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Information and Communication Technology

David Watson

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Information and Communication Technology

Theory Workbook

Second Edition

David Watson

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Contents

Introduction

Welcome to the Cambridge IGCSE™ Information and Communication Technology Theory Workbook. The aim of this Workbook is to provide you with further opportunity to practise the skills you have acquired through using the IGCSE Information and Communication Technology Student's Book. It is designed to complement the third edition of the textbook and to provide additional exercises to help you in your preparation for your examinations.

The chapters in this Workbook reflect the theory topics in the Student's Book and syllabus. There is no set way to approach using this Workbook. You may wish to use it to supplement your learning of different topics as you work through each chapter of the textbook, or you may prefer to use it to reinforce your understanding as you prepare for your examinations. The Workbook is intended to be sufficiently flexible to suit whatever you feel is the best approach for your needs.

1 Types and components of computer systems

1 Name the parts of a computer system shown below:

a .....

b .....

c .....

d .....

e .....

f .....

2 Choose items from the following list to identify the definition in the table.

- compiler
- control and measurement software
- database
- device driver
- graphics editing software
- linker
- operating system
- sensor software
- source code
- spreadsheet
- utilities
- video editing software

Definitions	Item from list
Software used to edit bitmap and vector images	....
Software that obtains data from sensors allowing computers to monitor and control external activities	....
Software used to manipulate and organise numerical data; data is put into grid of numbered rows and lettered columns	....
Software running in the background of a computer that manages most of the basic functions, such as user interface and memory management	....
Software that translates a program written in a high level language into machine code so that it can be directly run on the computer	....
Software that takes one or more object files produced by a language translator and combines them into a single program that can be run on a computer	....
Software that enables one or more hardware devices to communicate with the computer's operating system	....

3 Some of the statements that follow are true and some are false. Tick (✓) the appropriate column to indicate which are true and which are false.

Statement	True (✓)	False (✓)
A network interface card allows a user to access websites on the World Wide Web		
Read-only memory (ROM) is a type of non-volatile memory		
Spreadsheets and word processors are examples of applications software		
Video cards and sound cards are typical examples of computer software		
Solid-state drives make use of laser light to read and write data		

4 Computers can have command line interfaces (CLI) and graphical user interfaces (GUI).

a Give **two** advantages and **two** disadvantages of both types of user interface.

	Advantages	**Disadvantages**
CLI	1 .... 2	1 .... 2 ....
GUI	1 .... 2	1 .... 2 ....

b Give **one** example of who might use **each** type of user interface.

CLI: .....

.....

GUI: .....

.....

5 Three types of device are shown below. In **each** case:

i Name the device.

ii Give **two** features of each device which makes it different to the other devices.

iii Give **two** uses of each device; all six uses given must be different.

a

i Name: .....

ii Feature 1: .....

.....

Feature 2: .....

.....

iii Use 1: .....

.....

Use 2: .....

.....

b

i Name: .....

ii Feature 1: .....

.....

Feature 2: .....

.....

iii Use 1: .....

.....

Use 2: .....

.....

c

i Name: .....

ii Feature 1: .....

.....

Feature 2: .....

.....

iii Use 1: .....

.....

Use 2: .....

.....

6 a i Describe what is meant by a dialogue-based user interface.

.....

.....

.....

.....

ii Give **two** uses of a dialogue-based user interface.

.....

.....

.....

.....

b i Describe what is meant by a gesture-based user interface.

.....

.....

.....

.....

ii Give **two** uses of a gesture-based user interface.

.....

.....

.....

.....

7 Eight statements are given in the following table. Indicate, by placing a tick (✓) in the appropriate box, which of the statements are true and which are false.

Statement	True (✓)	False (✓)
Analogue data is made up of a series of discrete, discontinuous values		
Random-access memory (RAM) contents cannot be altered by a computer user		
Read-only memory (ROM) contains parts of the operating system currently in use		
Input devices are necessary to allow computers to receive commands from a user		
Output devices are needed by a computer so it can share the results of its processing with a human		
Read-only memory (ROM) can be increased in size to improve the operational speed of a computer		
Solid state drives (SSD) have a much faster data access time than internal memory, such as random-access memory (RAM)		
Before data on a hard disk drive (HDD) can be read by the CPU, it must first be moved into random-access memory (RAM)		

8 Artificial intelligence (AI) is having an impact on our everyday lives.

a Give **three** examples of the use of AI.

i .....

.....

.....

.....

ii .....

.....

.....

.....

iii .....

.....

.....

.....

b Discuss the positive and negative effects of the impact of AI on our everyday lives.

9 Discuss how augmented reality (AR) and virtual reality (VR) will have an impact in many areas of everyday life in the future. Your answer should include:

- features of AR and VR
- areas where AR and VR will have an impact
- how and why AR and VR will have an impact on the areas you have named.

.....

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.....

10 In each of the following questions, only one of the responses is correct. Choose one of the four options given.

a What is the meaning of BIOS?

A	Basic input-output system
B	Binary input-output system
C	Binary interface operating system
D	Basic interface operating system

.....

b What is the meaning of NIC?

A	Network integration card
B	Network input controller
C	Network interface card
D	Numerical integer converter

.....

c What is the meaning of CPU?

A	Control processor unit
B	Control (of) peripherals unit
C	Central programming unit
D	Central processing unit

.....

d What is the meaning of CLI?

A	Computer logic interface
B	Core logic interface
C	Command line interface
D	Complex logical interface

.....

e What is the meaning of ADC?

A	Augmented digital connection
B	Analogue to digital converter
C	Analogue to digital connection
D	Amplified digital connection

.....

2 Input and output devices

1 Six applications are shown in the table below. By using a tick (✓) indicate the **most appropriate** method of inputting data for each application.

Application	Keyboard	Touchscreen	Sensor
Inputting text into a word processor			
Inputting temperatures directly in an industrial control process			
Selecting from a menu at an ATM			
Inputting moisture levels in a greenhouse monitoring system			
Inputting commands, such as Prnt scrn or Ctrl+P, into a computer			
Selecting options at an information system access point at an airport			

2 a What is meant by the **two** terms: OCR and OMR?

OCR: .....

OMR: .....

b Compare the relative advantages and disadvantages of using OCR and OMR as a method of inputting data from a paper questionnaire.

OCR	OMR
.....	.....
.....	.....
.....	.....
.....	.....

3 Give **one** use for each of the following input devices.

Give a different use in each case.

a trackerball .....

.....

b joystick .....

.....

c remote control .....

.....

d microphone .....

.....

e scanner .....

.....

f light pen .....

.....

4 a 3D printers use various ways to produce solid objects. Explain each of the following terms:

i Additive .....

.....

ii Direct 3D printing .....

.....

iii Binder 3D printing .....

.....

b A car enthusiast has bought a car manufactured in 1911. Unfortunately, none of the parts for the car are available any more.

Explain how 3D printing technology could be used to create spare parts for this 1911 car.

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.....

.....

.....

.....

.....

c Describe **three** other uses for 3D printers.

1 .....

.....

2 .....

.....

3 .....

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5 a Describe **three** ways in which photographs can be transferred from a digital camera to a computer.

1 .....

.....

2 .....

.....

3 .....

.....

b Give **two** advantages of using digital cameras compared to using traditional film-based cameras.

1 .....

.....

2 .....

.....

c Give **two** disadvantages of using digital cameras compared to using traditional film-based cameras.

1 .....

.....

2 .....

.....

6 Which devices are being described below?

a A device that utilises radio waves to read and capture information using a tag, which comprises a chip and an antenna.

.....

b A device that can read marks written in pencil or pen, and is used in the marking of multiple-choice exam papers.

.....

c A device that can convert hard copy documents into an electronic form; software in the device also allows it to read and understand handwriting.

.....

d A device that takes an image from a computer, for example, and then magnifies the image and allows it to be shown on a large screen.

.....

e A device that uses a printing drum, which is positively charged, and negatively charged sheets of paper.

.....

7 Five output devices are shown on the left and five descriptions are shown on the right.

By drawing lines, connect each output device to its correct description.

(Graph) plotter	Output device that uses tiny crystals which change when different electric fields are applied
Dot matrix printer	Output device that uses pens to build up the image by drawing multiple continuous lines
Inkjet printer	Device under computer control which is mechanical or electromechanical in nature and operates switches, motors, and so on
Actuator	Droplets of ink are ejected onto paper; makes use of thermal bubble or piezoelectric technology to eject the ink onto paper
LCD screen	Output device where a print head (containing a matrix of pins) strikes an inked ribbon to print characters

8 Airports use QR codes to advertise tourist information aimed at arriving passengers.

a Describe a QR code.

.....

.....

.....

.....

b Give **three** advantages of using QR codes.

