    <title>Manor School Library</title>
  </head>
  <body>
    <p>Our favourite genres are:</p>
    <ul>
      <li>Science fiction</li>
      <li>Suspense</li>
      <li>Comedy</li>
    </ul>
    <a href="topten.html">Discover our Top Ten Books</a>
  </body>
</html>
```

- (a) With reference to the contents of **Figure 1**, draw a diagram to show how this web page would appear on a screen when viewed through a web browser. If necessary, use labels to make your diagram clear.



(4)

- (b) Style rules defined in an external style sheet are to be used to control the look and layout of the page for which the HTML code is provided in **Figure 1**.

- (i) One of the style rules is:
`p { font-family: Arial; color: blue; }`

Describe the effect of this style rule on the web page.

(1)

- (ii) The following HTML code is added to the body of the page.
<div id="header">Welcome to the school library</div>

Write a style rule so that only the text 'Welcome to the school library' displays as green coloured text with font size 36 point.

(3)

(Total 8 marks)

Q22.

An ICT technician at a secondary school has access to a variety of programs that she uses to manage a group of servers.

- (a) State **one** use for each of the protocols listed below

(i) Telnet: _____ (1)

(ii) FTP: _____ (1)

(iii) POP3: _____ (1)

- (b) Whilst remotely connecting to one of the servers the technician executes a command that displays the current network connections. The table below shows these network connections.

Active Internet Connections					
Proto	Recv-Q	Send-Q	Local Address	Foreign Address	(state)
tcp4	0	0	192.168.3.205:80	74.125.4.148:58539	ESTABLISHED
tcp4	0	0	192.168.3.205:80	208.43.202.29:57458	ESTABLISHED
tcp4	37	0	192.168.3.205:25	208.43.202.29:57459	CLOSE_WAIT

From the table above provide an example of the following:

(i) IP address: _____ (1)

(ii) Port:: _____ (1)

(iii) Socket: _____ (1)

- (c) State **two** reasons why the technician uses remote management software from her computer rather than going to the actual servers.

Reason 1: _____

Reason 2: _____

(2)
(Total 8 marks)

Q23.

Software is being developed to allow secure transmission of data over the Internet.

The two computers involved in a communication will be known as A and B.

- (a) What is *encryption*?

_____ (1)

- (b) The data that are being transmitted will be encrypted using public and private keys. A and B will each have a public key and a private key.

A will encrypt the data that it is sending using B's public key.

Explain why the data should **not** be encrypted using:

- (i) A's public key.

_____ (1)

- (ii) A's private key.

_____ (1)

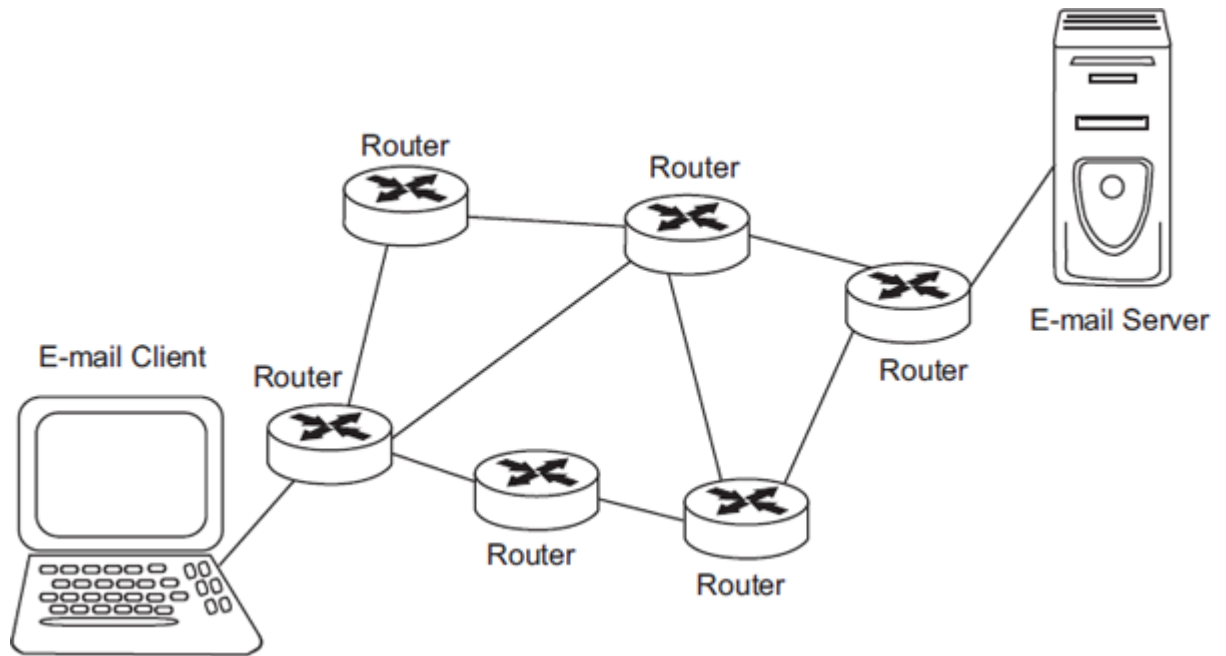
- (c) The communication will be made more secure by the use of a digital signature

- State the purpose of the digital signature.
