



Rewarding Learning

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General Certificate of Education  
2012

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**Applied Information and  
Communication Technology**

Assessment Unit A2 13

*assessing*

Unit 13: Networking and Communications

[A6J71]

TUESDAY 12 JUNE, AFTERNOON

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**MARK  
SCHEME**

1

Cable	✓
Network software	✓
Firewall	
Four computers	✓
Printer port	

[3]

3

2 (a) **Handshaking** is the term that describes how **two devices coordinate or synchronise** data transfer. [2]

(b) (i) **Unidirectional**

The PC's parallel port generally supports unidirectional communications (from the PC to the printer).

In a unidirectional parallel communication system there is the transmitter and the receiver. The transmitting site places its data on the data lines and informs the receiving site that data is available.

The receiving site then reads the data lines and informs the transmitting site that it has taken the data.

(ii) **Bidirectional**

Computer to computer communication.

Bidirectional data transmission is often nothing more than two unidirectional data transfers with the roles of the transmitting and receiving sites reversed for the second communication channel. Used when two devices are communicating and sending data and signals in each direction.

Use of strobe (data is available line)

Use of acknowledge line (ready for more data)

Use of busy line (don't send data yet)

(Definition = [2] + **two** valid reasons × 2 = [4])

[4]

6

3

Half duplex	✓
Double flex	
Full duplex	✓
Token flex	
Simplex	✓

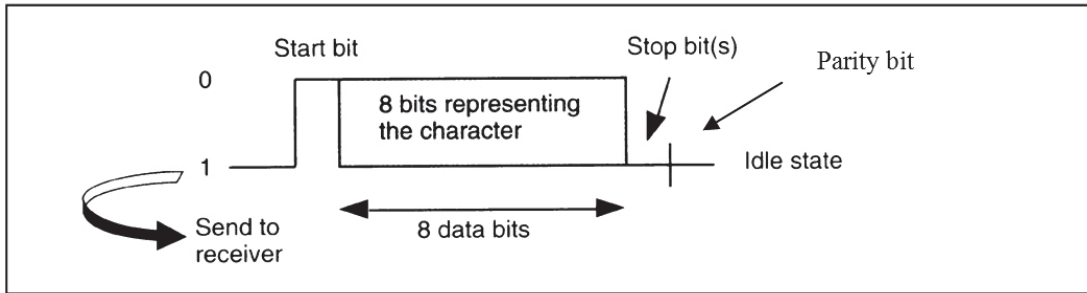
Each correct tick = ([1] × 3)

[3]

3

Level of response	Marking Criteria	Mark band
Excellent	<p>The candidate describes correctly and in detail the packaging of the byte. (The candidate has included an accurate labelled diagram showing start bit, stop bit and parity bit.)</p> <p>Their use of spelling, punctuation and grammar is excellent and writing is clearly legible.</p> <p>Their discussion of the transmission shows a very good knowledge of the requirements of sending and receiving data using this method.</p> <p>Their discussion of the set up and receiving data uses an excellent form and style.</p> <p>Their discussion is highly coherent and is very well organized and they use a wide range of correct specialist terms.</p>	[9]–[12]
Good	<p>The candidate describes correctly the packaging of the byte. (The candidate has included a labelled diagram showing start bit, stop bit and parity bit.)</p> <p>Their use of spelling, punctuation and grammar is good and writing is legible.</p> <p>Their discussion of the transmission shows a good knowledge of the requirements of sending and receiving data using this method.</p> <p>Their discussion of the set up and receiving data uses a satisfactory form and style.</p> <p>Their discussion is coherent and is organized and they use a range of correct specialist terms.</p>	[5]–[8]
Poor	<p>The candidate may describe some packaging required to send a data byte.</p> <p>There may not be a diagram.</p> <p>Their use of spelling, punctuation and grammar is poor and writing is not that legible.</p> <p>Their description may not be well organised.</p> <p>Their discussion of the set up for sending and receiving the data byte uses a poor form and style.</p> <p>Their discussion is poor and they use few specialist terms.</p>	[1]–[4]

The packaging of a data byte during asynchronous data transmission should include a diagram similar to that as shown below.



