Complete ICT for Cambridge IGCSE® Revision Guide

A practical approach for the updated syllabus

Stephen Doyle
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Introduction

This revision guide covers the theory content of Cambridge International Examinations IGCSE® ICT (0417). It also gives you useful advice on the practical part of the syllabus. This book will support you in your revision and will help you achieve your best by offering practical help and guidance on how to approach examination questions.

The main part of the book covers the theoretical part of the course. Towards the end, you will find help and guidance on the practical section. Here are some of the key features you will encounter throughout this revision guide:

**SYLLABUS**
This gives the syllabus headings covered in the topic.

**REVISION SUMMARY**
This describes the main concepts and terminology covered in the topic.

**Exam preparation**
These short exercises will increase your confidence in approaching exam-style questions. Suggested answers can be found at the back of the book.

**Exam-style questions**
These are exam-style questions for you to try, based on the content in each topic. Sample answers are provided at the back of the book.

**Important things to remember**
This is a summary of the topic content but with some words missing. Test yourself to see if you can fill in the missing words and phrases. Answers are provided at the back of the book.

**10 MINUTE TEST**
This is a short test covering the key concepts and terms covered in the topic. Suggested answers to these are provided at the back of the book.

**Exam guidance and practice**
These sections will help you prepare for assessment. They contain useful tips and techniques and there are lots of sample exam questions for you to practise. Sample answers are provided at the back of the book.

**Revision checklist; practical papers**
The detailed content for the practical papers has not been included in this revision guide as the skills needed should be developed over time during your lessons.

However, in this section you will find checklists which allow you to assess your practical skills. By assessing your skills and knowledge you can decide where to focus your efforts. Are there areas where you need further practice?

**Glossary**
At the end of the revision guide, you will find a glossary containing definitions of key ICT terms.

Best of luck in your examinations and beyond!
What you will learn

There are three assessment objectives for the IGCSE in ICT. You will be assessed on your:

- ability to recall, select and communicate knowledge and understanding of ICT,
- ability to apply knowledge, understanding and skills to produce ICT solutions,
- ability to analyse, evaluate and make reasoned judgements and present conclusions.

You will be required to take three examination papers with each paper covering the following:

Paper 1  Theory
Paper 2  Document Production, Data Manipulation and Presentations
Paper 3  Data Analysis and Website Authoring.

The examination will assess your skills and knowledge of ICT

All questions in each of the papers are compulsory and your answers to all the papers are externally assessed.

<table>
<thead>
<tr>
<th>Paper</th>
<th>Duration</th>
<th>Coverage</th>
<th>Weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>1  Theory</td>
<td>2 hours</td>
<td>Assesses theoretical knowledge in Sections 1–21 (i.e. all the sections).</td>
<td>40%</td>
</tr>
<tr>
<td>2  Document Production, Data Manipulation and Presentations</td>
<td>2½ hours</td>
<td>Assesses practical skills in Sections 17, 18 and 19.</td>
<td>30%</td>
</tr>
<tr>
<td>3  Data Analysis and Website Authoring</td>
<td>2½ hours</td>
<td>Assesses practical skills in Sections 20 and 21.</td>
<td>30%</td>
</tr>
</tbody>
</table>

Answering questions

There are two main things which might limit how well you do in an examination:

- Lack of knowledge
- Lack of examination technique.

It is possible to know a topic very well and yet not do as well as you could because of lack of examination technique. Examination technique is particularly important in ICT because the questions need quite a lot of analysing before answering.

Most importantly, you need to answer:

- the question you have been asked
- not a question you think has been asked
- or the question you would like to have been asked (because you know the answer to it!).
Common mistakes when answering ICT questions
Here is a list of the common mistakes made when answering ICT questions:

- Copying out the question or part of the question in the answer – this just wastes time.
- Writing one word for an answer that requires a sentence.
- Writing a sentence for an answer that requires a one-word answer.
- Writing ‘faster, cheaper, better, easier, etc.’, in your answers, rather than explaining why.
- The use of brand names on their own such as Word or Access when you should write word-processing software or database software.

Tips for answering questions
In many cases the introductory sentences/paragraphs will refer to a particular business or type of organisation such as a car dealership, a school library, a shop, a doctors’ surgery, etc., and the answers you give should relate to the context. Do not write general answers that would apply to any organisation.

Be clear and concise in your answers.
Do not waffle or ramble on. This wastes time. Concentrate on giving facts, not flowery prose.