- Explain how it will be created and used in the data transmission process from A to B.



Q24.

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- (a) Describe **two** roles of the routers shown in the diagram above.

Role 1: _____

Role 2: _____

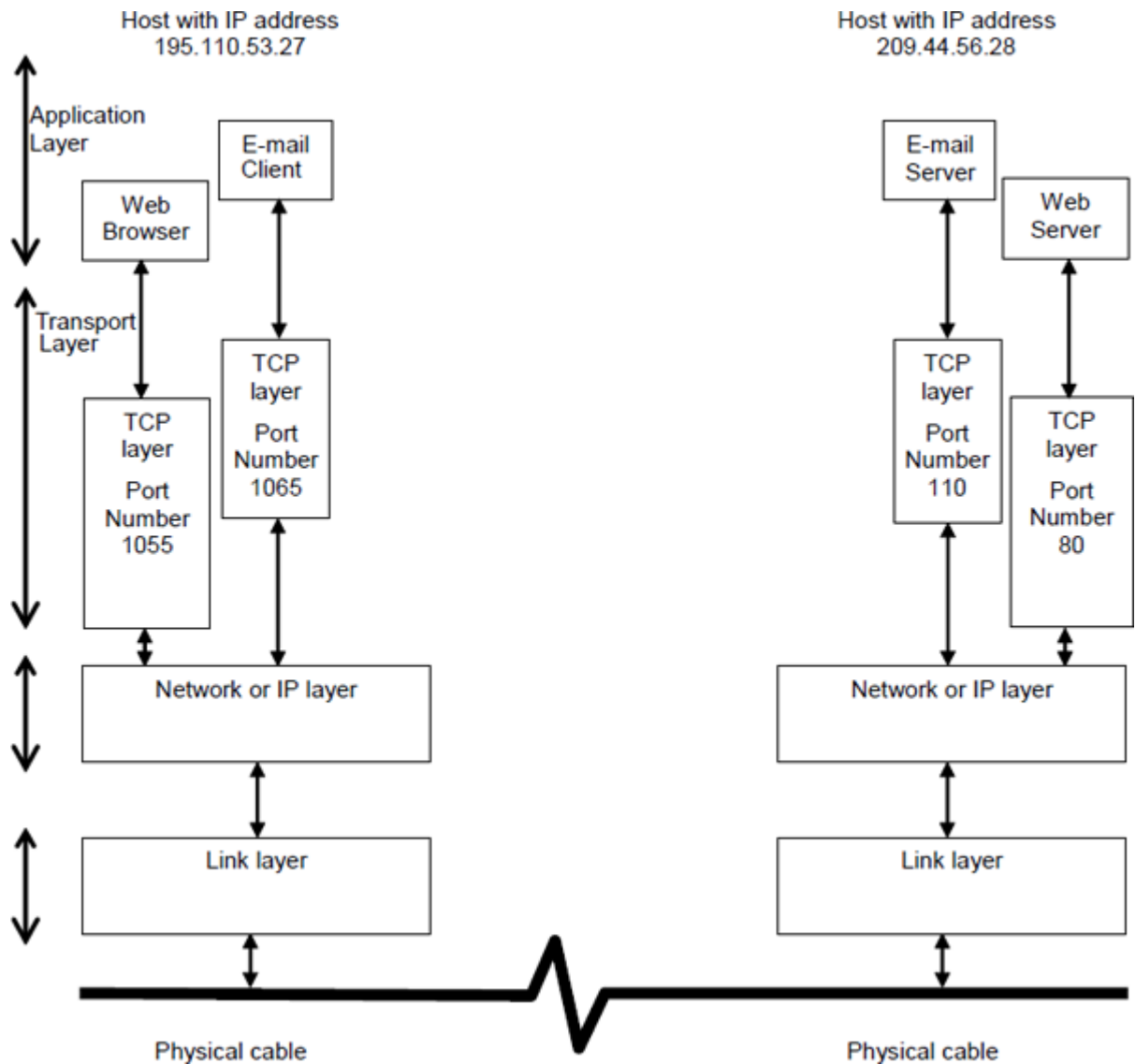
(2)

- (b) Name **one** of the application protocols associated with e-mail.

