



## Cambridge IGCSE™

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**INFORMATION AND COMMUNICATION TECHNOLOGY****0417/11**

Paper 1 Theory

**May/June 2023****1 hour 30 minutes**

You must answer on the question paper.

No additional materials are needed.

**INSTRUCTIONS**

- Answer **all** questions.
- Use a black or dark blue pen.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- You may use an HB pencil for any diagrams, graphs or rough working.

**INFORMATION**

- The total mark for this paper is 80.
- The number of marks for each question or part question is shown in brackets [ ].
- No marks will be awarded for using brand names of software packages or hardware.

This document has 12 pages. Any blank pages are indicated.



- 1 A book has an ISBN which is 330247204X

Tick (✓) the most appropriate data type for the ISBN.

- |                    |                                     |                                                                               |
|--------------------|-------------------------------------|-------------------------------------------------------------------------------|
| A Numeric: integer | <input type="checkbox"/>            | - data type used to store numeric data which is used to perform calculations. |
| B Text             | <input checked="" type="checkbox"/> | - can be a string of letters or numbers or other symbols                      |
| C Boolean          | <input type="checkbox"/>            | - stores data in a Yes/No or True/False format (logical options)              |
| D Date             | <input type="checkbox"/>            | - allows dates and time to be stored                                          |

[1]

- 2 Identify the hardware from the descriptions given.

- (a) A volatile internal memory that stores the current instruction.

..... Random Access Memory ..... [1]

- (b) A printed circuit board containing the CPU and other components of a computer.

..... Motherboard ..... [1]

- (c) A printed circuit board that controls the output to a monitor.

..... Graphics Card ..... [1]

- (d) A printed circuit board that is installed in a computer so that the computer can be connected to a network.

..... Network Interface Card ..... [1]

- 3 A headteacher is setting up a newsletter to send to parents of pupils at a school. She has some photographs saved on storage devices that she needs to place in the newsletter.

State **two** communication methods which the headteacher could use to upload the photographs onto the school network.

1 ..... Connecting the storage device by Bluetooth ..... [2]

2 ..... Connecting the storage device by Wi-Fi .....  
 ..... Connecting the storage device to the computer via USB cable for file transfer ..... [2]

- 4 (a) Describe the purpose of a web browser.

A web browser is software that enables a user to display a web page on their computer screen. It translates/interprets the HTML from bits into and show the result of the translation.  
 - It retrieves code from the server, interprets the code as a webpage / runs the code then renders/displays the webpage to view  
 - It also allows users to navigate to other information  
 - It runs client-side scripts on the web page [2]

- (b) A company may use an intranet or an extranet.

An intranet is a computer network designed to meet internal needs. Describe the differences between an intranet and an extranet. Access to the internet is usually for sharing information within a single organisation. confined to the company/organisation  
 Extranets are intranets but extended outside the organisation allowing third parties eg trading partners, to have controlled access to some information  
 - Intranets share data within an org, extranets share content with customers/suppliers  
 - Intranet is owned by a single organisation, extranets can be used by several organisations  
 - Extranets is part of a company's intranet  
 - Extranets can lead to more security breaches compared to intranets [2]

- 5 State the safety issue that is most likely to occur for each of these causes.

- (a) Spilling drinks on computer equipment

Electrocution [1]

- (b) Overloading sockets by plugging in too many devices

Fire hazard [1]

- (c) Trailing cables across the floor

Tripping hazard [1]

- (d) Placing a laser printer at the edge of a table

Equipment (heavy) falling and injuring people [1]

- 6 A student has set up a password for his laptop computer. The password he has chosen is Px2zYlCg3?bd

(a) Discuss the benefits and drawbacks of using this password.

#### Benefits

- It is a strong password: composed of numbers, characters and letters, symbols...
- It is hard to crack due to point (1) above
- There are more letters due to point (2) above
- It is long hence reduces the chance of shoulder surfing.
- It does not contain personal information so is harder to crack

#### Drawbacks

- Easy to forget as it has many different characters
- The user would have to look at the keyboard when entering the password
- The user may have to write it down to remember it
- The user might confuse the letters and numbers such as l and 1
- As the password is long it may be mistyped
- Even though it is long/strong it may still be easy for a computer to crack

[6]

- (b) The student could have protected his laptop computer by using two-factor authentication. This could have combined his password with a biometric method.