1 .....

.....

2 .....

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3 .....

.....

c Give **two** disadvantages of using QR codes.

1 .....

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2 .....

.....

d Describe how a traveller arriving at an airport can use QR codes to obtain tourist information. In your description, name any devices needed to read the QR code and explain how the data read would be processed.

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9 Direct data entry (DDE) is used to input data into a computer, removing the need for manual data entry. Complete the following table by giving the most appropriate DDE device for each application described.

Application	DDE device
Shaded boxes or lozenges on a paper questionnaire to be read in directly to a computer	
To automatically track an item in a distribution centre without the need for any scanning; the item can be recognised from up to 50 metres away	
Device that can read a matrix made up of dark squares on a light background; these squares represent data which can be read by a smartphone camera	
Device that can read alternating dark and light lines, of varying thickness, that can be used to identify an item	
System that can take characters on paper and convert each character into a form that can be understood by, for example, a word processor	

10 Use the following list of words and phrases to complete the paragraph that follows. Each word or phrase can be used once, more than once or not at all.

- fuser
- impact
- ink cartridges
- inked ribbon
- laser
- negatively
- noisy and dirty
- piezoelectric
- positively
- quiet
- red
- strikes
- thermal bubble
- toner
- toner cartridge

Inkjet printers use ..... to supply ink to a spray nozzle to enable printing.

Ink droplets are produced using ..... or ..... technology.

Dot matrix printers are a type of ..... printer where a matrix print

head ..... an ..... to print characters; this type of

printer works well in ..... environments, unlike other types of printer.

Laser printers use a printing drum which is given a positive charge; as the drum rotates, a ..... light scans across it removing the ..... charged areas which match the image to be printed. The drum is then coated in positively charged .....; a ..... charged sheet of paper is then rolled over the drum. Finally, a ..... is used to melt the ink onto the paper.

11 Seven statements about input/output devices are given below. By ticking (✓) either the true or false column, indicate which statements are true and which are false.

Statement	True (✓)	False (✓)
Digital cameras use HDD storage to hold the photographs		
Light pens only work with CRT monitors		
Trackerballs are used in luxury cars to select functions rather than operate dials and switches		
Data from microphones can be directly processed by a computer		
Optical mice use light to transmit data directly to the computer		
Ergonomic keyboards are much smaller than standard QWERTY keyboards		
Driving (steering) wheels use sensors to detect left/right movement to give the sensation of steering		

12 Describe **i** the use and **ii** the operation of the following devices:

a RFID:

i use: .....

.....

.....

ii operation: .....

.....

.....

b Contactless card reader:

i use: .....

.....

.....

ii operation: .....

.....

.....

13 3D printers produce solid objects. When data is sent to a 3D printer, it goes through a number of stages. The stages are shown below. By writing the numbers 1 to 5, put the following stages in the correct order:

Description of stage	Order of stage
3D printer is now set up to allow the solid object to be 'printed'	
Finalised drawing is imported into 3D printing software that prepares data in a format understood by the printer	
Object removed from the 3D printer and any unwanted material is cut away or washed away to produce a final solid object	
Design is made using CAD software or blueprint downloaded from the internet	
Solid object is now built up layer by layer; each layer is 0.1 mm thick and printing can take several hours	

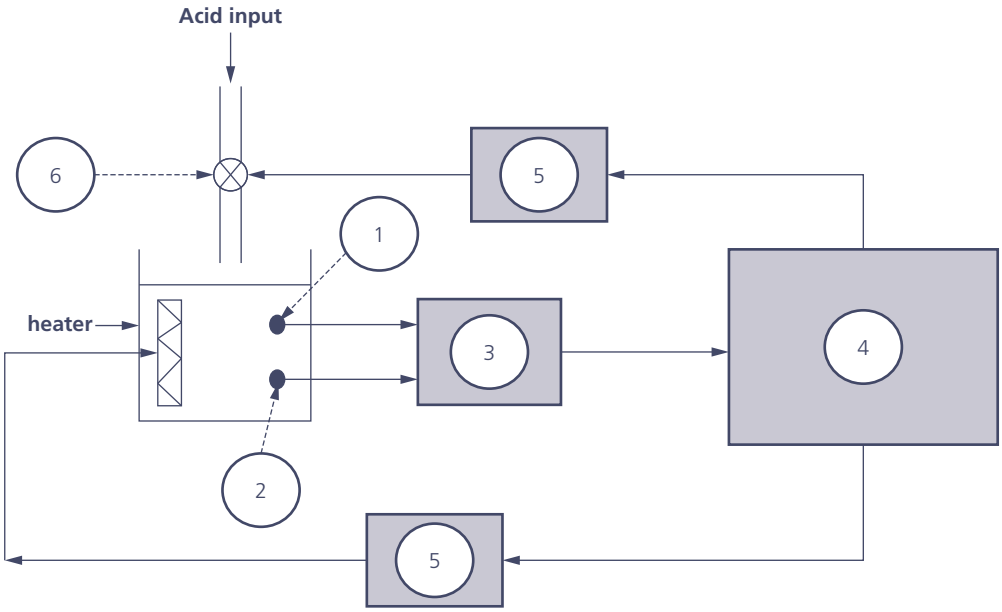
14 Complete the table below by identifying the **most** appropriate output device for each use. The same answer can be used more than once.

Description of use	Name of device
To produce high-quality 'one-off' printing, such as a photograph	
To make use of continuous stationery and produce multi-part printouts	
To produce a prototype for a new machine part to test its functionality	
To operate a valve in a computer-controlled chemical process	
To produce wage slips (4000 to be printed overnight unattended); a carbon copy is also needed	
Produces high quality printing where high volume is also required	
Produce verbal output from a computer to help a sight-impaired person correct errors in a word-processed document	
Produces very large accurate printouts, such as an A0 drawing, on a variety of materials	

15 A chemical process is being monitored by temperature and pH sensors and by a microprocessor. A heater is used to raise the temperature and a valve is controlled to admit acid whenever the pH rises above 5.0.

The following diagram is a schematic of the process. Label each of parts numbered 1 to 6 from the list below.

- actuator
- analogue to digital converter
- digital to analogue converter
- microprocessor
- pH sensor
- temperature sensor



1 .....

2 .....

3 .....

4 .....

5 .....

6 .....

16 At the beginning of the 21st century, cathode ray tube (CRT) monitors were being phased out as LCD monitors became much cheaper to purchase.

a Describe **three** advantages of LCD monitors compared to CRT monitors.

1 .....

.....

2 .....

.....

3 .....

.....

b Describe **two** disadvantages of LCD monitors compared to CRT monitors.

1 .....

.....

2 .....

.....

c Tablet computers could be operated using a mouse. Describe the advantages of using touch screens on tablets rather than using a mouse.

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.....

17 By drawing connecting lines, choose the most appropriate sensor shown on the left, which could be used in each of the five applications shown on the right.

Temperature	System that counts the number of vehicles passing over a plate in the road
Pressure	Checking the acidity levels in soil
Light	Automatic operation of doors leading into a building
Acoustic (sound)	Intruder alarm system that works by picking up the noise of breaking glass
pH	Part of the control of a central heating system

18 Discuss the relative advantages and disadvantages of using:

- laser printers
- inkjet printers
- dot matrix printers

to produce a hard copy output.

3 Storage devices and media

1 Hard disk drives are used in many computers as the main storage device.

a Explain the following terms:

i data transfer rate .....

ii data access time .....

iii (disk) sector .....

iv latency .....

v platter .....

b i What material are platters made from and what type of coating do they use?

.....

.....

.....

.....

ii Describe the role of actuators in hard disk drives (HDDs).

.....

.....

.....

.....

2 Storage media can be classed as magnetic, optical or solid state. Six types of storage media are shown below. Tick (✓) the appropriate column in the table to indicate the type of media used in each case.

Storage device	Magnetic	Optical	Solid state
Hard disk drive			
Flash memory card			
Blu-ray disk			
DVD-RW			
Memory stick/pen drive			
Tape drive			

3 Describe the main differences between Blu-ray discs and DVDs.

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4 **a** Discuss the main advantages of using an SSD rather than an HDD in laptop computers.

.....

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.....

.....

b Name **two** other devices that could make use of solid-state storage and give a reason for your choice; a different reason should be given in each case.

Name **1:** .....

Reason **1:** .....

.....

Name **2:** .....

Reason **2:** .....

.....

5 CD-ROMs, DVD-RWs and Blu-ray disks are used in a number of applications. Four applications are shown in the following table.

By ticking (✓) a box, indicate which type of optical media is the most appropriate for each application.