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(1)

- (c) The diagram below shows the TCP/IP stack for two computers (hosts) connected via a network.




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Explain how the TCP/IP stack in each host supports an e-mail client to e-mail server request at the same time as a web browser to web server request. You should cover in your explanation:

- the steps from the initiation of a request to the receipt of a response
- the role of the different TCP/IP layers in the stages of client-server operation
- the use of packets.

In your answer you will be assessed on your ability to use good English and to organise your answer clearly in complete sentences, using specialist vocabulary where appropriate.



provider (ISP) has instructed a firm of solicitors to act on behalf of the ISP's clients.

Q25.

An Internet Service Provider (ISP) has instructed a firm of solicitors to investigate the download activities of the ISP's clients.

(1)

- (b) The clients under investigation are alleged to have downloaded music files from a file-sharing site.

The ISP wishes the firm of solicitors to investigate whether any laws have been broken.

State the **full name** of the law which might have been broken by the clients downloading music files.

(1)

- (c) The ISP stores personal data concerning each of its clients.

What is meant by the term *personal data*?

(1)

- (d) The firm of solicitors discovers during their investigation that the same clients have been downloading personal data relating to other clients of the ISP without authorisation.

- (i) State the **full name** of the law that may have been broken by the ISP.

(1)

- (ii) State the **full name** of the law that may have been broken by the clients.

(1)

(Total 5 marks)

Q26.

Below is the Uniform Resource Locator (URL) of a web page.

`http://www.aqa.org.uk`

Explain what each of these parts of the URL mean.

`http://` _____

`www` _____

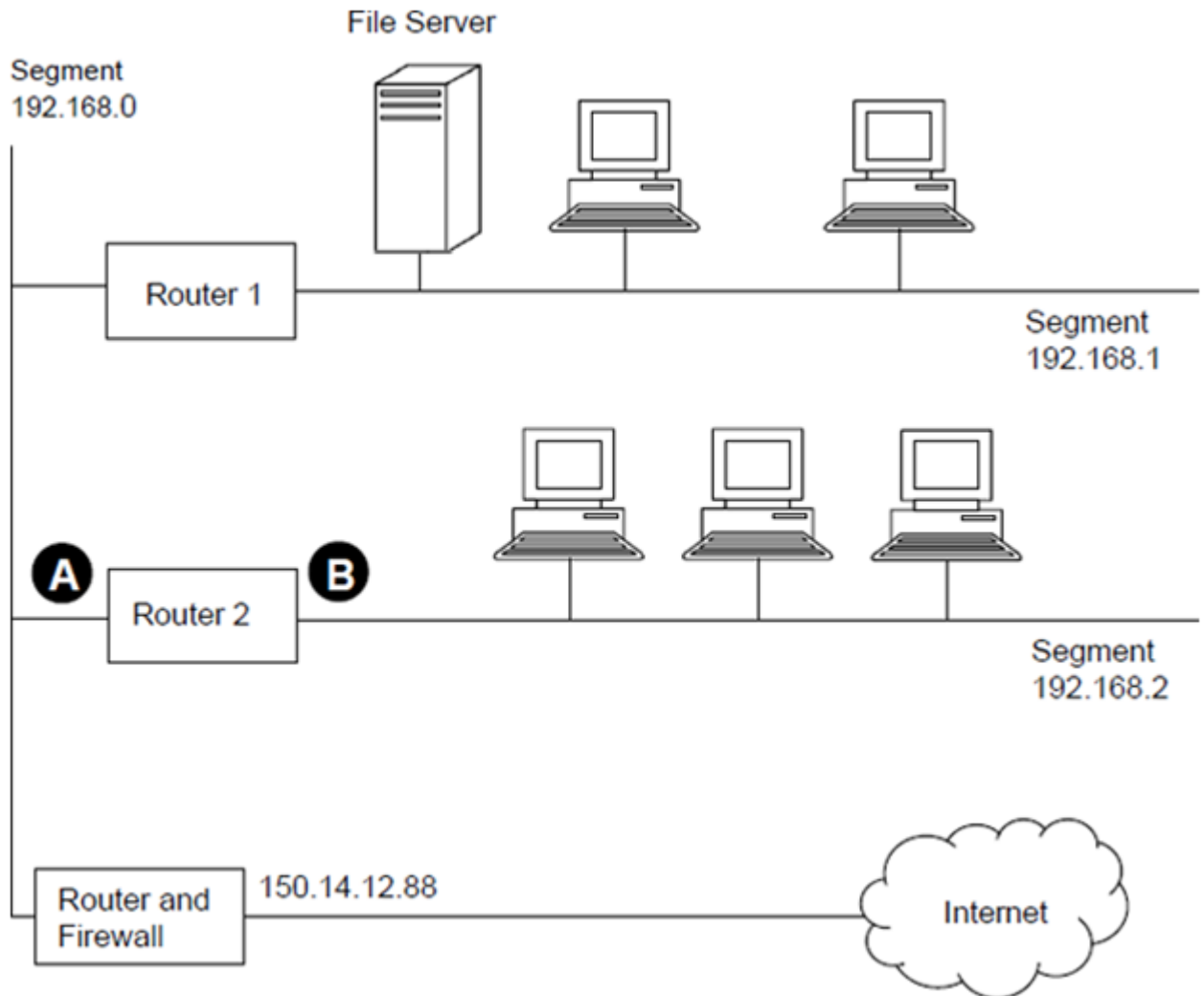
EXAM PAPERS PRACTICE

`uk` _____

(Total 3 marks)

Q27.

The figure below shows the topology of a particular computer Local Area Network (LAN) that is divided up into segments.



- (a) Suggest suitable IP addresses for:

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(i) the Router 2 port labelled **A** : _____

(ii) the Router 2 port labelled **B** : _____

(2)

