



Please write clearly in block capitals.

Centre number

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Candidate number

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Surname

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Forename(s)

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Candidate signature

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# Level 3 Technical Level

IT: CYBER SECURITY

IT: NETWORKING

IT: USER SUPPORT

Unit 2 Communication technologies

Thursday 17 January 2019

Morning

Time allowed: 2 hours

## Materials

For this paper you must have:

- a ruler
- a scientific calculator (non-programmable)
- 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 in **Section A** and 30 marks in **Section B**. Both sections should be attempted.

## 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 |      |
|--------------------|------|
| Question           | Mark |
| 1–5                |      |
| 6                  |      |
| 7                  |      |
| 8                  |      |
| 9                  |      |
| 10                 |      |
| 11                 |      |
| 12                 |      |
| 13                 |      |
| 14                 |      |
| 15                 |      |
| 16                 |      |
| 17                 |      |
| 18                 |      |
| <b>TOTAL</b>       |      |



J A N 1 9 H 5 0 7 6 4 2 6 0 1

IB/M/Jan19/E6

**H/507/6426**

**Section A***Do not write  
outside the  
box*Answer **all** questions in this section.**0 1**

Bluetooth connects devices using

Tick (✓) **one** box.**[1 mark]**

infrared radiation.

☐

microwaves.

☐

short-range radio waves.

☐

X-ray radiation.

☐**0 2**

Which of the following cables is least affected by electromagnetic interference?

Tick (✓) **one** box.**[1 mark]**

coaxial

☐

fibre optic

☐

television transmitter

☐

unshielded twisted pair

☐

**0 3**

Bandwidth is the

Tick (✓) **one** box.**[1 mark]**

amount of data transmitted in a fixed amount of time.

☐

connection between server and client.

☐

energy waves propagated by a material substance.

☐

unwanted information that interferes with a transmission signal.

☐**0 4**

Which of the following is also referred to as line topology?

Tick (✓) **one** box.**[1 mark]**

bus topology

☐

mesh topology

☐

ring topology

☐

tree topology

☐**Turn over for the next question****Turn over ►**

|   |   |
|---|---|
| 0 | 5 |
|---|---|

The IEEE 802 defines

Tick (✓) **one** box.

[1 mark]

equal access to online information.

☐

Internet access over local area networks.

☐

networking layer protocols in TCP/IP.

☐

standards for local and metropolitan area networks.

☐

|         |
|---------|
| <hr/> 5 |
|---------|



**0 6**

Information can be transmitted in analogue or digital form.

Give **one** example of each type of signal.

**[2 marks]**

Analogue \_\_\_\_\_

\_\_\_\_\_

Digital \_\_\_\_\_

\_\_\_\_\_

**2****0 7**

Download times depend on file size and Internet speed.

Define Mbps and MBps.

**[2 marks]**

Mbps \_\_\_\_\_

\_\_\_\_\_

MBps \_\_\_\_\_

\_\_\_\_\_

**2**

**Turn over for the next question**

**Turn over ►**

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A hub, a switch, and a router can all now be found in one device.

Define each of these three network components.

Provide an example of how each operates in a network.

**[6 marks]**

Hub \_\_\_\_\_

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Example \_\_\_\_\_

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Switch \_\_\_\_\_

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Example \_\_\_\_\_

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Router \_\_\_\_\_

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Example \_\_\_\_\_

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|   |
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| 6 |
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0 9

The Internet has been described as an international network of networks.

State the role of the following in connecting one device to another across the Internet.  
[2 marks]

Internet Protocols (IP) \_\_\_\_\_

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Transmission Control Protocols (TCP) \_\_\_\_\_

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1 0

Explain when and where wireless networks might not work as effectively as wired networks.

[4 marks]

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4

Turn over for the next question

Turn over ►



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|---|---|

**[4 marks]**

[illegible]

4







|   |   |
|---|---|
| 1 | 3 |
|---|---|

Describe how Layer 2 (Data link layer) and Layer 3 (Network layer) of the OSI conceptual model enable packets of data to reach their destination address.

**[3 marks]**

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| 3 |
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1 4

Electromagnetic interference (EMI) is electrical noise. EMI can scramble images and cause errors in data.

Identify **three** other causes of EMI.

Suggest a possible solution for each.

[6 marks]

1 \_\_\_\_\_

Solution \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

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2 \_\_\_\_\_

Solution \_\_\_\_\_

\_\_\_\_\_

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3 \_\_\_\_\_

Solution \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

6

Turn over for the next question

Turn over ►



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|---|---|
| 1 | 5 |
|---|---|

**[6 marks]**

[illegible]

6



|   |   |
|---|---|
| 1 | 6 |
|---|---|

**[4 marks]**

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4

**Turn over ►**



**Section B**Answer **all** questions in this section.**1 7**

Transmission media make data transfer and communication possible across a network. They are the physical pathways connecting computers and other devices.

Each transmission requires specialised hardware. Some hardware operates better than other hardware in particular environments.

**1 7 . 1**Complete **Table 2** using the information from each of the boxes.**[3 marks]**

variable

easier to connect  
multiple devices

great

probably faster  
and less  
expensive in  
challenging  
locations

good

costly to buy and  
install**Table 2**

| Transmission media        | Set up | Includes                                  | Relative performance |
|---------------------------|--------|-------------------------------------------|----------------------|
| <b>Twisted pair cable</b> |        | UTP, STP, coaxial                         |                      |
| <b>Wireless</b>           |        | radio frequencies,<br>microwave, infrared |                      |
| <b>Fibre optic</b>        |        | bundles of 400 or 500<br>pairs            |                      |



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outside the  
box*

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|---|---|---|---|

Online high-definition gaming is played in the home across Internet links, most of which still use twisted pair copper-based cable.

Discuss the advantages and disadvantages of using copper-based cable.

Use examples in your answer.

**[9 marks]**

[illegible]

**Extra space is available on the next page if required**

**Turn over ►**



[illegible]

Describe attenuation and how this affects cable design.

[illegible]





[illegible]

15



*Do not write  
outside the  
box*

[illegible]

[illegible]

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