Application	CD-ROM (✓)	DVD-RW (✓)	Blu-ray (✓)
Supplying software for use on a computer			
Backing up files on a regular basis			
Recording of a high definition three-hour movie			
Files to support an application which cannot be altered			

6 **a** Explain the function of the floating gate and control gate in solid-state devices.

.....

.....

.....

.....

b Describe two disadvantages of using solid-state drives to operate web servers.

1 .....

2 .....

7 Ten statements are shown in the following table. Indicate which of the statements are true and which are false by putting a tick (✓) in the appropriate box.

Statement	True (✓)	False (✓)
Magnetic tapes have a very slow data transfer rate		
Hard disk drive (HDD) platters can be made from ceramic material coated in iron oxide		
Hard disk drive (HDD) surfaces can be split up into tracks and sectors		
Hard disk drives (HDDs) are more reliable than solid-state drives (SSD)		
DVD-Rs are used to read and write data several times		
DVD disks and Blu-ray disks can both use dual-layer technology		
Solid-state drives (SSDs) suffer from latency		
Devices that use solid-state technology, known as flash drives, use NAND chips		
Solid-state drive (SSD) data access time is 100 times less than that for a hard disk drive (HDD)		
Memory cards (such as SD and XD) are examples of magnetic media		

8 A student wrote:

'Optical storage media is likely to disappear in the next 5 years.'

Discuss this statement by referring to a range of modern technologies.

9 Given that the wavelength of a red laser can range between 780 nm and 650 nm, and the wavelength of a blue laser is 450 nm, complete the following table:

Disk type	Laser colour	Wavelength of laser light	Disk is constructed from:
CD			
DVD (dual-layer)			
Blu-ray (single layer)			
Blu-ray (dual-layer)			

4 Networks and the effects of using them

1 Ken owns a large business. He has purchased 30 computers and three printers to help run his business more efficiently.

a Identify **three** items of hardware Ken will need to buy to allow the computers to be networked and allow access to the internet to process customer orders.

1 .....

.....

2 .....

.....

3 .....

.....

b Ken's business is expanding. He buys another company in a different location and installs a second network of computers in the new company.

i Describe what additional hardware Ken needs to buy to enable the two networks to be linked (both are using the same protocols). Give a reason for your choice of hardware.

.....

.....

.....

.....

.....

.....

ii Describe **two** of the features of the additional hardware you named in part **b i**.

1 .....

.....

2 .....

.....

c Ken has asked all his staff to use passwords to protect their computers from illegal access. His staff has chosen a number of passwords. Indicate in the table below whether you think the passwords chosen are weak or strong.

Password	Weak (✓)	Strong (✓)
Pas5word		
Ken123		
Ab!*56@@		
15April2022		
TXwm50.		

2 a Describe the following terms.

i LAN

.....

.....

.....

.....

ii WAN

.....

.....

.....

.....

iii WLAN

.....

.....

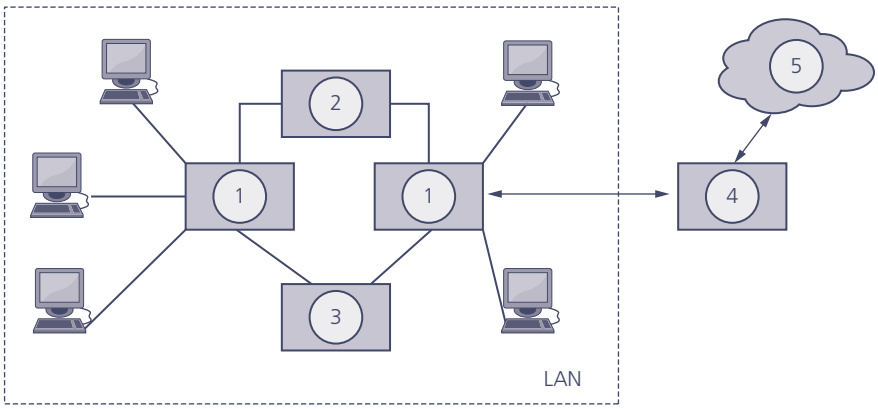
.....

.....

b Identify the items shown in the following diagram using the following terms:

- bridge
- switch
- internet
- router
- server

Each item can be used once, more than once or not at all.



1 .....

2 .....

3 .....

4 .....

5 .....

c Give **one** advantage and **one** disadvantage of using WLANs rather than LANs.

Advantage: .....

.....

.....

Disadvantage: .....

.....

.....

3 **a** Data is often transmitted using packets. Indicate, by using a tick (✓) which of the following information forms part of the packet.

Item of information	Present (✓)
Size of the packet (in MB)	
Date packet sent	
Sender's IP address	
Name of recipient	
Routing table	
Identity number of each packet	

b Describe what happens when the packets of data arrive together at their destination.

.....

.....

.....

.....

c Computer X is connected to a LAN in Sweden. Computer Y is connected to a LAN in Pakistan.

Describe how computer X could send data packets to computer Y.

.....

.....

.....

.....

.....

.....

4 a Name **three** items of hardware and/or software needed to carry out video conferencing.

1 .....

.....

2 .....

.....

3 .....

.....

b Describe **two** potential disadvantages and **two** clear advantages of using video conferencing rather than face-to-face meetings.

Disadvantages:

1 .....

.....

.....

2 .....

.....

.....

Advantages:

1 .....

.....

.....

2 .....

.....

.....

5 Describe the operation of:

i web conferencing (webinars):

.....

.....

.....

.....

.....

.....

.....

.....

ii phone conferencing:

.....

.....

.....

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6 A research company needs to control which personnel are allowed access to secure areas. The company has issued each member of staff with a magnetic stripe card.

a Describe how the magnetic stripe card can be used to limit access to the secure areas.

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b Describe additional features which can be added to the card to improve security even further.

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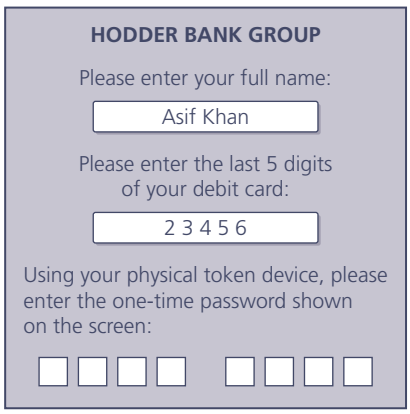
.....

7 Asif logs into his bank's website using his debit card number (1234 5678 9012 3456). The logon page at this stage is as shown below.

Physical and electronic tokens are used to authenticate the user.



a Describe what is meant by a physical token.

.....

.....

.....

.....

.....

b Explain how the physical token can be used to generate the one-time password (OTP) which Asif needs to complete the login to his bank.

.....

.....

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.....

.....

c Explain the difference between a disconnected physical token and a connected physical token.

.....

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.....

.....

d Describe what is meant by an electronic token.

.....

.....

.....

.....

8 a Explain the term authentication.

.....

.....

b Zero login is one form of authentication.

i Explain what is meant by zero login.

.....

.....

ii Give **two** disadvantages of zero login.

1 .....

.....

.....

2 .....

.....

.....

c Some smartphones use biometrics as a security feature to unlock the device.

Name **two** types of biometric check used by smartphones.

1 .....

2 .....

9 Eight statements are shown in the table below.

Indicate whether each statement is true or false by putting a tick (✓) in the correct box.

Statement	True (✓)	False (✓)
A network interface card has a MAC address hard-wired at the manufacturing stage		
Hubs only send data packets to a specific device on the local network		
A bridge is used to connect a local area network (LAN) to any external network		
Routers use IP addresses to direct data packets to the correct network		
Bluetooth uses spread-spectrum frequency hopping to allow device pairing		
Cloud computing does not require access to the internet to enable files to be downloaded or uploaded		
Wide area networks (WANs) only work over a very limited distance geographically		
Zero login depends on biometrics and behavioural patterns		

10 a One type of LAN is a wireless LAN (WLAN).

Compare LANs with WLANs.

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b Explain the difference between a LAN and a WAN.

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11 a Explain the term cloud computing.

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b Give **three** advantages and **three** disadvantages of cloud computing.

Advantage 1: .....

.....

Advantage 2: .....

.....

Advantage 3: .....

.....

Disadvantage 1: .....

.....

Disadvantage 2: .....

.....

Disadvantage 3: .....

.....

5 The effects of using IT

1 a Name **three** labour-saving devices in the home that are microprocessor-controlled.

1 .....

2 .....

3 .....

b Give **three** advantages of using labour-saving microprocessor-controlled devices in the home.

1 .....

.....

2 .....

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3 .....

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c Give **three** disadvantages of using labour-saving microprocessor-controlled devices in the home.

1 .....

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d Some devices are microprocessor-controlled but are not labour-saving (for example, televisions, alarm clocks and home entertainment systems).