The average person knows quite a bit about ICT. For IGCSE ICT your knowledge is deeper than this, so your answers to questions need to reflect this.

Questions often contain emboldened details on the number of responses needed. For example, ‘Describe three ways in which an organisation’s own staff can present a security risk for ICT systems’. Make sure that your three answers are distinctly different.

Make sure that you also use some of the knowledge gained from practical work in your answers.

What is a structured question?
A structured question consists of a series of related questions often based on a short paragraph describing a situation. Some questions may require short, one-word answers or a single sentence. Others will require more detailed explanations.

Here is an example of a structured question:
Stergos runs a medium-sized company. His computer network uses a file server which has all the data files and programs stored on it. Stergos is investigating the best method of backing up the data and programs on this server.

A Describe what is meant by a backup. (2 marks)
B Give two ways in which the original data on the file server could be lost, damaged or destroyed. (2 marks)
C Stergos has decided to choose between magnetic hard disk and magnetic tape for the taking of backup copies. Discuss the advantages and disadvantages of using each of these media. (6 marks)
The marks for each question will vary according to how much explanation is required in the answers. For example, short answers requiring a very brief statement or definition could earn you 1 or 2 marks. Questions that require longer answers that demonstrate a deeper understanding will usually be awarded more marks.

**Identifying what each question requires**

In the example structured question on page 2, notice how different words are used at the start of each question to tell you what to do, such as ‘describe’, ‘give’ and ‘discuss’.

The following words are commands or instructions common to all structured questions. Each one requires you to answer a question in a different way. Some examples of questions are provided.

<table>
<thead>
<tr>
<th>Commands</th>
<th>What is required?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compare and contrast</td>
<td>Point out the similarities and differences between two things.</td>
</tr>
<tr>
<td>Define</td>
<td>Give a definition of a term.</td>
</tr>
<tr>
<td>Describe</td>
<td>Provide a series of short descriptions or explain a series of steps.</td>
</tr>
<tr>
<td></td>
<td>‘A store uses an EFTPOS terminal for stock control. Describe the computer processing that takes place in order to determine if a product needs re-ordering.’</td>
</tr>
<tr>
<td></td>
<td>‘Describe what is meant by spyware.’</td>
</tr>
<tr>
<td></td>
<td>‘Describe the differences between physical security and e-safety when using computers.’</td>
</tr>
<tr>
<td>Discuss</td>
<td>Describe reasons or arguments for and against a particular proposal.</td>
</tr>
<tr>
<td></td>
<td>Sometimes you have to weigh up the advantages and disadvantages of two devices, ways of doing things or situations.</td>
</tr>
<tr>
<td></td>
<td>Usually these are questions requiring longer answers.</td>
</tr>
<tr>
<td></td>
<td>‘Homes contain many microprocessor-controlled devices. Discuss the effects of these on people’s lifestyles.’</td>
</tr>
<tr>
<td>Explain</td>
<td>Clearly define and describe what a term/process means. Usually a more extended answer is needed involving several sentences.</td>
</tr>
<tr>
<td></td>
<td>‘Explain the differences between phishing and pharming.’</td>
</tr>
<tr>
<td>Give</td>
<td>Usually a single word or a short sentence.</td>
</tr>
<tr>
<td></td>
<td>‘CDs or pen drives can be used for transferring work between computers. Give three reasons why a student may prefer to use a pen drive.’</td>
</tr>
<tr>
<td></td>
<td>‘Give two uses of expert systems.’</td>
</tr>
<tr>
<td>Identify</td>
<td>Find or state the choice.</td>
</tr>
<tr>
<td></td>
<td>‘Identify two input devices which would be used at an EFTPOS terminal.’</td>
</tr>
<tr>
<td>Name</td>
<td>Just give the name, which is usually a single word.</td>
</tr>
<tr>
<td></td>
<td>‘Other than a temperature sensor, name two sensors used in a greenhouse.’</td>
</tr>
</tbody>
</table>
How to approach a structured question

Read the introductory sentences/paragraph slowly and then read all the subsequent questions in full before starting your answer.

Make sure you understand as much as you can about each question before you start writing your answer.

Underline all the key terms and concepts you can identify in the extract/scenario and each question.

Note the command word in each question to identify what is expected from your answer.

We will now apply these techniques to the structured question on page 2.

Stergos runs a medium-sized company. His computer network uses a file server which has all the data files and programs stored on it. Stergos is investigating the best method of backing up the data and programs on this server.

