**Cambridge Assessment**
International Education

# Cambridge IGCSE™

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**INFORMATION AND COMMUNICATION TECHNOLOGY**                    **0417/12**

Paper 1 Theory                                                     **October/November 2020**

                                                                  **2 hours**

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 100.
- 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 **16** pages. Blank pages are indicated.

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**[Turn over**
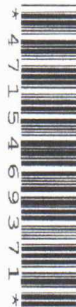
1   Complete the question using an appropriate item from the list given.

| Bar code reader | Blu-ray drive | DVD drive | Hard Disk Drive | Keyboard |

| Memory stick | Mouse | Optical Character Reader | SSD | TFT monitor |

(a) Identify **two** solid state storage devices from the list.

1 ...SSD...........................................................................................

2 ...Memory stick..........................................................................

[2]

(b) Identify **two** direct data entry devices from the list.

1 ......Bar Code reader...............................................................

2 ......Optical character Reader................................................

[2]

2   A website can have three web development layers.

Tick (✓) whether the following statements refer to the **behaviour** layer, **content** layer or **presentation** layer.

| | behaviour (✓) | content (✓) | presentation (✓) |
|---|---|---|---|
| This layer is used to display and format elements within the web page | | | ✓ |
| This layer includes the hyperlinks to navigate around the website | | ✓ | |
| This layer is used to enter scripting language to elements within a web page | ✓ | | |
| This layer is used to create the structure of a web page | | ✓ | |

[4]

**3** A computer system consists of a number of different items of hardware.

Write down the most appropriate item of hardware that fits the following descriptions.

**(a)** A non-volatile device that stores the start-up commands.

...............*Read Only Memory (ROM)*............................................................... [1]

**(b)** A printer that produces physical objects.

...............*3D Printer*............................................................................................ [1]

**(c)** A hardware device that reads analogue data from the environment.

...............*Sensor*................................................................................................... [1]

**4** The temperature in a glasshouse is controlled by a computer. A program is being designed to open and close the glasshouse windows. If the temperature is too hot, then the windows will open; otherwise the windows will close.

The systems analyst has produced a number of different instructions to show how the system works. Part of the instructions are shown.

**(a)** Complete the instructions by writing the most appropriate technical terms to explain how the windows are operated.

- Data is read by the sensor.

- ...............*Analogue*............................................... data is output from the sensor.

- Data from the sensor is sent to the microprocessor via the .........*Analogue to*.......
...*Digital Convertor (ADC)*.....................................................................

- If the temperature is greater than the ...........*Pre-Set value*..................................

- The microprocessor sends a signal to the .........*Activator*.....................................
[4]

**(b)** Circle the **two** most appropriate input devices associated with the computerised glasshouse.

Chip and PIN reader        Hard Disk Drive        Laser printer

LED monitor        (Moisture sensor)        (Numeric keypad)

[2]

4

(c) Another use of computer control is in the manufacture of cars.

Discuss the benefits and drawbacks of using computer-controlled systems rather than humans to build a car.

Advantages of Robotic
- They can work any time day and night (24/7)
- They are cheaper in the long-run as they help eliminate paying salaries and allowances to employees.
- The Cars made will be more consistent
- They work in hazardous areas where human life would be feared hence need protective clothing.
- They lead to higher productivity hence increase in profits.

Drawbacks.
- They are very expensive to set up and install.
- They require backup systems which is expensive.
- They promote high un-employment as many [6] employees will become reddndant.
- They require experts to operate them and other workers need to be re-trained which is expensive.
- They need constant observation which increases the cost of maintenance staffs.

5 (a) Compare and contrast an intranet with the internet.

Internet - International network - global interconnection of computers

Intranet - Internal Network - a network of computers within an organisation.

They are both communication systems

They use internet technologies

Both use HTML (hyper text mark up language) to write the web pages.

Difference

Intranet is privately owned and accessed within an organisation while Internet is publicly accessed.

Intranet is internally managed and moderated whereas Internet anyone can post materials hence not moderated.

The Internet has greater amount of information than intranet.

Data in the intranet is more relevant and reliable than information found on the Internet                    [8]

(b) Protocols are associated with the internet and an intranet.

Identify **three** protocols and for each one, identify a use.

Protocol 1 ..... SMTP - Simple Mail transmission protocol

Use ..... It is a communication protocol for email transmission.

Protocol 2 ..... HTTP - Hyper text transfer protocol

Use ..... It helps one to connect to a webpage as it helps in the transfer of data between a webserver and browser.

Protocol 3 ..... SSL - Secure Socket Layer Protocol

Use ..... A protocol used to determine variables of the encryption for both the link and the data being transmitted.

[6]

6

6   Khalid keeps a spreadsheet to record his expenses and to plan for future spending. This spreadsheet is split into two separate sheets, which he has named Plan and Model.

Plan contains details of his future spending.
Model contains a model of his income and expenses.