Discuss the advantages and disadvantages of using non labour-saving microprocessor-controlled devices.

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2 Use the following words to complete the paragraph that follows. Each word can be used once, more than once or not at all.

- accident
- actuators
- automatic
- autonomous
- cameras
- clever
- congestion
- hacking
- hazardous
- human
- phishing
- safer
- sensors
- smart
- speeding

Computer-controlled driverless vehicles are referred to as ..... and can include cars, buses and vans. They rely on devices, such as ..... and ..... to 'understand' their environment. The big advantage is these type of vehicles are ..... as they remove the ..... element.

Changing gears or applying, for example, is done by ..... controlling physical actions and operating motors.

Motorway signs and traffic management can also be computer-controlled; these are referred to as being ..... systems. If there has been an ..... or there is considerable traffic ....., then the computer system can operate signs to keep the traffic moving efficiently.

One problem with this technology is the risk of a cybercriminal carrying out a ..... attack on the computer system to take control of a section of road or a vehicle.

3 **a** Explain what is meant by an autonomous vehicle.

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b Describe **three** advantages of using autonomous vehicles.

1 .....

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c Describe **three** disadvantages of using autonomous vehicles.

1 .....

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d Explain why public acceptance of autonomous trains has been very positive and yet very negative regarding autonomous cars and aeroplanes.

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4 Eight statements are shown in the table below.

Indicate whether each statement is true or false by putting a tick (✓) in the correct box.

Statement	True (✓)	False (✓)
A mobile phone is an example of a labour-saving device		
Microprocessor-controlled devices last longer than manually-controlled devices and are not just 'thrown away'		
Smart fridges and freezers can lead to more healthy life styles		
Microprocessor-controlled devices create an increase in people's skill levels and make people less lazy		
Autonomous vehicles will increase the number of road accidents in the future		
Smart motorway signs can improve traffic management control, resulting in less traffic congestion		
Autonomous vehicles rely on sensors, cameras and actuators to allow them to drive on the road		
The operation of autonomous vehicles would not be affected by adverse weather conditions, such as a snow blizzard		

5 Using IT equipment for long periods of time can impact on a user's health.

Complete the table below by giving four different health risks. Give a cause for each health risk and two ways of minimising or removing the health risk.

Health risk	Cause of health risk	Method 1 of removing/ reducing the health risk	Method 2 of removing/ reducing the health risk

6 Discuss how computer-controlled devices used in everyday life affect the social interaction between people. In your discussion, include:

- examples
- the positive effects
- the negative effects.

7 Four health risks from using IT equipment are shown below on the left, and six ways of reducing these health risks are shown on the right.

Draw lines from the health risks to the appropriate method(s) which could be used to reduce that particular health risk. (Note: there may be more than one method to reduce a health risk.)

RSI	Use an anti-glare screen
	Take regular breaks and exercise regularly
Eye strain	Use voice-activated software to reduce keyboard usage
	Use adjustable chairs to ensure correct posture
Headaches	Have eyes tested on a regular basis
Back and neck strain	Use tiltable screens/monitors

6 ICT applications

1 Maira owns a company that wishes to advertise their products and services. She has decided on three possible methods:

- paper-based advertising (posters and newsletters)
- computer-based advertising (using their own website)
- multimedia advertising in local shopping malls.

a Give **three** advantages of using all three methods.

Paper-based advertising:

1 .....

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Computer-based advertising:

1 .....

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2 .....

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Multimedia advertising in a local shopping malls:

1 .....

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2 .....

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3 .....

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b Maira frequently goes overseas on marketing visits. She uses VoIP to keep in touch with her main office.

i What is meant by VoIP?

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ii Name **two** devices needed for VoIP.

1 .....

2 .....

iii Give **one** advantage and **one** disadvantage of using VoIP.

Advantage: .....

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Disadvantage: .....

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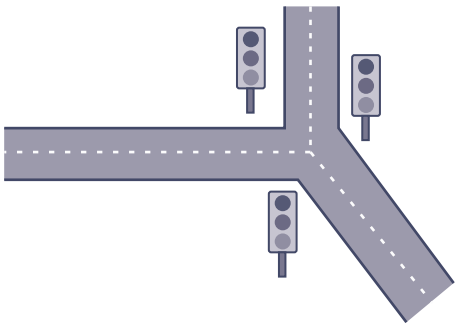
2 A set of traffic lights at a Y-junction is to be modelled on a computer.

Before modelling can be carried out, there is a need to collect data at the Y-junction. This data would then be input into a computer.



a Describe **three** pieces of data that would need to be collected for this model.

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b Give **three** reasons why modelling is carried out.

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c The diagram shows five computer modelling applications on the left and five reasons why modelling is carried out on the right. Draw lines to match each application to the best reason why it would be modelled.

Car driving simulation	Cost of building the real thing is too expensive
Climate change simulation	Some real situations are too dangerous to humans
Model the loading on a new bridge	It takes too long to get results back from the real thing
Chemical reaction involving toxic chemicals	Almost impossible to do the tasks for real
Under sea exploration	Easier and safer to make changes to a model rather than the real thing

3 Robots are used in many factories.

Indicate with a tick (✓) which of the following are disadvantages to the management of a company using robots in their factory.

Reasons	Disadvantage? (✓)
Robots have difficulty in doing 'one off' tasks	
Management can move factories anywhere in the world	
Using robots can lead to unemployment	
Robots manufacture more items per hour than humans	
All items produced using robots are identical	
The set up and maintenance of robots is expensive	

4 A customer of Hodder Bank would like to check the balance on their bank account.

The customer decides to use the local ATM and inserts their debit card into the ATM.

a Describe the computer processing that takes place at the ATM once the customer inserts their card.

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b During the customer's request for a current balance, the bank's computer will carry out a number of processes to enable the customer to see their balance.

Describe these processes.

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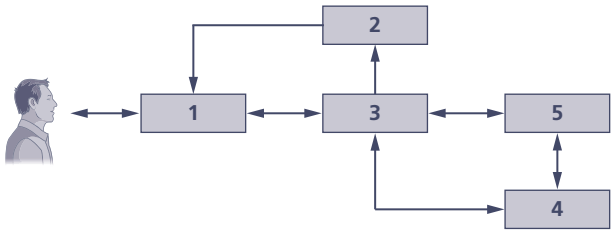
5 a The following diagram shows the components that make up an expert system. The parts have been labelled 1 to 5.

Name these five parts.



1 .....

2 .....

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4 .....

5 .....

b Faults in TVs can be identified using expert system diagnostics.

Describe how an expert system is used to carry out the diagnostics.

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c Give **three** other uses of expert systems.

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d Describe how a new expert system could be tested to ensure the results produced are correct.

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6 Seven statements are shown below. Each statement is either true or false.

Tick (✓) one of the boxes, next to each statement, to indicate whether it is true or false.

Statement	True (✓)	False (✓)
The making of prosthetic limbs is one example of an expert system application		
One of the disadvantages of expert systems is that the results are inconsistent		
Expert systems are not infallible		
An explanation system provides the user with the reasons why an expert system came to its final conclusion		
The rules base acts like a search engine in an expert system		
The knowledge base in an expert system is made up of objects and attributes		
When setting up an expert system, the first task is to gather information from knowledgeable sources		

7 A car with registration number ABC 123 enters a car park. The car park uses ANPR.

a Explain what is meant by ANPR?

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b There are ten stages used by ANPR to recognise a car entering and leaving the car park. These ten stages are listed below, but are in the wrong order.

By placing the numbers 1 to 10 next to each stage, put them into the correct order.

Stage order	Stage
	Algorithms are used to locate and isolate the number plate from the camera image
	The text string is stored in a database
	The motorist returns to the car park and makes payment after inserting his ticket into the machine
	A sensor detects a vehicle and sends a signal to the microprocessor to instruct the camera to capture an image of the front of the vehicle
	The motorist drives to the entrance barrier and the ANPR system reads the number plate on the vehicle and checks the database for the number plate
	Brightness and contrast of the number plate is adjusted so that the characters can be clearly read
	If the number plate is recognised and payment has been made, the exit barrier is raised
	Once all the checking is done, the car park entrance barrier is raised and the motorist is issued with a ticket showing date and time of entry
	The motorist drives up to the entrance to the car park.
	Each character on the number plate is then recognised using OCR; the characters are converted into a text string

8 Give **three** uses of a geographic information system (GIS).

1 .....

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2 .....

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3 .....

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9 Global positioning satellites (GPS) are used to help motorists navigate to a given location.

Indicate (✓) which of the following are true and which are false statements about GPS.