A Describe what is meant by a backup. (2 marks)

Do not waste time writing any part of the question out – so, for example, don’t start by writing 'The purpose of a backup is…'.

Here is a sample answer with the marks in brackets.

A copy of programs and data files (1) kept for security purposes on an alternative medium (1) in case the originals are damaged or destroyed (1) and kept away from the location of the computer (1).

B Give two ways in which the original data on the file server could be lost, damaged or destroyed. (2 marks)

‘Give’ means one-word or several-word answers are ok.

Any two answers from the following would be acceptable:

Fire (1)

Theft of hardware (1)

Virus attack (1)

Equipment malfunction (1)

User error (1)

C Stergos has decided to choose between magnetic hard disk and magnetic tape for the taking of backup copies.

Discuss the advantages and disadvantages of using each of these media. (6 marks)

There are six marks here for advantages and disadvantages, so separate and distinct points are needed. In ‘discuss’ questions you should provide a conclusion.

Here is an example of a good quality answer, which includes a number of clear advantages and disadvantages, as well as a conclusion:

It is faster to store onto tape when all the files on the server need backing up (1)

For the same amount of data, tape storage is cheaper (1)

Tapes are easier to store (1)
Tapes are easier to remove from the premises as they are separate from the drive (1)

Hard disks are mainly situated in the drives which makes them heavy and less portable (1)

Tape backup drives are usually included with file servers so no extra device needs to be bought (1)

Conclusion: Tape would be best as the capacity is higher, they are more portable and the speed at which data is saved to them is faster as all the files on the server need to be backed up (1)

You now have 20 minutes to answer the following structured question using all the techniques you have learned in this section.

1. There are a number of health and safety risks associated with the use of computers.
   A. Explain the difference between a health risk and a safety risk. (2 marks)
   B. Give the names of three health risks associated with computer use and describe what a computer user can do to minimise each risk. (6 marks)

When you have finished writing your answers, compare them with the sample answers and teacher comments provided on the following pages.
A Explain the difference between a health risk and a safety risk. (2 marks)

Sample answer
A health risk is something that makes you unhealthy and a safety risk is something that is dangerous.

Teacher comments
This answer simply repeats a lot of words from the question and is not clear enough to do well. The student needed to mention that safety usually concerns the things which might cause accidents (e.g. things piled too high that may fall over onto someone, cables lying across the floor as a tripping hazard, etc.) and health risk are things that do not cause accidents but can lead to health problems.

B Give the names of three health risks associated with computer use and describe what a computer user can do to minimise each risk. (6 marks)

Sample answer
Becoming overweight – do not snack while you are using your computer.
Eye strain – have regular eye tests.
Repetitive strain injury caused by using a keyboard or mouse over a long period without a break – take regular breaks or changes in activity to an activity that does not involve computer use.

Teacher comments
Putting on weight is not really directly caused by computers because this tends to be caused by overeating or lack of exercise.
The second answer is okay but it fails to explain how eye strain is caused by computer use. If the student had mentioned that it was caused by a dirty screen, screen flicker, etc., then I would have given two marks. Only one out of two marks is given.
The third answer is fine as the health risk, how it is caused by computer use and how it can be avoided are mentioned. I’d award two marks here.

So, how good do you think your answers were compared to those of the student and the examiner’s comments? For each question, make a note of where you need to improve your answers.

Let’s look at another example
Computer viruses are a threat to computer systems.
A Explain what is meant by a computer virus. (2 marks)
B Give one thing that a computer virus might do on a computer system. (1 mark)
C Give one way of preventing computer viruses entering a system. (1 mark)

Sample answer 1
A A program that does damage.
B Destroy the computer.
C Use McAfee to stop viruses getting into your computer.
Teacher comments
A  This is a bit vague because it is not specific about what it does damage to. I would award 1 mark for this answer.
B  Not a strong answer. Viruses can be removed and therefore cannot be said to ’destroy’ the computer.
C  Brand names should never be given. So instead of McAfee they should have said ’antivirus software or virus scanner’.

(1 mark out of 4)

Sample answer 2
A  A mischievous program that copies itself onto your computer and does harm by messing up settings or deleting data.
B  It can start to make your computer run slowly and can also cause it to crash unexpectedly.
C  Use virus scanning software to scan for viruses and remove them if they are found.

Teacher comments
A  A good answer which makes it clear that it is a program that copies itself.
B  Again another good answer which gives an example of what a virus might do.
C  A strong answer.