**Plan**

| | A | B | C | D | |
|---|---|---|---|---|---|
| 1 | *Income Statement* | | % of spending | % of income | |
| 2 | Income | 63,784 | | | |
| 3 | | | | | |
| 4 | Expenditure items | | | | |
| 5 | Taxes | 12,757 | 22.22% | 20% | |
| 6 | Housing | 19,135 | 33.33% | 30% | |
| 7 | Food | 6,378 | 11.11% | 10% | |
| 8 | Transportation | 9,568 | 16.67% | 15% | |
| 9 | Entertainment / Other | 6,378 | 11.11% | 10% | |
| 10 | Healthcare | 3,189 | 5.56% | 5% | |
| 11 | | | | | |
| 12 | Investment return | 4% | | | |
| 13 | Income Growth | 2.5% | | | |
| 14 | Expense Ratio % | 90% | | | |
| 15 | | | | | |

**Model**

| | A | B | C | D | E | F | G | |
|---|---|---|---|---|---|---|---|---|
| 1 | **Model** | | | | | | | |
| 2 | | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | |
| 3 | | | | | | | | |
| 4 | Income | 63,784 | 65,379 | 67,013 | 68,688 | 70,406 | 72,166 | |
| 5 | Investment Income | | 255 | 527 | 816 | 1,123 | 1,450 | |
| 6 | Total Income | 63,784 | 65,634 | 67,540 | 69,504 | 71,529 | 73,616 | |
| 7 | | | | | | | | |
| 8 | Taxes | 12,757 | 13,076 | 13,403 | 13,738 | 14,081 | 14,433 | |
| 9 | Housing | 19,135 | 19,614 | 20,104 | 20,607 | 21,122 | 21,650 | |
| 10 | Food | 6,378 | 6,538 | 6,701 | 6,869 | 7,041 | 7,217 | |
| 11 | Transportation | 9,568 | 9,807 | 10,052 | 10,303 | 10,561 | 10,825 | |
| 12 | Entertainment / Other | 6,378 | 6,538 | 6,701 | 6,869 | 7,041 | 7,217 | |
| 13 | Healthcare | 3,189 | 3,269 | 3,351 | 3,434 | 3,520 | 3,608 | |
| 14 | Total Expenses | 57,405 | 58,842 | 60,312 | 61,820 | 63,366 | 64,950 | |
| 15 | | | | | | | | |
| 16 | Net Income (Savings) | 6,379 | 6,792 | 7,228 | 7,684 | 8,163 | 8,666 | |
| 17 | | | | | | | | |
| 18 | | | | | | | | |
| 19 | Balance Sheet | | | | | | | |
| 20 | Savings | 6,379 | 13,171 | 20,399 | 28,083 | 36,246 | 44,912 | |
| 21 | Can I afford a car? | N | N | N | N | Y | Y | |
| 22 | | | | | | | | |

**(a)** Khalid has entered a formula in cell C4 of the Model sheet. The formula is B4+(B4*Plan!$B13)

Explain, in detail, what the formula does. Include in your answer an explanation of why the $ and the ! are used in the formula.

Its a formula to calculate the total income for year 2021 in the model sheet.
    This is done by increasing the 2020 income by 2.5% which is a value in the Plan sheet B13 The $ is used for absolute referencing to maintain the value in cell B13 as constant even after replication. The ! is used to show the data is being copied from another worksheet, here its named Plan.

[5]

**(b)** He is saving up to buy a new car; this will cost at least $35,000.

Khalid has entered a formula in cell B21 of the Model sheet. The formula is IF(B20>35000,"Y","N")

Explain, in detail, what the formula does.

IF is a conditional function.
The formula is used to check if savings (B20) is greater than $35,000; If the answer is true, then it displays "Y" Otherwise if less then it displays an "N"

[3]

**Plan**

| | A | B | C | D | |
|---|---|---|---|---|---|
| 1 | *Income Statement* | | % of spending | % of income | |
| 2 | Income | 63,784 | | | |
| 3 | | | | | |
| 4 | Expenditure items | | | | |
| 5 | Taxes | 12,757 | 22.22% | 20% | |
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| 10 | Healthcare | 3,189 | 5.56% | 5% | |
| 11 | | | | | |
| 12 | Investment return | 4% | | | |
| 13 | Income Growth | 2.5% | | | |
| 14 | Expense Ratio % | 90% | | | |

(c) Khalid is planning to create an appropriate graph/chart to be placed in a new sheet. The graph/chart will display the % of income and the names of the expenditure items from the Plan sheet.

Identify the most appropriate graph/chart he could use and describe the steps he needs to take to produce this graph/chart in a new sheet.

- First, select the Plan worksheet; then highlight A5:A10
- Press/Hold the control ("CTRL") key from the keyboard and highlight D5:D10
- Click on insert chart, Select the type of chart (pie chart), Choose the style of chart.
- Add the title, axes, legend.
- Give appropriate names to the axes, title and legend.
- Add name for the new sheet.; You need to right click on the chart and move it to a new sheet.

[7]

7 The owner of a soccer club has employed a systems analyst to create a new computerised system to store details of club members.

The systems analyst starts by researching the existing system. One way he could do this is to interview members of the soccer club.

