



Please write clearly in block capitals.

Centre number

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Candidate number

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Surname

Forename(s)

Candidate signature

Level 3 Technical Level

IT: CYBER SECURITY

IT: NETWORKING

IT: USER SUPPORT

Unit 2 Communication technologies

Thursday 18 January 2018

Morning

Time allowed: 2 hours

Materials

For this paper you must have:

- a ruler.

You may use

- a calculator
- stencils or other drawing equipment (eg flowchart stencils).

Instructions

- Use black ink or black ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer each question in the space provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work you do not want to be marked.
- If you need more space use the additional pages at the back of this booklet.

Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 80. There are 50 marks for **Section A** and 30 marks for **Section B**.

Advice

- In all calculations, show clearly how you work out your answer.
- Use diagrams, where appropriate, to clarify your answers.
- You are expected to use a calculator where appropriate.
- You are reminded of the need for good English and clear presentation in your answers.

For Examiner's Use	
Examiner's Initials	
Question	Mark
1–5	
6	
7	
8	
9	
10	
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16	
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19	
TOTAL	



J A N 1 8 H 5 0 7 6 4 2 6 0 1

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Section AAnswer **all** questions in this section.**Total for this section: 50 marks**In the multiple choice questions, only **one** answer per question is allowed.

For each question completely fill in the circle alongside the appropriate answer.

CORRECT METHOD



WRONG METHODS



If you want to change your answer you must cross out your original answer as shown.



If you wish to return to an answer previously crossed out, ring the answer you now wish to select as shown.

**0 1**Which **one** of the following is **not** typically an example of data terminal equipment (DTE)?**A** Printer.**B** Modem.**C** Console.**D** Application server.**[1 mark]****1****0 2**

Guided transmission media provides a conduit from one device to another.

Which **one** of the following is **not** an example of guided transmission media?**A** Twisted-pair cable.**B** Coaxial cable.**C** Fibre-optic cable.**D** Microwave.**[1 mark]****1**

0 2

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0 3

A Metropolitan Area Network (MAN) is typically owned and operated by a single entity such as a government body or large corporation.

Which **one** of the following would you expect to be larger than a MAN?

A Local area network (LAN).

B Wireless local area network (WLAN).

C Wide area network (WAN).

D Storage area network (SAN).

[1 mark]

1

0 4

Network topology defines a computer network's layout or structure.

Which **one** of the following defines a star network?

A Data flows through one centralised device.

B Messages can take any of several possible paths from source to destination.

C Has a common backbone to connect all devices.

D Every device has exactly two neighbours for communication purposes.

[1 mark]

1

0 5

The first layer of the Open Systems Interconnection (OSI) network model is called the physical layer.

Which **one** of the following **best** describes the physical layer?

A Determines the physical addressing of the hosts.

B Concerned with the physical characteristics of electrical or optical signalling.

C Uses logical addresses to deliver packets to the correct network.

D Handles reliable or unreliable delivery of data to the destination.

[1 mark]

1

Turn over ►



0 3

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Communication is the process of transmitting information. Noise is any type of disruption that interferes with the transmission.

Suggest a tool you could use to remove impulse noise and what additional problem using that tool may cause.

[2 marks]

2**0 7**

Wi-Fi use in the home can be disrupted by electronic equipment such as cordless phones and baby monitors.

State **two** possible causes as to why this disruption occurs.

[2 marks]

2**0 8**

Unlicensed technologies have been described as essential to the success of the Internet of Things (IoT).

Suggest why the development of licensed frequencies for the IoT might be beneficial.

[3 marks]

3

0 4

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Unshielded twisted pair (UTP) and shielded twisted pair (STP) are both cables used in the transmission of data.

Give **one** advantage of using:

[2 marks]

unshielded twisted pair (UTP) _____

shielded twisted pair (STP) _____

2**1 0**

A Network Management Station (NMS) is a server that runs a network management application.

List **two** network elements the network management application might monitor and control.

[2 marks]

2**1 1**

4G has made a significant difference to data transfer speeds.

1 1 . 1

Explain the difference that 4G has made to data transfer speeds.

[2 marks]

1 1 . 2

Suggest **one** factor that affects data transfer speeds.

[1 mark]

3

Turn over ►



0 5

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1 2Provide a brief definition for each network in **Table 1**.**[3 marks]****Table 1**

Network	Definition
LAN Local Area Network	
WLAN Wireless Local Area Network	
SAN Storage Area Network	

3**1 3**

The International Standards Organisation (ISO) has standardised various protocols for use in computer networks.

1 3**1** Explain why protocols are used in networking.**[2 marks]**

1 3**2** The application layer is a layer of both the OSI and TCP/IP models.

Explain how the application layer interacts with the end user.

[3 marks]



0 6

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1 3 . 3 Each layer of the OSI uses a protocol data unit (PDU) to communicate and exchange information.

Complete **Table 2** below with the unit of data the PDU represents at each layer.

Table 2

OSI model layer	Protocol data unit (PDU)
Layer 1	
Layer 2	frame
Layer 3	
Layer 4	segment
Layer 5 and above	

[4 marks]

9

1 4

A subscriber identity module or subscriber identification module (SIM) stores the international mobile subscriber identity (IMSI) number and its key.

Explain how mobile phones identify and authenticate users.

[3 marks]

3

Turn over for the next question

Turn over ►



0 7

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1	5
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There are many advantages associated with installing a wireless network rather than a wired network.

1	5
---	---

. 1 List **three** advantages of installing a wireless network rather than a wired network. [3 marks]

Advantage 1: _____

Advantage 2: _____

Advantage 3: _____

1	5
---	---

. 2 List **three** disadvantages of installing a wireless network rather than a wired network.

[3 marks]

Disadvantage 1: _____

Disadvantage 2: _____

Disadvantage 3: _____

6



0 8

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Explain what is meant by the following statement:

“As a Network Manager allocating bandwidth, you cannot allocate a band or width; you can only manage network traffic over time”.

[6 marks]

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17

Explain the difference between “bps” and “Bps” and provide an example of each.

[4 marks]

6

4

Turn over ►



0 9

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Section B

Answer **all** questions in this Section.

Total for this section: 30 marks

1 8 Over-the-air programming (OTA) has become increasingly important as the use of advanced smart applications has become widespread.

1 | 8 . 1 Explain what is meant by an “over-the-air update”.

[3 marks]

1 8 . 2 The networking of electronic devices without the need for human interaction is known as the Internet of Things (IoT).

Providing examples, discuss the benefits and risks of using over-the-air updates to maintain, monitor, and control the IoT.

[12 marks]



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15

Turn over ►



A definition might suggest a computer network does nothing more than allow nodes to share resources. Yet a computer network can transform a business.

Discuss the advantages and disadvantages, benefits and risks of investing in a network, having only ever used stand-alone machines.

[15 marks]



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15

END OF QUESTIONS



If needed, use the following pages to continue your answers. Write the question number beside your answer.

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ANSWER IN THE SPACES PROVIDED**

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