Statements	True (✓)	False (✓)
The sat nav in the car sends signals to the GPS satellites giving the car's location		
If the maps are not up to date, the driver can be given incorrect instructions		
The satellites move round the Earth keeping track of all the cars		
The sat nav system installed in the car has state of the art timing systems		
The system can estimate the time of arrival of the car at its destination		
Paper maps have been scanned in so that the route shows up on the sat nav screen in the car		

10 Seven statements are shown on the left and ten ICT terms are shown on the right.

Draw lines to connect each statement to the correct ICT term.

Continuous transmission of video or audio files over the internet; there is no need to download and save files first	Buffering
Temporary storing of files (during streaming) to compensate for difference in download speeds and playback speeds	Video conference
Method used to talk to people over the internet using a computer's internal microphone and speakers	Computer assisted learning
Creation of a model of a real system in order to study the behaviour of the system	Bio-inks
Electromechanical device, equipped with sensors, which can automatically do different tasks by using programming and various end effectors	Media streaming
Computer-based systems used to assist in the academic teaching of students	Simulation
Liquids used in 3D inkjet printers which are used to produce layers and layers of artificial living tissue	Modelling
	Voice over Internet Protocol
	Robot
	Biometrics

11 A student gave the following statements about a number of ICT terms. Explain why the student's statements are incorrect in all **five** cases.

a 'Near field communication requires two devices to be in contact with each other for at least 5 seconds.'

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b 'OMR can convert characters which are handwritten into an electronic form which can be input directly into a word processor.'

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c 'Passive RFID tags are simply chips with their own power source, which enables them to be used in livestock tracking.'

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d 'Satellite navigation systems rely on global positioning satellites transmitting the car's coordinates to an on-board computer system in the car.'

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e 'To transmit telephone conversations around the world, sound waves are sent to global satellites which retransmit amplified sound signals back to a receiver dish on the Earth.'

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12 Which ICT terms are being described below?

a Computer system that allows us to map, model, query and analyse vast amounts of data according to their location.

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b Devices used to read a chip and antenna embedded in a passport by providing the chip with sufficient energy to broadcast its data.

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c A series of randomly generated numbers which change every time a payment transaction is made using a smartphone payment app.

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d The electronic transfer of sums of money between accounts by interacting with websites to pay bills, buy items, check accounts, and so on.

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e Software developed to mimic the expertise and knowledge of a number of learned sources, such as people, books and the internet.

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f The simulation of a real life situation in order to study its behaviour.

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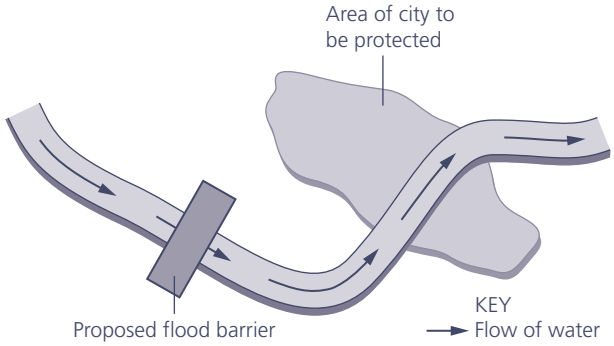
13 A city area is built up around a large river. The city is prone to flooding at certain times of the year. A computer-controlled flood barrier (which uses sensors to measure the flow of water and the river depth) is to be built upstream of the city. The developers of this flood barrier used computer modelling to decide where to place the barrier to reduce the risk of flooding.



a Give **three** reasons why computer models were used to simulate flooding of the river, and how the proposed flood defence system would work.

1 .....

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2 .....

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3 .....

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b Prior to this flood barrier being built, a manual system was used to detect flooding of the river upstream. This required people to be stationed on the river banks at various points.

Explain why using a computer-controlled flood barrier system is better than the manual system.

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c Describe what data would need to be collected to allow the computer model to simulate the flooding of the city and how it would be used to decide where to build the barrier.

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d Give **two** disadvantages of using a simulation to model the flooding of the river.

1 .....

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2 .....

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14 An expert system is being used to diagnose illnesses in patients.

a Describe what you might expect to see in the user interface.

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b Describe how the expert system would make a diagnosis.

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c What outputs would you expect to see in the expert system?

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15 Consideration is being given to building a new bridge in northern Russia, within the Arctic Circle.

Describe how modelling of a number of possible bridge designs could be carried out. Your answer should include:

- what scenarios (for example, extreme weather) the model would need to consider
- the reasons why modelling was done
- how scale models of the actual bridge designs could be used as part of the modelling process.

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16 A company manufactures mobile phone leads. The manufacturing cost varies according to the number of leads made/sold. The mobile phone leads are sold for $0.80 each.

Manufacturing costs are:

- 1 to 100 – $1.00 each
- 101 to 1000 – $0.50 each
- 1001 to 5000 – $0.25 each
- >5000 – $0.10 each

Therefore, if the company makes and sells 200 leads, they would sell for $160.00 (200 × $0.80) and cost $150.00 to make (100 × $1.00 + 100 × $0.50).

A spreadsheet was used to model the manufacturing costs and sales. An input of 500 in cell D4 is being initially modelled:

	A	B	C	D	E
1	1.00	100			
2	0.50	1000			
3	0.25	5000			
4	0.10		**INPUT NO. SOLD**	500	
5			**COST OF MANUFACTURE**	300.00	
6			**INCOME FROM SALES**	400.00	
7				**PROFIT/LOSS**	100.00

a Describe why using a spreadsheet is a good way of modelling a financial problem such as this one.

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b If the number of leads sold is input into cell D4, what formulas would you expect to see in cells D5, D6 and E7?

D5: .....

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D6: .....

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E7: .....

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17 a Which **one** of the following is NOT an advantage of using websites for advertising products and services? Circle the correct answer.

A sound/video/animation can be used

B it is possible to use hit counters to count the number of visitors to the website

C it is easy to spellcheck the website contents

D the website can be seen by a global audience

b Which **one** of the following does NOT have any impact on the quality of a video being streamed to a laptop? Circle the correct answer.

A large buffer capacity

B large RAM capacity in the laptop

C stable internet connection

D at least 25 Mbits/second download speed

c Which **one** of the following is the correct meaning of VoIP? Circle the correct answer.

A volume input-output protocol

B video on internet platform

C variable output integration program

D voice over internet protocol

d Which **one** of the following is NOT an advantage of using computer models? Circle the correct answer.

A it is often safer to use a model than use the real thing

B software, such as spreadsheets, are well-known to users

C it is much easier and faster to try out various scenarios using a model

D some tasks are impossible to do in real life

e Which **one** of the following is an advantage to the workforce in using robots? Circle the correct answer.

A robots leave humans free to do more interesting jobs

B robots can easily replace skilled labour

C it is possible to move manufacturing overseas where labour is cheaper

D robots have greater productivity

f What term refers to a driverless vehicle? Circle the correct answer.

A automatic

B analogue

C augmented

D autonomous

18 A customer banks with bank A. They write out a cheque to pay a bill to a company that uses bank B. There are eight stages in the clearing of the cheque. These eight stages are shown below, but they are not written in the correct order.

By writing the numbers 1 to 8 in the boxes, put each stage into its correct order.

Stage order	Stages
	Cheque image and digital record are added to file of all cheques for bank A
	Bank A receives data stream containing 'request to pay' and 'no pay' messages
	Camera in bank B takes an image of the cheque
	Central facility breaks file down into individual payment messages and also does a payment validation
	OCR software turns camera images into electronic data
	Central facility routes all 'request to pay' and 'no pay' responses to bank B
	Bank B sends all files to a central facility
	Bank B uses electronic data to create a digital record of money to be paid, sort code of bank A and account number of customer

19 Explain each of the following terms:

a media streaming

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b buffering

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c subscriber identity module

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d simulation

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e end effector

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f e-ticket

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g out clearing (of a cheque)

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h expert system

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i near field communication

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j tokenisation

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20 Explain the role of the following components in an expert system:

a rules base

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b knowledge base

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c inference engine

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d explanation system

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21 A cinema has an online booking system. Describe what happens when a customer visits the cinema's website and chooses to purchase four seats to see the film 'Hachette – the story of a book'. Include in your description the role of:

» the user

» the website software

to ensure tickets cannot be double-booked.