(4 marks out of 4)

Teacher’s suggested answers
A  Two marks allocated in the following way:
   Program that copies itself automatically (1) and causes damage to data or causes the computer to run slowly (1).
B  One mark for an answer such as:
   Can erase files which means the operating system software cannot be loaded (1).
   Can cause the deletion of data (1).
   Can cause the computer to crash (1).
   Can cause the changing of settings, which causes annoyance to the user (1).
   Can copy passwords and usernames and transmit these to another person (1).
C  One mark for one of the following:
   Don’t open file attachments unless you know who they are from. (1)
   Install virus scanning/checking software. (1)
   Keep virus scanning/checking software up-to-date. (1)
   Don’t download files from unknown sources. (1)
1.1 Hardware and software

Hardware – can be internal or external

Internal hardware devices are devices inside the computer casing and include the following:

- Processor/central processing unit (CPU) – does the processing such as calculations, logic comparisons, sorts, etc.
- Motherboard – the main printed circuit board containing the central processing unit and memory and also connectors for connecting external hardware devices such as keyboards, mice, speakers, etc.
- Random access memory (RAM) – memory chips which lose their contents when the power is removed.
- Read-only memory (ROM) – memory chips where the contents cannot be changed by the user and where the contents are retained when the power is removed.
- Video cards – circuits that generate the signals so that a video output device can display computer data such as text and graphics.
Sound cards – an expansion card that allows a computer to send audio signals to audio devices such as speakers or headphones.

Internal hard disk drives – a rigid magnetic material coated disk on which programs and data can be stored.

**External hardware devices** are those devices outside the computer casing and include monitors, keyboards, mice, printers, scanners, etc., as well as external storage devices such as some optical drives and portable hard disks.

**Software**

Software consists of sets of instructions that tell the computer hardware what to do.

There are two types of software: system software and applications software.

**System software** consists of programs that control the computer hardware directly by giving the step-by-step instructions that tell the computer hardware what to do. Here are the components of system software and what they do:

- **Operating system** – controls the system resources and the processes using these resources on a computer. Operating systems control the handling of input, output, interrupts, etc.
- **Device drivers** – short programs used to supply the instructions to the hardware on how to operate devices connected to a computer such as a printer, scanner, etc.
- **Compilers** – software that converts programming language instructions into binary code in one go. The binary code can be understood directly by the computer.
- **Linkers** – link the code (i.e. program instructions) that the programmer writes with other resources and libraries that make up the whole program file.
- **Utilities** – programs to help users with everyday tasks such as: file maintenance, compressing files to make more room, installing and uninstalling software, checking for and removing viruses, etc.

**Applications software** are programs designed to carry out certain tasks such as keeping accounts, storing and organising student details, producing documents, etc.

### 1.2 The main components of computer systems

![Diagram showing the main components of computer systems]

- **Input devices**
- **Processor (CPU) and internal memory**
- **Output devices**
- **Back ing/secondary storage devices**
Input devices – include keyboards, mice, microphones, scanners, etc., and are used to enter data into the computer system for processing by the processor.

Processor – sometimes known as the CPU (central processing unit), it is the brain of the computer and it interprets and executes the commands given to it by the hardware and software.

Internal memory – this is where data and instructions are held that are needed immediately by the processor and can be ROM (read only memory) or RAM (random access memory).

Backing/secondary storage devices – this is storage other than internal memory (i.e. RAM and ROM) and includes the internal hard disk, portable hard disk, optical disks, pen drives, etc.

Output devices – such as screens, printers and speakers, and are used to output the results of processing the input data.

<table>
<thead>
<tr>
<th>ROM (read only memory)</th>
<th>RAM (random access memory)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data and program instructions are stored permanently.</td>
<td>Data and program instructions are stored temporarily.</td>
</tr>
<tr>
<td>The computer can only read the contents.</td>
<td>Can read contents as well as write new contents.</td>
</tr>
<tr>
<td>Non-volatile, meaning the contents of memory are retained when there is no power.</td>
<td>Volatile, meaning the contents are lost when there is no power.</td>
</tr>
<tr>
<td>Used to store the BIOS program used to boot up the computer when the power is turned on.</td>
<td></td>
</tr>
</tbody>
</table>

1.3 Operating systems

Operating systems use the following two main ways of interacting with users:

**Graphical user interface (GUI)** – consisting of Windows, Icons, Menus and Pointers (i.e. WIMP for short). Selections are made by clicking a mouse.