- There may be a definition of asynchronous data transmission – data is sent at irregular intervals
- The sending device will package the byte adding a start bit, stop bit and parity bit (a special chip located in the sender will do this)
- The sender counts the number of bits to be sent and adds the parity bit to the byte
- There may be some odd and even parity explanation
- The byte is sent
- The receiver will strip the start and stop bits and recalculate parity - there may be some explanation of how this is done
- There may be a discussion of what happens if parity is correct (or incorrect)
- There may be some discussion of the limited effectiveness of parity checking (e.g. if two bits are in error)
- Parity checking is not only used on single characters, but can check entire blocks of characters
- If parity check suggests an error a signal to resend is sent

[12]

12

5

Baseband signalling	✓
Bluetooth technology	
Cable sharing	✓
Cable length restrictions	✓
Multiple access	✓
Token ring	

Each correct tick = ([1] × 4)

[4]

4

6	In a star network the failure of one of the stations affects the whole network.	FALSE
	Within a star network, each network interface card has its own unique identifier.	TRUE
	Only one hub can be installed in a star network.	FALSE
	Star networks can be used as peer to peer networks when there are only a few computers to be connected.	TRUE
	The cabling for star topologies requires the use of terminators.	FALSE
	A star network uses a token to pass on data from one node to another.	FALSE

Each correct statement =  $([1] \times 6)$  [6] 6

7 Router

- It is used to determine if an address is inside or outside a network
- Description of NAT
- It is a device that examines IP addresses of incoming packets
- It determines the best path for packets
- It forwards data along this path
- It can connect multiple Ethernet segments
- It will work with the firewall to:
  - i. intercept forbidden attempts to use the network
  - ii. prohibit attempts to access external networks
- ability to adapt
- ability to keep traffic in subnets

Any **three** features plus description  $\times [2]$  [6] 6

8 (a) Threats

Threats:

- Physical threats, e.g. attempts to damage server
- Attempts to use the network without permission
- Attempts to use resources without authority
- Depending on topology (e.g. star) risk to network if hub (or switch) fails
- Threats based on viruses, Trojan horses and worms
- DoS attacks
- Any other suitable threat

Each threat ( $4 \times [1]$ ) [4]

(b) Threats and counters to threats may include:

- Physical threats e.g. attempts to damage server
  - ✓ Countered by physically locking server away (or removing keyboard and/or screen)
- Attempts to use the network without permission
  - ✓ Use of log on usernames and passwords
- Attempts to use resources without authority
  - ✓ Allocation of rights and permissions
- Depending on topology (e.g. star) risk to network if hub (or switch) fails
  - ✓ Have appropriate backup strategy in place
- Threats based on viruses, Trojan horses and worms
  - ✓ Use of appropriate software
  - ✓ Use of good practice – don't open e-mails from unknown sources
- DoS attacks
  - ✓ Appropriate rules in place to allow routers to react
- Any other suitable threat
- Any other suitable counter to threat [8]

12

Level of response	Marking Criteria	Mark band
Excellent	<p>The candidate describes correctly and in detail the main threats to network security and how the threats may be minimised.</p> <p>Their use of spelling, punctuation and grammar is excellent and clearly legible.</p> <p>Their discussion of network security shows a very good knowledge of the different ways in which computer networks are subject to threat and how these threats may be overcome.</p> <p>Their discussion uses an excellent form and style.</p> <p>Their discussion is highly coherent and is very well organized and they use a wide range of correct specialist terms.</p>	[6]–[8]
Good	<p>The candidate describes correctly some threats to network security and how the threats may be minimised.</p> <p>Their use of spelling, punctuation and grammar is satisfactory and legible.</p> <p>Their discussion of network security shows a knowledge of the different ways in which computer networks are subject to treat and how some of these threats may be overcome.</p> <p>Their discussion uses a satisfactory form and style.</p> <p>Their discussion is satisfactory and is organized and they use a range of correct specialist terms.</p>	[3]–[5]
Poor	<p>The candidate may describe some threats to network security – e.g. viruses.</p> <p>Their use of spelling, punctuation and grammar is poor and writing is not that legible.</p> <p>Their description may not be well organised.</p> <p>Their discussion of network security uses a poor form and style.</p> <p>Their discussion is poor and they use few specialist terms.</p>	[0]–[2]