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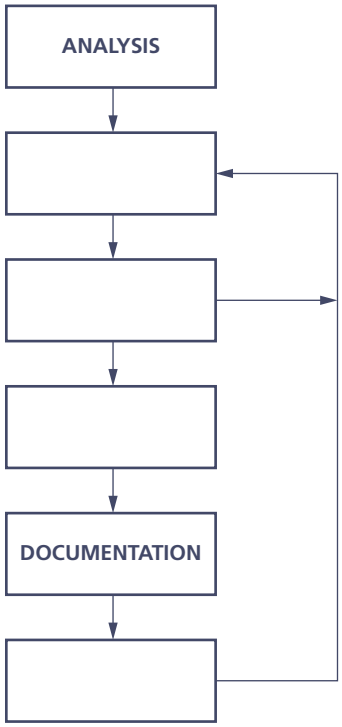
7 The systems life cycle

1 Complete the following diagram with the missing stages from the systems life cycle.



2 Part of the analysis stage involves researching the existing system.

Name **three** methods of gathering information about the existing system. For each named method:

a give a brief description **b** give **one** advantage **c** give **one** disadvantage

Method 1: .....

Description: .....

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Advantage: .....

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Disadvantage: .....

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Method 2: .....

Description: .....

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Advantage: .....

.....

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Disadvantage: .....

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Method 3: .....

Description: .....

.....

.....

Advantage: .....

.....

.....

Disadvantage: .....

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3 a Data is entered in the format: dd/mm/yyyy. A range check was carried out on the month (mm). Which one of the following data items would FAIL the range check? Circle the correct answer.

A 2 **C** 12

B 10 **D** 15

b The number 25.54 is typed into a spreadsheet. The input passes a data type check. Which one of the following data type checks must have been used? Circle the correct answer.

A Integer **C** Character

B Decimal/real **D** Date/time

c Which one of the following is found in technical documentation only? Circle the correct answer.

A Sample runs and results

B Hardware requirements

C Program listings

D Purpose of the system

d Which one of the following is found in user documentation only? Circle the correct answer.

A How to print out a document

B Limitations of the system

C Software requirements

D Meaning of any error messages

e Which one of the following is NOT used in the evaluation stage of systems analysis? Circle the correct answer.

A Compare final solution with the original system

B Identify limitations in the new system

C Interview users about the new system

D Examine the documentation

4 Data capture forms can be paper-based or electronic, online forms.

a i Give **four** features you would expect to see in a well-designed paper-based data capture form.

1 .....

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4 .....

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ii Look at the following data capture form designed to collect information about car ownership.

Design an improved paper-based form for data capture using some of the features described in part **a i** above.

Your name: .....

Your address: .....

Registration number of your car: .....

Make of car: .....

Colour of car: .....

Was it bought new? .....

When did you buy it (dd/mm/yy)? .....

b Computer-based (online) data capture forms are also used.

i Give **five** features you would expect to see in a well-designed computer-based data capture form.

1 .....

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4 .....

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5 .....

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ii Design an improved computer-based data capture form using some of the features you described in part **b i** above.

5 The owner of a number of leisure centres has had a new computerised booking system installed.

A systems analyst was brought in to research the existing system and to oversee the installation of the new system.

a In the table below, tick (✓) the relevant stage of the systems analysis for each of the five named activities.

Activity	Analysis stage (✓)	Design stage (✓)	Evaluation stage (✓)
Interviewing users of the existing system			
Planning the validation routines/rules			
Deciding on the required file structures			
Interviewing users of the new system			
Examining existing documentation used in the booking system			

b The systems analyst needs to decide the best way to implement the new system.

Name and describe **three** different methods of implementation.

Method 1: .....

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Description: .....

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.....

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Method 2: .....

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Description: .....

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Method 3: .....

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Description: .....

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c Once fully implemented, the systems analyst handed over documentation to the owner of the leisure centre. The documentation was referred to as: technical and user.

In the following table indicate, using a tick (✓), which items would be found in the technical documentation, in the user documentation or in both types of documentation.

Items	Technical	User	Both types
Program listing/coding			
How to print out data			
Hardware requirements			
Software requirements			
Sample runs (with results)			
Validation routines			
Systems flowcharts			
How to add/delete/amend files			
Meaning of possible error messages			
Troubleshooting guide			

6 a Explain, using examples, the meaning of:

i normal data: .....

.....

.....

ii extreme data: .....

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.....

iii abnormal data: .....

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b A holiday company is using a database to store tourist information about a resort. The number of hours of sunshine per day, which must lie between 0 hours (minimum value) and 18 hours (maximum value), is being input.

In the table below, indicate whether the number of hours of sunshine being input, is normal, extreme or abnormal data.

Input data	Normal (✓)	Extreme (✓)	Abnormal (✓)
0			
22.5			
15.1			
18			
1			
fifteen			
2.175			
–10			
25			

7 A new database is being developed for a shop that sells CDs. The new database needs to indicate when stock levels have reached re-order levels. Each CD title needs to be recorded uniquely and the manager also needs to know the last date each CD title was ordered and whether a new order has yet been placed.

a Complete the table, giving the full field names to be used in the stock database. It is also necessary to give the most suitable validation check to be carried out on each data field and also indicate the data type in each field. (NOTE: it is not adequate just to say numeric for data type where appropriate.)

Field name	Validation check	Data type
cd_title		alphanumeric
		integer
last_ordered_date		

b A record is made up of five fields.

Each field needs to be clearly defined. For example, a field name needs to be specified. Name **three** other items that need to be defined when creating a field.

1 .....

2 .....

3 .....

c File structures are part of the systems life cycle design stage.

Name **three** other items that are also part of the design stage.

1 .....

2 .....

3 .....

8 The following fields are being used on an online form to allow customers to enter key data:

credit card number: 16-digit code

order code: XXNNNNXX (X = letter, N = digit)

colour: red, black or white

size: XS, S, M, L, XL

Give a suitable validation check for each data item. For each validation check, give:

» **one** example of a data item that would fail your validation check
» **one** example of a data item that would pass your validation check.

Field name	Validation check	Example of data item which would PASS validation check	Example of data item that would FAIL validation check
credit card number			
order code			
colour			
size			

9 Once new systems have been implemented and have been running for a few months, it is necessary to carry out an evaluation.

Discuss how an evaluation is carried out.

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10 a Explain why testing of data is important.

b Explain what is meant by a testing strategy.

c i Explain what is meant by a test plan.

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ii A module is being written to record the pH values of some soil samples. The pH values must be in the range 4.0 to 10.0 (inclusive), and can be either decimal or integer values.

Design a test plan to check that the module is functioning correctly.

Data set	Data input	Type of data input	Expected outcome	

iii What information should appear in column 5 of the table in part **c ii**?

Explain how this information is used.

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8 Safety and security

1 There are a number of potential safety risks associated with the daily use of computers.

a Explain how safety risks are different to health risks.

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b Complete the following table by naming **three** safety risks. For **each** safety risk, give **two** causes for the risk and give **two** ways of minimising or removing the risk.

Safety risk	Cause 1 of risk	Cause 2 of risk	Way 1 of prevention	Way 2 of prevention

2 **a** Explain what is meant by e-safety.

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b Describe **five** precautions that should be taken to reduce any potential danger when using the internet.

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2 .....

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3 .....

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4 .....

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5 .....

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3 a Data stored about a person can be referred to as personal data or sensitive (personal) data.

i Give **three** examples of personal data.

1 .....

2 .....

3 .....

ii Give **three** examples of sensitive data.

1 .....

2 .....

3 .....

b Personal data is sometimes shared in online gaming.

Describe **three** of the potential risks associated with online gaming.

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2 .....

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3 .....

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4 Identify the security risks being described in this table.

Descriptions of security risk	Name of security risk
The act of gaining unauthorised access to a user's computer	
The use of legitimate-looking emails that contain links to fake websites; once the user clicks on the link, their browser is sent to this fake website	
Malicious code installed on a user's HDD/SSD or on a web server; the code will redirect the user's browser to a fake website without their knowledge	
Program code that can replicate, with the intention of deleting, corrupting or altering data/files on a computer's HDD/SSD; this causes the computer or software to malfunction	
Malware that does not need an active host program to do damage to, for example, a network of computers; they replicate without targeting any specific files or programs on a computer	
Software that gathers information by monitoring keyboard activity carried out on a computer; the gathered data is sent back to the cybercriminal who sent the software in the first place	

5 a Which one of the following is a form of data theft where criminals steal personal information from a user when they are using their card at an ATM? Circle the correct answer.

A key logging **C** smishing

B shoulder surfing **D** authentication

b Which one of the following refers to the use of voice mail messenger to trick a user into calling a cybercriminal's telephone number to gain personal data? Circle the correct answer.

A fraud **C** smishing

B phishing **D** vishing

c Circle the answer which describes the following: Malware that encrypts data on a user's computer that can only be decrypted once a cybercriminal is paid to do so.

A ransomware **C** phishing

B adware **D** encryption

d What is the name of the device used to copy the data on the magnetic stripe of a credit card to make a cloned credit card called? Circle the correct answer.

A key logger **C** shoulder surfing

B cloner **D** skimmer

e What is the name of the malware that floods a user's computer with unwanted advertising in the form of pop-ups or in browser windows? Circle the correct answer.