State two examples of biometric methods he could use.

1 Retina scan / Iris scan

2 Finger print / Thumb print

Facial recognition

Voice recognition

[2]

- 7 A systems analyst has been asked to carry out an analysis of a company's current computer system.

(a) State three methods of analysing the current system.

1 Observation - involves watching personnel using existing system to find out exactly how it works.

2 Interviews - involves a one on one Q&A session between the analyst and the user

3 Questionnaires - involves distributing questionnaires to the workforce/clients to find out their views of the existing system and find out how many some of the key tasks are carried out

Looking at the existing documents - allows the analyst to see how existing files are kept, looking at the operating instructions and training manuals.

[3]

- (b) The systems analyst is working with a team to create some new software. The software documentation will be stored on the cloud.

Describe how the team can use the cloud to share the documentation.

- Documentation is uploaded to the cloud.
- Access is given to members of the team
- Members of the <sup>team</sup> log into the cloud
- Members of the team open the documentation
- Members of the team update the documentation
- Documentation is synced
- Several copies of the document are made
- Can be tracked by the owner of the document

[4]

- (c) Members of the team can use video-conferencing to join business meetings from different locations around the world.

Describe, giving reasons, **three** disadvantages of using video-conferencing for business meetings rather than meeting in person.

Video conferencing is a communication method that uses both video and sound

Disadvantages

- Potential time lag in responses / delays when talking.
- Images can jerk - usually due to poor internet / network performance.
- Can be expensive to set up at first as both hardware & software are expensive
- Training people to use the system correctly can be time consuming and costly.
- Requires a good/reliable internet connection as documents may require more bandwidth
- Disconnection issues may lead to members missing sections of meeting.
- Background noise/echo could be distracting.
- Users could be distracted and not pay attention to the meeting.

Advantages

- It is possible to hold conferences at short notice
- Not travelling physically to meetings saves on cost
- It is better for the environment, less travel means less pollution
- It connects people in an organisation who might be otherwise left out
- It may be better to use video conferencing than have delegates travel to potentially unsafe places around the world.

[6]

- 8 (a) Compare Optical Mark Readers (OMRs) with Optical Character Readers (OCRs). Your answer must include similarities and differences.

Optical Mark Recognition is a device which can read marks written in pen/pencil on a form.  
Optical Character Recognition is a device that converts the text on hand copy documents into an electronic form.

- Similarities**
- Both read/scan data using optical methods.
  - Both are direct data entry
  - Both are input devices
  - Both read data very quickly
  - Both input large amounts of data
  - Both read data from printed documents

- Differences**
- OCR is more accurate at reading detailed data. Data read from the OCR can be manipulated by word processing software.
  - OCR requires manual intervention to change the scanned words.
  - The OMR marks have to be in the correct location.
  - OMR does not need to read the characters written only, the marks. OMR is unable to recognise machines or hand printed characters for OMR to read, marks need to be within a specified area.

[6]

- (b) Identify two uses of Optical Mark Recognition (OMR).

- 1 - Bar code / QR Codes
- 2 - Lottery tickets
  - Questionnaires - Multiple Choice Forms
  - Attendance Registers

[2]

- 9 (a) Absolute and relative file paths are used in the content layer when creating a web page.

- (i) Explain the differences between an absolute file path and a relative file path.

- Absolute file paths contain a complete URL/full path with file name. Constructs of the URL include protocol, website domain name, specific file, subfolder, page name etc.
- Relative file paths only include a specific file or page. This is relative to the current path/starts from the same folder as the web page.

[2]

- (ii) Explain why absolute file paths should not be used for hyperlinks to locally-saved web pages.

If the web pages have moved then the references refer to an old/previous file path.  
Hyperlinks will not work.

[1]

## (b) Anchors and hyperlinks are both used in HTML.

Compare an anchor with a hyperlink. Your answer must include similarities and differences.

An anchor is a link on a web page that allows a user to move from one part of the page to another.

A hyperlink is a link on a web page that allows a user to move from one web page to another web page/website.

