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General Certificate of Education
2014

Applied Information and Communication Technology

Assessment Unit A2 13

assessing

Unit 13: Networking and Communications

[A6J71]

A6J71

TUESDAY 17 JUNE, MORNING

TIME

1 hour 30 minutes.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces
provided at the top of this page.
Answer **all thirteen** questions on the paper in the spaces provided.

INFORMATION FOR CANDIDATES

The total mark for this paper is 100.
Quality of written communication will be assessed in Questions **9**,
12 and **13**.
Figures in brackets printed down the right-hand side of pages
indicate the marks awarded to each question or part question.

ADVICE TO CANDIDATES

You are advised to take account of the marks for each part
question in allocating the available examination time.

	For Examiner's use only		
Question	Marks available	Marks	Remark
1	9		
2	6		
3	4		
4	6		
5	12		
6	5		
7	5		
8	5		
9	10		
10	12		
11	6		
12	10		
13	10		
Total	**100**		

1 The following diagram represents serial data transmission from device X to device Y in three different ways.

(i)

data can only travel in one direction

X → Y

(ii)

data can only travel in one direction
at a time

X ⇄ Y

(iii)

data can travel in both directions
at the same time

X ⟷ Y
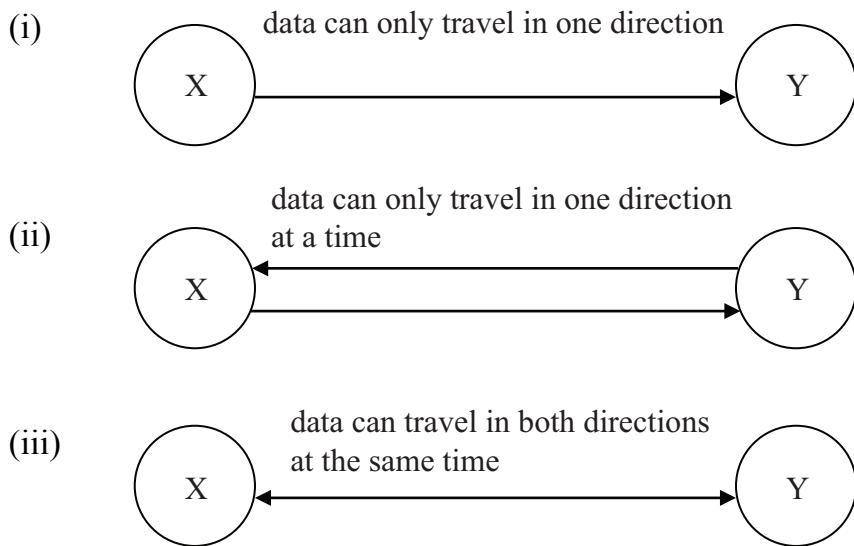
(a) Serial data transmission in part (i) is called _____

(b) Serial data transmission in part (ii) is called _____

**(c)** Serial data transmission in part (iii) is called _____

[3]

(d) Consider the following sequence of steps involved in synchronous data transmission and choose the correct word from the list given.

MAC   **host**   **header**   **ACK**   **clock**

SYN   **LAN**   **packet**   **line**   **WiFi**

In synchronous serial data transmission the signals on the data lines are valid when a _____ signal, used by both the sender and receiver, assumes a predefined state. When this state is reached, both the sender and receiver have agreed that transmission of data may take place. The signal may be delivered on a _____ separate from the data transmission line. Various codes are sent to enable the transmission to take place properly and accurately. One such code is _____ which starts the process by synchronising the sender and receiver. The receiver will acknowledge it is ready to receive data by sending the code _____ (or if it is not ready by using the code NAK). The data _____ is sent and framed by various other codes which include SOH (start of _____), STX (start of text), ETX (end of text) and BCC (block cyclic check). [6]

2 In a local area network (LAN) a network card is installed in each computer.

Describe **three** functions of the network card shown above.

Function 1 _____

_____

Function 2 _____

_____

Function 3 _____

_____

[6]

3 Consider the following section of a computer network.
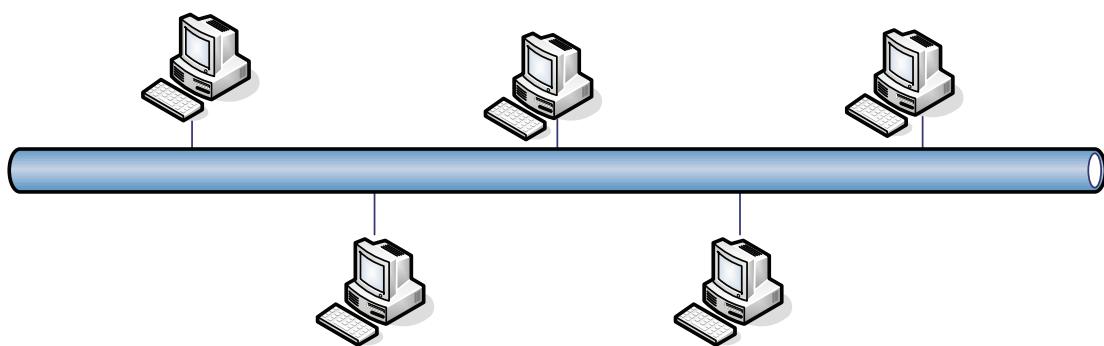
(a) What type of cable would you expect to find in this network?