A adware **C** phishing

B ransomware **D** spam

6 a Five stages that occur when a user wants to access a secure website and receive/send data to it are shown below. Put the five stages in their correct order.

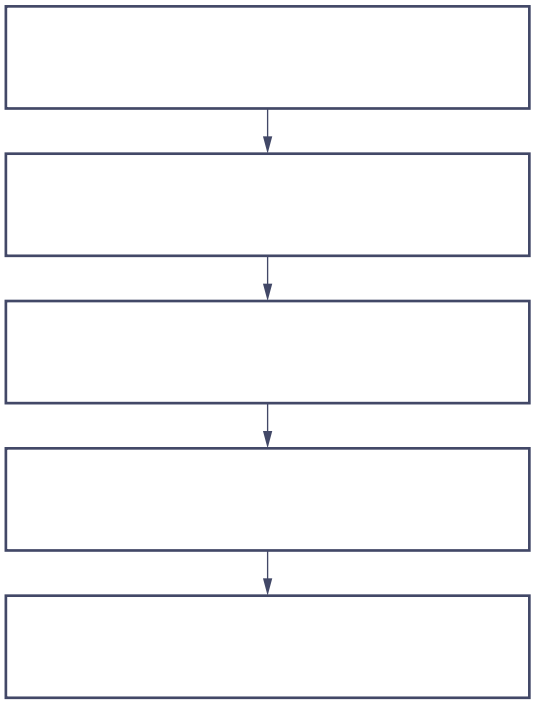
1 If the web browser can authenticate the SSL certificate, it sends a message back to the web server to allow communications to begin.

2 The web server responds by sending a copy of its SSL certificate to the user's web browser.

3 The user's web browser sends a message so that it can connect with the required website which is secured by SSL.

4 Once the message is received, the web server acknowledges the web browser and the SSL-encrypted two-way data transfer begins.

5 The web browser requests that the web server identifies itself.



b i Describe what is meant by a digital certificate.

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ii Name **three** of the component parts of a digital certificate.

1 .....

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2 .....

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3 .....

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c Describe what is meant by a secure sockets layer.

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7 What is meant by the following four abbreviations?

a SSL:

A secure system logon

B secure start-up login

C secure sockets layer

D secure server login

b ATM:

A automatic timer machine

B any time money (machine)

C authentication threat malware

D automatic teller machine

c OTP:

A one-time passcode (password)

B optional two-factor passcode (password)

C online two-factor password (passcode)

D one-time protocol

8 A student gave the following statements about a number of ICT terms. Explain why the student's statements are incorrect in all five cases.

a 'Pharming occurs when a user clicks on a link in an email and their browser is sent to a fake website.'

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b 'Credit card cloning is done by scanning in a card and making a plastic copy of the card using the scanned image.'

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c 'Backing up of data and files is a safeguard against a virus attack; any data or files lost can be re-loaded back into the computer from the back-up media.'

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d 'Regularly changing a password will always guard against key logging software.'

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e 'A data protection act stops hackers gaining illegal access to data on a computer system.'

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9 Using social media exposes users to a number of dangers.

Discuss these dangers when using social media sites and, include in your answer, how it is possible to protect yourself.

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10 a It is always good practice to encrypt emails. ISPs provide users with an email account.

Describe the **three** parts of an email account that should be encrypted to protect all emails used and stored in the account.

b SSL encrypts data to ensure it is protected when being transferred over a network.

Give **four** examples of where SSL would be used.

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11 Six descriptions are shown on the left and eight ICT terms are shown on the right.

Draw lines to connect each description to its correct ICT term.

Pair of files stored on a user's computer; the files contain a public key and a private key and are used to send data securely over a network	Secure sockets layer
Ability to prove who you are through something you know, something you have and something unique to you the user	Two-factor authentication
Protects the rights of an individual about whom data is obtained, stored and processed	Digital certificates
Type of protocol that allows data to be sent and received securely over the internet; its use is identified by https in a browser window	Authentication
Software or hardware that sits between a user's computer and an external network; it examines the traffic between the computer and the network	E-safety
Benefits, risks and responsibilities when using ICT; refers to safe and responsible use of technology and a user's behaviour online	Data protection act
	Encryption
	Firewall

12 a Explain what is meant by two-factor authentication.

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b Karl wants to buy a DVD from a website using his tablet. He has to go through a two-factor authentication process. The stages in this process are given below; but they are not in their correct order.

By putting the numbers 1 to 6 in the appropriate boxes, put each of the six stages into their correct order.

Step order	Step description
	Access to website is now allowed
	The website asks Karl to input his user ID and password into the login web page
	Karl registers his mobile phone with the website
	An eight-digit PIN is sent back to Karl's mobile phone
	Karl keys in the eight-digit PIN into the web page using his tablet
	Karl logs on to the website from his tablet

c If Karl has forgotten his password, how can the website help him to reset it securely?

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13 A security system requires the use of fingerprint recognition.

a **i** Give **three** advantages of using fingerprint recognition as a security method.

1 .....

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2 .....

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3 .....

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ii Give **three** disadvantages of using fingerprint recognition as a security method.

1 .....

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2 .....

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3 .....

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b i Name **three** other biometric security techniques.

1 .....

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2 .....

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3 .....

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ii For **one** of your named biometric techniques, discuss the benefits and drawbacks of the named method.

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14 Eight statements are shown in the following table.

Indicate whether each statement is true or false by placing a tick (✓) in the appropriate box next to each statement.

Statement	True (✓)	False (✓)
A Trojan horse contains malicious code embedded in legitimate-looking software; it needs to be executed by an end-user		
Eye strain is an example of a safety risk associated with using IT equipment		
A person's political and religious views are regarded as being personal data		
http in a browser window indicates that the website is using SSL encryption		
Smishing uses the SMS system on a mobile phone to send out fake text messages to a user		
The term 'malicious use' refers to data deletion, fraud, identity theft and selling personal and sensitive data		
Worms require an active host program to be initiated in a computer or computer network		
Plaintext is the result of putting cyber text through an encryption algorithm		

9 Audiences

1 You are planning and creating a presentation to a group of people.

a Give **three** factors which should be considered about the group of people.

1 .....

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b Give **three** methods of finding out information about the target audience.

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2 a What is meant by software piracy?

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b Describe **three** methods to protect software from piracy.

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2 .....

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3 .....

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c When software is supplied there are certain rules to obey regarding copyright.

Name these **three** rules.

1 .....

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2 .....

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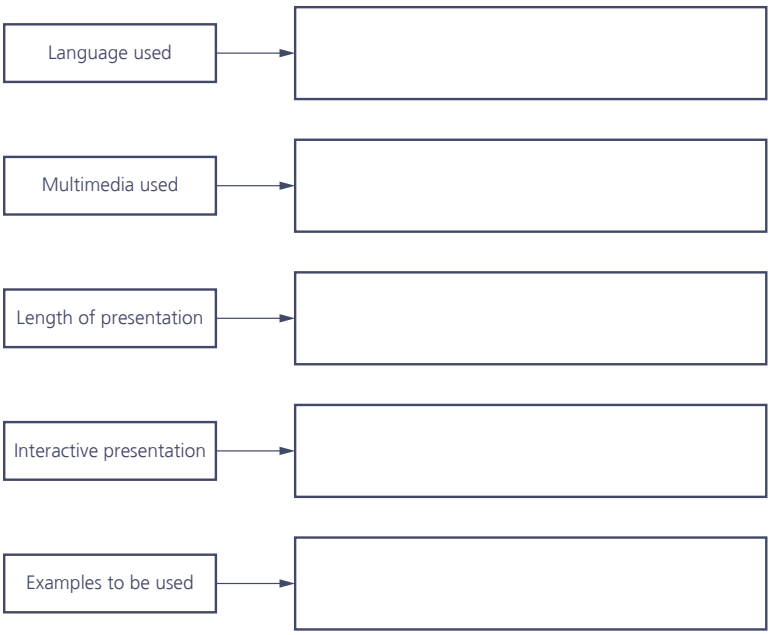
3 There are five items shown below which need to be considered when giving a presentation.

For each item, give **one** example of what needs to be considered.



4 A new computer game is being developed by a company. They have set up a research team to look at the target audience for the game:

a characteristics of the target audience

b needs of the target audience

c why it is necessary to consider the audience needs

Discuss what needs to be considered in each case.

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b .....

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c .....

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5 Explain the following terms:

a product key (applied to genuine software)

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b software piracy

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c a dongle (when used with software)

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d infringement of software copyright

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6 Six descriptions are given in the following table.

Indicate whether each statement is true or false by placing a tick (✓) in the appropriate box next to each statement.

