AQA

Please write clearly in block capitals.

Centre number | | | | | | Candidate number | | | | |

Surname _____

Forename(s) _____

Candidate signature _____

Level 3 Technical Level IT
COMMUNICATION TECHNOLOGIES

Unit Number: H/507/6426

Monday 26 June 2017 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 in **both** sections.
- You must answer each question in the space provided. Do not write outside the box around each page or on crossed through 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**.

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	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	
21	
TOTAL	

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ANSWER IN THE SPACES PROVIDED

Section A

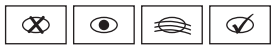
Answer **all** questions in this section.

Total for this section: 50 marks

In the multiple-choice questions, only **one** answer per question is allowed.

For each answer 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 Modulation is the process of using one signal to modify another signal. What name is given to the signal being modified?

A The PHASE

B The CARRIER

C The FREQUENCY

D The AMPLITUDE

[1 mark]

0 2 Which **one** of the following is **not** an example of wired transmission media?

A Twisted pair cable

B Coaxial cable

C Telephone lines

D Infrared signals

[1 mark]

0 3 Which **one** of the following best describes the key functions of a SIM card?

A IDENTIFY and AUTHENTICATE ⬭

B TRANSMIT and RECEIVE ⬭

C TRACK and CONTROL ⬭

D CONFIGURE and ENCRYPT ⬭

[1 mark]

0 4 Which **one** of the following is a **computer network** most likely to be used in e-commerce for high-speed online processing of large volumes of data?

A Local Area Network (LAN) ⬭

B Wireless Local Area Network (WLAN) ⬭

C Personal Area Network (PAN) ⬭

D Storage Area Network (SAN) ⬭

[1 mark]

0 5 Which **layer** of the Open System Interconnection (OSI) model is also known as the **network interface** layer?

A Application ⬭

B Transport ⬭

C Network ⬭

D Data link ⬭

[1 mark]

5

0 6 1G, 2G, 3G and 4G development has transformed mobile telecommunications to support the latest generation of smartphones.

Complete the table below, stating **one** key feature of each development.

[2 marks]

1G	
2G	
3G	
4G	

2

0 7 . 1 Define what is meant by point-to-point **connection**.

[1 mark]

0 7 . 2 Give **one** example of point-to-point **communication**.

[1 mark]

2

Turn over for the next question

0 8 Megabits per second (Mbps) is the ISP industry-standard unit for measuring your broadband connection speed.

Give **two** other examples of an appropriate unit for measuring broadband connection speed.

[2 marks]

2

0 9 **Communications data** (sometimes referred to as traffic data or metadata) is different from the content of the message.

Give **two** examples of metadata.

[2 marks]

2

1 0 Explain, using examples, why **network bandwidth** consumption and **network bandwidth capacity** are both important when calculating network bandwidth requirements.

[4 marks]

4

1 1 Provide a **technical** description of a **touch screen** for a mobile device.

[3 marks]

3

1 2 Explain why the use of **licensing** helps to ensure that mobile network operators' transmissions do **not** interfere with each other.

[3 marks]

3

1 3 Where might a network manager find a list of devices which are (or have been) connected to the local area network?

[3 marks]

3

1 4 . 1 Give **one** advantage of using **serial transmission** and **one** advantage of using **parallel transmission**.

[2 marks]

Serial transmission _____

_____

Parallel transmission _____

_____

1 4 . 2 State where parallel data transmission would be used.

[1 mark]

_____

_____

3

1 5 . 1 List **three** ways in which an analogue signal can be modulated.

[1 mark]

_____

_____

_____

1 5 . 2 Explain how a **modem** enables a computer to transmit data using a telephone line.

[2 marks]

_____

_____

_____

_____

3

1 6 Explain the key features of **simplex**, (full) **duplex** and **half-duplex** data transmission.

[4 marks]

Simplex _____

_____

_____

_____

Duplex _____

_____

_____

_____

Half-duplex _____

_____

_____

_____

4

1 7 Describe the terms **crosstalk** and **interference**, giving an example of each.

[6 marks]

Crosstalk _____

Interference _____

6

1 8 The real-world usage of the terms **mobile hotspot** and **tethering** has become almost interchangeable.

Explain your understanding of these terms and provide an example of how or where each might be used.

[4 marks]

4

1 9 Rather than using wired technology, a business decides to use mostly **wireless technology** when replacing its communication network.

Give **two** advantages and **two** disadvantages for the business making the decision to use **wireless technology**.

[4 marks]

Advantage 1 _____

_____

Advantage 2 _____

_____

Disadvantage 1 _____

_____

Disadvantage 2 _____

_____

4

Turn over for Section B

Section B

Answer **all** questions in this section.

Total for this section: 30 marks

2 0 **Network topology** is the arrangement of the various elements (links, nodes, etc.) of a computer network.

2 0 . 1 Choose **three** of the following network topologies and identify a strength and a weakness for each:

- Bus
- Ring
- Star
- Tree
- Mesh

[6 marks]

Choice 1 _____

Strength _____

_____

Weakness _____

_____

Choice 2 _____

Strength _____

_____

Weakness _____

_____

Choice 3 _____

Strength _____

_____

Weakness _____

_____

2 0 . 2 You are a network manager undertaking a review of the network topology for a setting of your choice.

State your chosen setting _____

Select the most appropriate topology for your setting. Justify your choice.

Your answer should include:

- cost
- size/scope
- setting and alternative topologies or options
- shortcomings of topology, eg: potential for failure, options to minimise failure.

[9 marks]

15

2 1 . 1 Draw a diagram that shows both the **OSI** and **TCP/IP** network models.

[3 marks]

2 1 . 2 Compare and contrast the **OSI** and **TCP/IP** network models.

In doing so, you should summarise:

- the functions of each model
- the relationships between each model
- the purposes of each layer.

[12 marks]

END OF QUESTIONS

15

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

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