**Command line interface (CLI)** – commands are entered using the keyboard.

<table>
<thead>
<tr>
<th>Benefits of a GUI</th>
<th>Drawbacks of a GUI</th>
</tr>
</thead>
<tbody>
<tr>
<td>More user friendly.</td>
<td>More hard disk space needed to store operating system.</td>
</tr>
<tr>
<td>No commands to remember.</td>
<td>Typing in commands can be faster.</td>
</tr>
<tr>
<td>Easy to pass data between software packages.</td>
<td>More RAM and ROM needed.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Benefits of a CLI</th>
<th>Drawbacks of a CLI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Can be faster to type commands than to move and click a mouse.</td>
<td>Commands need to be remembered.</td>
</tr>
<tr>
<td>Does not need as much hard disk space as a GUI.</td>
<td>Commands need to be given precisely.</td>
</tr>
<tr>
<td>Does not need as much ROM and RAM.</td>
<td></td>
</tr>
</tbody>
</table>
1.4 Types of computer

There are the following types of computer arranged in order of the largest to the smallest: desktop, laptop, tablet and smartphone.

Most of the exam questions on types of computer are comparative, for example comparing the relative advantages and disadvantages in using a desktop compared to a laptop.

The main features of each are summarised in this table:

<table>
<thead>
<tr>
<th>Desktop</th>
<th>Laptop</th>
<th>Tablet</th>
<th>Smartphone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Separate components</td>
<td>All in one so easy to move.</td>
<td>Light and compact so easily transported.</td>
<td>Very light and pocket sized.</td>
</tr>
<tr>
<td>means it is hard to</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>dismantle.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Used on a desk so less</td>
<td>Often used awkwardly</td>
<td>Uses an on-screen keyboard which can</td>
<td>On-screen keyboard is small and</td>
</tr>
<tr>
<td>likelihood of RSI or</td>
<td>so chance of backache or RSI.</td>
<td>be awkward to use.</td>
<td>hard to use.</td>
</tr>
<tr>
<td>backache.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Needs a mains power</td>
<td>Can be used away from the</td>
<td>Can be used away from the mains power.</td>
<td>Can be used away from the mains</td>
</tr>
<tr>
<td>supply.</td>
<td>mains power.</td>
<td></td>
<td>power.</td>
</tr>
<tr>
<td>Easy to upgrade and</td>
<td>Harder to upgrade and repair.</td>
<td>Harder to upgrade and repair.</td>
<td>Harder to upgrade and repair.</td>
</tr>
<tr>
<td>repair.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full-sized keyboard and</td>
<td>Touch pad is more clumsy to</td>
<td>Uses a touch screen which makes it</td>
<td>Small screen makes it more</td>
</tr>
<tr>
<td>mouse are easy to use.</td>
<td>use.</td>
<td>easy to surf the net.</td>
<td>difficult to use.</td>
</tr>
<tr>
<td>Flat surface needed to</td>
<td>No flat surface is needed.</td>
<td>Can be used in most positions</td>
<td>Easiest type to use when on the</td>
</tr>
<tr>
<td>move mouse on.</td>
<td></td>
<td>including standing up.</td>
<td>move.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1.5 Impact of emerging technologies

You need to know about the following emerging technologies:

**Artificial intelligence (AI)** – science of computers learning things to become more intelligent and work things out for themselves.

**Biometrics** – uses a property of the human body such as fingerprints, pattern on the back of the eye (i.e. the retina) or the pattern on the iris to recognise a person. Can be used for access to phones, buildings, computers and to restrict access at border control at airports and ports.

**Computer assisted translation** – automatically recognises the language a section of text is in and then converts it into a language you can understand.

**Quantum cryptography** – uses quantum mechanics to produce a very secure encryption technique. It can detect eavesdroppers and stop the communication.

**Vision enhancement** – detects light as well as some radiation outside the visible spectrum to produce a clearer image. Used by the military to see in poor light and it can enable people with poor eyesight to see more clearly.

**3D and holographic imaging** – uses lasers to give the illusion of depth in an image.
Virtual reality – a simulation of the real or an imaginary world. Image is displayed on a headset and you can interact with the system using a keyboard and mouse or using a special glove.

Robotics – robots are used in factories for welding panels, assembling components, paint spraying, moving and packing stock. Robots can be used in the home for vacuuming or washing floors or mowing grass.