Statement	True (✓)	False (✓)
A very young audience requires a fairly short presentation		
Sound, video and animation will always detract from the message given in a presentation		
The gender of a target audience when developing new products does not need to be considered		
When developing a new product, it is irrelevant to consider the income levels of the target group		
A hologram on the cover of a new CD/DVD is used to indicate it is a genuine copy		
It is illegal to make copies of software and then give copies of it to friends and family		

10 Communication

1 a Most countries in the world have laws governing email content.

Give **three** examples of topics often covered by these laws.

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2 .....

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b Explain the difference between passive and active attacks by email.

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c Give **three** reasons why users set up email groups.

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2 .....

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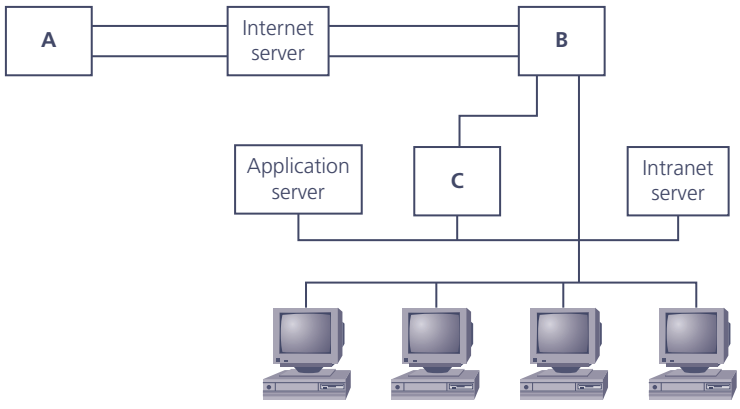
2 a The internet and intranet are two different types of network.

Tick (✓) the appropriate columns to show which features refer to the internet and which features refer to intranets.

Feature	Internet (✓)	Intranets (✓)
Information available to users is specific to a particular company or organisation only		
Requires passwords and user IDs to be entered to gain access to the network		
Allows public access to information on a global scale		
Sits behind a firewall to give protection from hackers and from viruses		
Using an ISP account, it is possible to access the network from anywhere in the world		

b The following diagram shows how an extranet, intranet and the internet can be connected together.

Complete the diagram by naming parts A, B and C.



Internal company network (intranet)

A .....

B .....

C .....

c Give **three** advantages of using intranets rather than the internet.

1 .....

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2 .....

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3 .....

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3 a Explain how you would know if a website is using encryption.

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b In each of the following questions, only one of the responses is correct. Choose one of the four options given.

i http:

A	hypertext transfer program
B	hypertext transfer protocol
C	hybrid text transaction protocol
D	handshaking (and) text transfer protocol

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ii ftp:

A	fixed (data) type protocol
B	format testing program
C	faster (data) transfer protocol
D	file transfer protocol

.....

iii bcc:

A	binary carbon copy
B	blind carbon copy
C	basic carbon copy
D	black carbon copy

.....

iv URL:

A	uploading remote language
B	user router locator
C	uniform resource locator
D	uniform remote linker

.....

v ISP:

A	Internet Security Protocol
B	Internet Service Protocol
C	Internet Security Provider
D	Internet Service Provider

.....

4 a The following table shows features of blogs and wikis. Tick (✓) the appropriate columns to show which are features of blogs and which are features of wikis.

Feature	Blogs (✓)	Wikis (✓)
Updated on a regular basis by the author only		
Anyone can edit, delete or modify the content		
Organised in reverse chronological order		
Can only be updated and edited by the author		
Can be easily edited using a web browser		

b Give four features of a typical social networking site.

1 .....

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2 .....

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3 .....

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4 .....

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c Explain the meaning of the following terms:

i ISP: .....

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ii netiquette: .....

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iii microblog: .....

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iv URL: .....

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5 Describe **three** advantages and **three** disadvantages of using search engines to research information on the internet.

Advantage 1: .....

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Advantage 2: .....

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Advantage 3: .....

.....

Disadvantage 1: .....

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Disadvantage 2: .....

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Disadvantage 3: .....

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6 **a** Give **four** rules of netiquette when sending messages across the internet.

1 .....

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2 .....

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3 .....

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4 .....

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b Explain why there is a need for netiquette.

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7 a Describe the differences between the internet and the World Wide Web (www).

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b i Describe what is meant by an extranet.

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ii Explain what is meant by a virtual private network (VPN).

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8 a Consider the URL:

https://www.hoddereducation.com/IGCSE_ICT

Using this URL:

i indicate what internet protocol is being used

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ii give the website address

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.....

.....

iii name the part of the website address which is known as the domain type

.....

iv indicate which part is the filename

.....

b Eight descriptions are given in the following table.

Indicate whether each statement is true or false by placing a tick (✓) in the appropriate box next to each statement.

Statement	True (✓)	False (✓)
It is regarded as adequate by law to delete images and messages, declared as offensive, from social media, blogs or wikis		
If part of a sender's email address contains a company name, then there is a need for the material in the email to follow company policies		
A strong password contains any eight characters		
Unsolicited text messages sent to a recipient are known as spam SMS		
ISPs allow the user to view web pages		
The internet is an example of a moderated forum		
Web browsers provide the user with access to the internet (for a monthly fee)		
One of the problems with using search engines is known as information overload		

9 a Explain the meaning of the following terms associated with emails.

i carbon copy: .....

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ii blind carbon copy: .....

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iii attachment: .....

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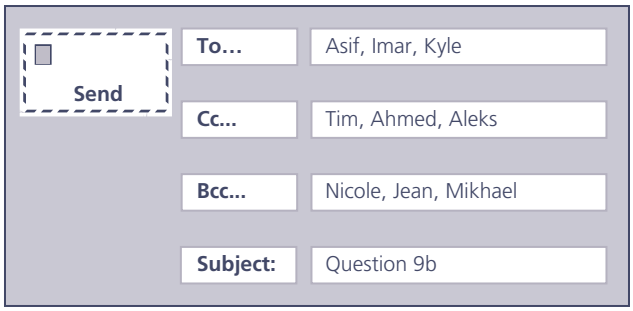
b The following is a sample showing some recipients who are being sent an email.



i Nicole has received this email. Explain who else can see that the email was sent to Nicole.

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ii Ahmed has also received the email. Explain who else can see that this email was sent to Ahmed.

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c Discuss why forwarding emails should always be treated with caution.

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10 Seven descriptions are shown on the left and ten ICT terms are shown on the right in the following diagram.

Draw lines to connect each description to its correct ICT term.

The need to respect other users' views and display common courtesy when posting messages online	Buffering
	Wikis
A collection of email addresses which can be used as a single name in the 'To' box	
	Netiquette
Email recipient invisible to everyone else apart from the recipient	Blind carbon copy
	Blogs
Network based on the internet, but is designed to meet the internal needs of company or organisation members only	
	Email group
Personal internet journal where the writer will type in their observations on a particular topic; it can be updated by the author only	Domain type
	Extranet
Websites that allow users to create and edit web pages using any browser; anyone can edit, delete or modify its contents	
	Intranet
In a website address, this is the general name given to, for example: .com, .co, .org, .net	Carbon copy

11 Discuss how you would evaluate the reliability of information found by searching on the internet.

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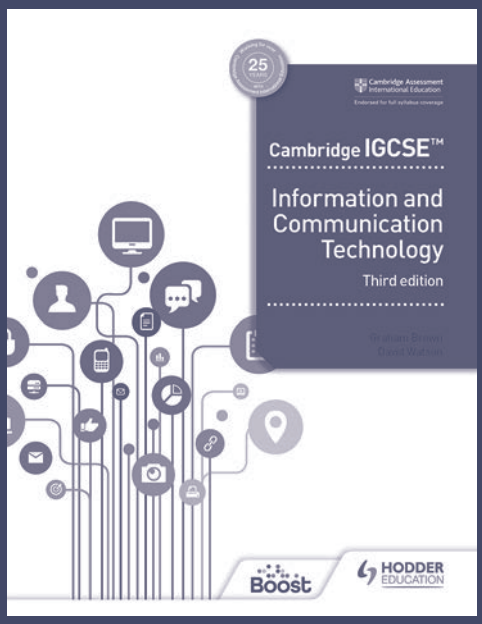
12 Discuss whether or not the internet should be policed.

Develop understanding of underpinning theory with further practice questions and activities

This Theory Workbook provides additional support and practice in the theory sections of the Cambridge IGCSE™ Information and Communications Technology syllabus

- **Develop a deep understanding of underpinning concepts:** includes a series of questions designed to test and develop knowledge of ICT systems and their impact.
- **Develop understanding and build confidence:** questions and activities will aid preparation for all aspects of examination.



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