Similarities

- Both are links in a web page
- Both can be attached to image/text/graphics
- Both are used for navigation
- Both are HTML tags used on web pages
- Both are coded as HTML tags with <a href...>

Differences

- Anchor allows user to move from one part of webpage to another part
- Hyperlink allows a user to move from one webpage to another webpage/website
- An anchor needs a point set in the doc. A hyperlink only needs the link and a web address
- An anchor can be placed at any point in the web page
- A hyperlink can be attached to text/image and is clickable.

## 10 Some people use dialogue-based user interfaces to operate their car audio system.

## (a) Describe what is meant by a dialogue-based user interface.

This is software that interacts through speech recognition. It uses spoken word/voice to carry out actions/control devices.

[2]

## (b) Describe the benefits and drawbacks of using a dialogue-based user interface in this way.

Benefits

- Allows for hands free control
- Safer than using standard interface
- More useful for physically disabled users

Drawbacks

- Limited access due to the number of commands stored
- More expensive to develop
- Need to be trained by the user
- May not operate reliably due to background noise/speech impediment/accents
- Can be distracting if the commands are not understood

[4]

11 Portable hard drives can be Solid State Drives (SSDs) or Hard Disk Drives (HDDs).

Explain why the SSD may be better to use than the HDD.

- HDD - data is stored in digital format on the magnetic surfaces of the hard disk platters.
- SSD - use NAND technology to store data and has no moving parts.
- SSDs are more portable than HDDs.
- SSDs have a faster data transfer rate.
- The seek time in the SSD is smaller than HDDs.
- The SSD is quieter; has no moving parts.
- SSD is more robust; it has no moving parts.
- SSDs are thinner/smaller than HDDs.

[4]

12 Many media companies now provide media streaming for users to watch their television programmes.

(a) Explain what is meant by the term media streaming.

- Media streaming is when users watch movies/videos or listen to music on devices connected to the Internet.
- Media could be live or recorded content, that can be played back in real time/on-demand.
- It is delivered to computers/devices via the Internet.
- Allows the user to view the media without downloading/saving it.

[2]

(b) Describe the benefits and drawbacks of media streaming.

- Benefits**
- Instant access to media.
  - No need for storage as there is no copy.
  - Saves time rather than downloading/going to the shops.
- Drawbacks**
- Requires an internet connection.
  - Requires a good internet/bandwidth connection otherwise buffering.
  - The user does not get to keep/store the product.
  - Online security issue related to the subscription.
  - Technology could fail in the middle of the stream.
  - If media is downloaded, it is time locked.

[4]

13 gif and jpg file formats are used to store images.

(a) Give one reason for using each of the file formats. Each of your reasons must be different.

- gif GIF - Graphics Interchange Format is supported by all browsers  
Can be animated images; supports 8-bit colours / 256 colours  
Features background transparency  
Image quality never degrades with resizing
- jpg JPE - Joint Photographic Experts Group uses lossy compression; image quality degrades slightly when a JPE is resized.  
- It supports 24-bit colours / 16.7 million colours  
- It offers no background transparency  
- Image quality is better  
- Enlarging the image can cause pixelation

[2]

(b) Explain the differences between the two file formats.

- GIF is used to store animated/moving images  
Used to store icons / simple logos.
- JPEG is used to store photographic images  
Used to store graphics with complex colours & gradients.

- | GIF                                           | JPEG                                                                                                       |
|-----------------------------------------------|------------------------------------------------------------------------------------------------------------|
| - Supports 8-bit colours / 256 colours        | - Supports 24-bit / 16.7 million colours                                                                   |
| - Features background transparency            | - No background transparency                                                                               |
| - Image quality never degrades with resizing. | - Uses lossy compression; enlarging the image can cause pixelation. Image quality is degraded on resizing. |
| - Graphics Interchange Format                 | - Joint Photographic Experts Group                                                                         |

[6]

- (c) The file size of an image can be reduced by changing the file format of the image.

State **two** other ways of reducing the file size of an image.

- 1 - Change the resolution / Quality of the image
- Change the colour / bit depth
- 2 - Change the compressible method / Compress the file
- Reduce layers in the image

[2]

- 14 Identify the most appropriate method for reducing data entry errors from the descriptions given.

- (a) Manually checking the data without reference to the original copy.

Proof reading [1]

- (b) Checking that the data being entered is reasonable.

Validation [1]

- (c) Preventing errors when data is copied from one medium to another.

Verification [1]