(a) Discuss the benefits and drawbacks of individually interviewing the members.

Benefits:
- It allows the interviewee to give more detailed answers than the use of questionaires
- One can be able to see body language
- It gives the opportunity for the members to give a more honest answer.
- One can probe for more answers - Its more flexible than questionaires

Drawbacks
- Its time consuming than the other methods.
- It assumes that both the members and interviewer are all free at the same time.
- Members cannot remain anonymous, so they cannot express themselves properly. [6]

(b) When the systems analyst created the new system, he had to choose data types for each field.

Write down the most appropriate data type for each field. The answers in the table must be different in each case. The data type for one field has already been identified; this data type must not be used for the other fields.

For any numeric field specify the type of number.

| Field name | Data type | Example data |
|---|---|---|
| Year_joined | Numeric: Integer | 2019 |
| Gender | Boolean | F |
| Date_of_birth | Date | 04/11/2000 |
| Membership_number | Text | 01254 |
| Cost_of_membership | Currency: Numeric | $10.50 |

[4]

**(c)** The systems analyst has set the data type for the Membership_number field as text.

Explain why this field has been set for a text data type rather than a numeric data type.

- This is because, the first number is a '0' and if numeric is used then it would truncate it.
- The field is not being used for calculation and hence it serves by saving on space than numeric field. [2]

**(d)** The owner of the soccer club is planning to create membership cards for all its members using mail merge. The membership card will include personal data from the new system.

Describe the steps required to perform the mail merge.

- Open the word application
- Click on mailings /mail merge
- Create the master document / load the document
- All the needed fields/place holders are placed in the membership card
- Select the recipient list in the new system / load data source
- Link the new system to the membership card template
- The membership card is merged with the new system.
- The data from the fields are imported into the membership card
- The data tags is replaced by the data and results previewed.
- Proof read the whole document
- Save the whole document /membership cards may also be printed or sent via email as attachment. [6]

8  Many supermarkets now use the internet and allow customers to buy their products online.

(a)  Explain, in detail, the effects that online shopping has had on supermarkets.

- Reduced operational cost as less staff are employed
- Less physical shops are required and hence reduced rent/lease. All business is carried out over the Internet
- Theres increase in customer base as online Shopping targets global customers.
- The installation and maintenance cost is high
- Increased training cost for employees.
- It only favors those with internet connectivity. [4]

(b)  When customers shop online, they can pay using a debit card.

Describe measures that customers could use to reduce fraud when using a debit card online.

- The customers are adviced to use an updated anti-virus and anti-spyware software inorder to stop phishing and pharming.
- Always ensure that you are safe browsing by encrypting data on transmission using SSL/HTTPS
- Use complex passwords for online shopping account and passwords should be different from other accounts.
- Check all transactions carried out with issued receipt
- Avoid doing transactions with untrusted websites.
- Ensure that the wireless password to the router is strong.
- Disable cookies / delete cookies frequently. [5]
↑
They keep a log (record) of your transaction.

**(c)** Smishing, pharming and phishing are three security threats that can occur when using the internet for shopping.

Tick (✓) whether the following statements refer to **pharming**, **phishing** or **smishing**.

| | pharming (✓) | phishing (✓) | smishing (✓) |
|---|---|---|---|
| Fake emails are sent to target users | | ✓ | |
| When the user types in a URL they are directed to a fake website | ✓ | | |
| Malicious code is installed on the user's computer | ✓ | | |
| Fake text messages are sent to the user's phone | | | ✓ |

[4]

**9** When software is bought, the purchaser is subject to copyright legislation.

Give **four** actions that would breach copyright legislation.

1 Making a copy of the software and sharing it with friends without permission.

2 Making a copy and selling it out for your personal gains without permission

3 Modifying the original code without getting permission from the owner.

4 Renting/Lending a copy of the software without permission.

[4]

**10** Define the following internet terms.

**(a)** Hyperlink
This is a link where when clicked it opens up another page or an attached image or document

[2]

**(b)** ISP Internet Service Provider
These are companies that provide users with access to the Internet

[2]

11 For each of the following pieces of hardware, explain the strategies you would use to help minimise health problems.

(a) Monitor — Use of an anti-glare screens to reduce glare
+ Avoid sitting too close to the monitor.
— Use of screens that have height adjustments
— Use of a flat screen monitor that help reduce eye strain
— Use screen filters to lower the brightness. [3]

(b) Keyboard — Using ergonomic keyboards to reduce RSI
— Using voice activated software to reduce much use of keyboard
— Ensure correct posture when typing on the keyboard.
— Avoid using keyboard for longer hours — regular breaks. [2]

12 Describe the differences between using a Graphical User Interface (GUI) and a Command Line Interface (CLI).

— CLI involves the user typing in commands inorder to carry out an action. In the GUI, One clicks on Icons.
— In CLI the user needs to remember the commands.
— GUI is more users friendly, as One uses windows, Icons, menus and popup/popdowns to access elements.
— GUI uses more memory space than the CLI which uses less memory space. [4]