_____ [1]

(b) What type of network is shown here?

_____ [1]

(c) What would happen if two computers attempt to send data at the same time?

_____

_____

_____

_____ [2]

4 The following statements about LAN network topologies are either **true** or **false**. Write the word **true** or **false** beside each statement shown below.

Star based networks use routers to manage user accounts.	
Peer-to-peer network computers allow users to share resources with other users.	
In star networks if one computer fails then all computers are affected.	
Hybrid networks are a mixture of bus and star based systems.	
Bus based networks are best used when many computers must be networked.	
Baseband signalling is used in bus based topologies.	

[6]

5 A business organisation uses a client server network for its operations.

(a) Describe **three** features that would be needed to enable a computer to act as a server.

Feature 1 _____

_____

_____

Feature 2 _____

_____

_____

Feature 3 _____

_____

_____ [6]

(b) Describe **three** benefits of using a client server network.

Benefit 1 _____

_____

_____

Benefit 2 _____

_____

_____

Benefit 3 _____

_____

_____ [6]

7

6 Consider the following paragraph about digital communication naming conventions. Insert the correct phrase from the following list.

IP addressing   **DNS server**   **host name**

domain name   **low level**   **top level**

sample.net   **star network**   **proxy server**

http://www.sample.net/index.html   **.com**

Digital communication methods use a variety of naming conventions.

The _____ is a component of

a Uniform Resource Locator (URL) used to access web sites.

An example of a URL is _____ .

An example of a _____ domain

name is .net.

A second-level domain name is _____

while an example of a _____ is

www.example.net.

[5]

7 **Tracert** is a tool used by network managers to trace the route taken by an IP packet.

Output from a typical trace is shown below.

```
Tracing route to www-bbc-com.bbc.net.uk [212.58.244.71]
over a maximum of 30 hops:
  1     3 ms     3 ms     3 ms  192.168.0.1
  2    29 ms    28 ms    28 ms  host-92-4-224-1.as43234.net [92.4.224.1]
  3    34 ms    53 ms    34 ms  host-92-31-247-113.as13285.net [92.31.247.113]
  4    39 ms    40 ms    39 ms  host-92-31-247-112.as13285.net [92.31.247.112]
  5    42 ms    40 ms    40 ms  xe-11-2-0-scr002.log.as13285.net [78.144.2.131]

  6    40 ms    40 ms    41 ms  xe-11-0-0-scr010.thn.as13285.net [78.144.1.0]
  7    41 ms    40 ms    40 ms  host-78-144-3-47.as13285.net [78.144.3.47]
  8     *         *         *    Request timed out.
  9     *         *         *    Request timed out.
 10    40 ms    45 ms    44 ms  ae0.er01.telhc.bbc.co.uk [132.185.254.109]
 11    41 ms    41 ms    41 ms  132.185.255.148
 12    44 ms    45 ms    44 ms  bbc-vip116.telhc.bbc.co.uk [212.58.244.71]

Trace complete.
```

(a) What website is the network manager trying to find out about?

_____ [1]

(b) What does the IP address 192.168.0.1 signify?

_____ [1]

(c) Identify the type of device named as host–92–4–224–1

_____ [1]

(d) Give one reason why, at hop 8 and hop 9, the 'request timed out'.

_____ [1]

(e) How does the network manager know if the IP packet has reached its intended destination?

_____ [1]

8 Complete the following table as shown by matching the most appropriate statements.

Voice over IP ………	
Private IP addresses ………	**B**
A switch…….	
When playing network games over the Internet…….	**C**
A proxy server………	
DNS………	
Bandwidth……..	

A stores recently visited web pages.
B are hidden from the Internet by Network Address Translation (NAT).
C the port details of the user's device are sent.
D translates URL domain names into IP addresses.
E enables people to use the Internet for telephone calls.
F is used to connect star networks.
G specifies the amount of data that can be sent over a period of time.   [5]

9 Explain what is meant by the following network terms.

(a) Media Access Control (MAC)

_____

_____

_____

_____ [2]

(b) Internet Protocol (IP) addressing

_____

_____

_____

_____ [2]

(c) Describe how the MAC address and the IP address are used by the Address Resolution Protocol (ARP).

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____ [6]

11

10 Explain the following in the context of a wireless networked environment.

(a) Wireless Access Points

_____

_____

_____

_____ [2]

(b) Wireless standards

_____

_____

_____

_____ [2]

(c) Security

_____

_____

_____

_____

_____

_____

_____ [4]

12

(d) Wireless range

_____

_____

_____

_____

_____

_____

_____ [4]

[Turn over

11 The following statements about firewalls are either **true** or **false**.
Write the word **true** or **false** beside each statement.

Firewalls hide IP addresses using NAT.	
Firewalls can be both hardware and software.	
Firewalls prevent unauthorised access to or from a private network.	
All messages entering or leaving an intranet should pass through the firewall.	
A firewall recognises if the network is bus, star or ring.	
A firewall records users' passwords.	

[6]

12 Discuss the main characteristics of the different types of transmission media used to transmit data when using both cabled and wireless LAN.

[10]

15

[Turn over

13 Discuss the evolution of Ethernet technology. Your answer should include reference to bus and star based networks, standards and technical terms related to data transmission.

[10]

THIS IS THE END OF THE QUESTION PAPER