<table>
<thead>
<tr>
<th>Advantages of using robots</th>
<th>Disadvantages of using robots</th>
</tr>
</thead>
<tbody>
<tr>
<td>Can operate continuously 24 hours per day.</td>
<td>Initial purchase cost is high.</td>
</tr>
<tr>
<td>You don’t have to pay them wages.</td>
<td>Equipment can go wrong.</td>
</tr>
<tr>
<td>Can re-program the device to perform different tasks.</td>
<td>Fewer people employed leads to unemployment.</td>
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<tr>
<td>Expensive specialist programmers needed.</td>
<td></td>
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<tr>
<td>More accurate than humans.</td>
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Exam preparation

1 Use the information contained in the table in Section 1.4 (Types of computer) to compare the benefits and drawbacks of the following different types of computer:
   A A desktop computer compared to a laptop computer.
   B A laptop computer compared to a tablet computer.
   C A tablet computer compared to a smartphone having all the latest features.

Exam-style questions

1 A Define the terms hardware and software.
   B Hardware devices can be internal or external. Give the names of three internal hardware devices and three external hardware devices.
   C Here are the main components of a computer system:
       Output devices
       Backing/secondary storage devices
       Input devices
       Processor (CPU) and internal memory
       Place each of the above in its correct box in the following diagram of a computer system.

2 Desktop computers and smartphones can be used to access the internet.
   A Give two advantages in using a desktop computer rather than a smartphone for this purpose.
   B Give two disadvantages in using a desktop computer rather than a smartphone for this purpose.
Important things to remember

Fill in the missing key words

Computer systems consist of physical components you can touch called ________ and the instructions, data and programs to tell the computer what to do called _________.

Hardware inside the computer casing (such as the motherboard, RAM and ROM) is called ________ hardware and hardware outside the computer casing (such as keyboards and printers) is called ________ hardware.

Software used to control the computer hardware directly is called ________ software, and that used to accomplish a task such as word processing is called ________ software.

__________ driver software gives instructions to the computer as to how to use a new hardware device such as a new printer attached to the computer.

Operating systems, linkers and compilers are examples of ________ software.

The central processing unit is the brain of the computer and it carries out the instructions given to it by the hardware and _________.

There are two types of internal memory: ROM and _________. The BIOS program used to start the computer is stored in ________ which is non-volatile meaning it retains its contents when the power is removed. RAM is ________ meaning it loses its contents when the power is removed, and it is used to hold program instructions and user data currently being worked on.

__________ storage is slower storage and includes the internal hard disk as well as external hard disk, pen drives, tape drives, etc.

Operating systems require an ________ to allow a user to communicate with them and there are two main types: a graphical user interface and a ________ ________ interface. A GUI consists of windows, ________, ________ and pointers and uses a mouse or touch pad to make selections. A command line interface works by the user typing in carefully constructed ________ and this makes it hard to use.

There are a number of ________ methods used to recognise a person to allow them access to buildings, countries or computer resources. One method called ____ ________, scanning uses the unique pattern of blood vessels at the back of the eye and another method called ________ scanning uses the pattern on the coloured area around the pupil to recognise a person. Another method called ________ uses the unique pattern on a finger or thumb to recognise a person.

Other emerging technologies include using quantum physics for quantum ________, which allows very secure transmission of secret information, and ________ enhancement which can allow partially blind people to improve their sight.

__________ are used in factories for the assembly of components, welding, paint-spraying, etc. They have the advantages that they don’t need paying, can work ________ without a break and produce high-quality work.
1 Tick true or false next to each of these statements.

| A graphical user interface is a method of interacting with a user. | true | false |
| A compiler is an example of system software. | true | false |
| A laptop computer is usually larger than a desktop computer. | true | false |
| An icon is part of a command line interface. | true | false |
| Input devices are examples of hardware. | true | false |

2 Tick true or false next to each of these statements.

| System software is a set of programs and not a single program. | true | false |
| Command line interfaces are usually considered to be the easiest interface to use. | true | false |
| One disadvantage in using GUIs is that older computers may need to be upgraded owing to their increased memory and processor requirements. | true | false |
| Biometric devices are computers that behave like the human brain. | true | false |
| Graphical user interfaces have features such as windows, icons, menus and pointers. | true | false |

3 Describe the differences between the two types of internal memory: ROM and RAM.

4 Robots are used in car factories.
   A Describe two tasks performed by robots on a car production line.
   B Describe two advantages and two disadvantages of using robots in car factories.

5 Describe three drawbacks of using an operating system that uses a command line interface (CLI).

6 Two emerging technologies are: vision enhancement biometrics
   Choosing just one of the above technologies, explain how it works and how it is used.