- (b) When the computers in segment 192.168.2 were configured on the LAN, they were programmed with a subnet mask.

What subnet mask should have been used?

(1)

- (c) The LAN has a bus topology and has been divided into segments.

Explain why the LAN has been segmented.

(2)

- (d) Alternatively, the LAN could have been constructed using a star topology.
- (i) State **one** advantage of using a bus topology and explain how the advantage is achieved.

(1)

- (ii) State **one** advantage of using a star topology and explain how the advantage is achieved.



(1)

- (e) Discuss the security threats that the network manager will need to deal with because the LAN is connected to the Internet, together with how these may be dealt with.

In your answer you will also be assessed on your ability to use good English, and to organise your answer clearly and coherently in complete sentences, using specialist vocabulary where appropriate.

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This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There are approximately 20 lines visible. The paper has a slight shadow on the right side, suggesting it's resting on a surface.

(6)
(Total 13 marks)

A home desktop computer is connected to a number of peripherals including a printer and a keyboard. It is also connected to the Internet and to a wired Local Area Network (LAN).

- Explain what is meant by *baud rate*.

(1)

- (i) Explain how it is possible for the number of bits transmitted per second to be higher than the baud rate.

(1)

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Step	Direction	Data / Request Sent
1	Computer → Printer	Is printer ready to receive data?
2	Computer ← Printer	
3	Computer → Printer	
4	Computer ← Printer	Printer receiving data
5	Computer → Printer	Sending has ended
6	Computer ← Printer	

(3)

- (c) The computer is connected to a small LAN using a wired baseband connection and to the Internet using a broadband connection.

Explain the difference between baseband and broadband connections and justify why the LAN connection is baseband whereas the Internet connection is broadband.

In your answer you will also be assessed on your ability to use good English, and to organise your answer clearly and coherently in complete sentences, using specialist vocabulary where appropriate.

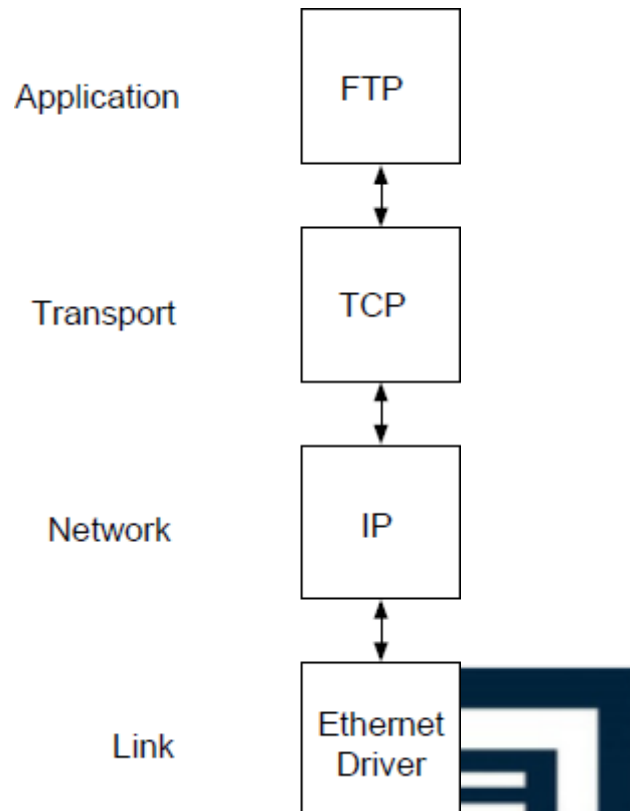
EXAM PAPERS PRACTICE

(4)

(Total 9 marks)

Q29.