9 DHCP

It is used to control the number of users on the network.	FALSE
It protects the file server in the network from Spam attack.	FALSE
It is a protocol for assigning or supplying IP addresses.	TRUE
It makes network administration much easier.	TRUE
It allows a device to have a different IP address every time it connects to the network.	TRUE
It helps to combat computer fraud.	FALSE

(6 × [1])

[6]

6

10 Firewall

- Security feature (software) that prevents an internal network being entered by unauthorised user(s)
- It can prevent access to external networks
- Checks IP addresses and monitors data entering and leaving the network
- Can be set up to prevent access to specific websites (containing inappropriate content)
- Any other suitable feature

Any **three** features plus brief description (3 × [2])

[6]

6



11 Wired vs wireless networks

Level of response	Marking Criteria	Mark band
Excellent	<p>The candidate describes correctly, and in detail, the main advantages and disadvantages of using wired and wireless options.</p> <p>Their use of spelling, punctuation and grammar is excellent and clearly legible.</p> <p>Their discussion of networking shows a very good knowledge of the different ways in which computer networks are set up and managed.</p> <p>Their discussion uses an excellent form and style.</p> <p>Their discussion is highly coherent and is very well organized and they use a wide range of correct specialist terms.</p>	[9]–[12]
Good	<p>The candidate describes correctly some advantages and disadvantages of using wired and wireless options.</p> <p>Their use of spelling, punctuation and grammar is satisfactory and legible.</p> <p>Their discussion of network security shows a good knowledge of the different ways in which computer networks are set up and managed.</p> <p>Their discussion uses a satisfactory form and style.</p> <p>Their discussion is satisfactory and is organized and they use a range of correct specialist terms.</p>	[5]–[8]
Poor	<p>The candidate may describe some advantages and disadvantages of using wired and wireless options.</p> <p>Their use of spelling, punctuation and grammar is poor and is not that legible.</p> <p>Their description may not be well organised.</p> <p>Their discussion of wired and wireless options uses a poor form and style.</p> <p>Their discussion is poor and they use few specialist terms.</p>	[1]–[4]

**Advantages of star wired option:**

- Secure, main base (timetabling easy)
- Disadvantages of wired options
- Little flexibility, always in same room, star – hub or switch fails – all fails

**Advantage of wireless option:**

- Flexibility

**Disadvantage of wireless**

- Security, signal problems, speed of transmission.

[12]

12

**12 Client server – roaming profiles**

Advantages:

- Same profile no matter where the log on is
- Individuality plus explanation
- Easy using same HCI plus explanation

Any **two** advantages × [2]

[4]

4

**13 E-mail**

- (a) Spam – definition, slowing down network, nuisance to company
- (b) Privacy – inappropriate use, use at home issues
- (c) Viruses – definition, need for anti-virus software

**Three** descriptions × [2]

[6]

6

**14 Video conferencing**

Advantages:

- No need for travel
- Saving on air fares
- Can send documents for discussion
- Multipoint discussions possible

Disadvantages:

- Set up equipment (need for technical support)
- Time zones synchronisation
- Lack of face to face contact
- High band width required

Each **two** advantages × 2 = [4] + **two** disadvantages × 2 = [4]

[8]

8

15

3.	hides IP addresses.
6.	is a sequence of moving images sent in compressed form over the Internet.
5.	is an open wireless technology standard for exchanging data over short distances.
4.	tries to cause the removal of network services to users.
1.	translates domain names into IP addresses.
2.	defines how messages are formatted and transmitted on the World Wide Web.

Each correct answer (6 × [1])

[6]

6

**Total**

**100**