The diagram below shows the TCP / IP protocol stack as applied to a network.



- (a) Describe **two** tasks that the transport layer performs.

1. _____

2. _____

EXAM PAPERS PRACTICE

(2)

- (b) FTP is an application layer protocol.

Name another application layer protocol.

(1)

- (c) A router is a vital component in the structure of the Internet.

In which layer of the TCP/IP protocol stack does a router operate?

(1)

(Total 4 marks)

Q30.

To request a particular web page on the Internet a user will need to enter into the address bar of their web browser a Uniform Resource Locator (URL).
This is in the form of:

`http://www.aqa.org.uk/courses/computing.html`

- (a) The first part `http://` is the protocol.

Describe the following parts of this URL.

`aqa.org.uk`

`courses/computing.html`

(2)

- (b) What is a protocol?

(1)

- (c) A requested page might be found locally on an intranet or it may be found on the Internet.

State **two** similarities between an intranet and the Internet.

1. _____

2. _____

EXAM PAPERS PRACTICE

(2)

- (d) 192.120.12.67 is a typical IP address.

Why do people prefer to use a Fully Qualified Domain Name (FQDN) rather than an IP address?

(1)

(Total 6 marks)

Q31.

An Internet user uses a web browser to access the World Wide Web.

- (a) Web pages can be retrieved from a web server using either the HTTP or the HTTPS protocol.

(i) What does HTTP stand for? _____

(1)

(ii) What is the difference between HTTP and HTTPS?

(1)

(iii) Describe a typical website that might be accessed using HTTPS.

(1)

(b) The computer that is retrieving a web page from a web server is known as a client. It will use a client port for the communication.

What is a *client port*?

(1)

(c) A web server uses well known port numbers to provide a service to client computers.

Why must these port numbers be well known?

EXAM PAPERS PRACTICE

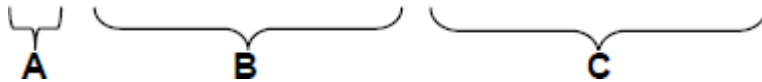
(2)

(Total 6 marks)

Q32.

Describe the **three** labelled parts of this URL.

<ftp://ftp.fileden.org.uk/pascal/source.pas>



A _____

B _____

C _____

(Total 3 marks)

Q33.

- (a) Put **one** tick on each row of the table below to classify each of (i), (ii) and (iii) as either a URL, a Domain Name, an IP address or a Protocol.

		URL	Domain Name	IP Address	Protocol
(i)	http://www.guineas.co.uk				
(ii)	212.58.251.195				
(iii)	guineas.co.uk				

(3)

- (b) What is the purpose of a Domain Name Server on the Internet?

(1)

(Total 4 marks)

Q34.

- (a) Explain **one** similarity and **one** difference between the Internet and an intranet.

Similarity: _____

(1)

Difference: _____

(1)

- (b) Computers connected to the Internet use the TCP/IP suite of protocols for data transmission.

- (i) What is a protocol?

(1)

- (ii) Name **two** of the layers in the TCP/IP protocol stack.

Describe **one** function of each of the layers that you have named.

	Layer name	Description of layer function
1		
2		

(4)
(Total 7 marks)

Q35.

A Uniform Resource Locator (URL) is the address of a resource on the Internet. For example, http://www.aqa.org.uk/qual/gce/computing_new.php.

Explain the different parts of this address.

(i) <http://> _____

(ii) www.aqa.org.uk _____

(iii) [/qual/gce/computing_new.php](http://www.aqa.org.uk/qual/gce/computing_new.php) _____

(Total 3 marks)