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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.

- 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

2 [2]

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

1

2 [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.

..... [1]

- (b) A printer that produces physical objects.

..... [1]

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

..... [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.
- data is output from the sensor.
- Data from the sensor is sent to the microprocessor via the
.....
- If the temperature is greater than the
- The microprocessor sends a signal to the
[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]

- (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.

[6]

5 (a) Compare and contrast an intranet with 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

Use

Protocol 2

Use

Protocol 3

Use

- 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 | <i>Income Statement</i> | | % 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% | | |

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.

.....

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..... [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.

.....

.....

.....

.....

.....

..... [3]

Plan

| | A | B | C | D |
|----|-------------------------|--------|---------------|-------------|
| 1 | <i>Income Statement</i> | | % 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 | | | | |

- (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.

..... [7]

Question 7 starts on page 10.

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

[6]

- 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 | | 2019 |
| Gender | | F |
| Date_of_birth | | 04/11/2000 |
| Membership_number | Text | 01254 |
| Cost_of_membership | | \$10.50 |

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- (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.

.....

.....

.....

..... [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.

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..... [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.

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..... [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.

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..... [5]

- (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
-
- 2
-
- 3
-
- 4
-

[4]

- 10 Define the following internet terms.

(a) Hyperlink

.....

.....

..... [2]

(b) ISP

.....

.....

..... [2]

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

(a) Monitor
.....
.....
.....
.....
..... [3]

(b) Keyboard
.....
.....
..... [2]

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

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.....
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.....
.....
..... [4]

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INFORMATION AND COMMUNICATION TECHNOLOGY

0417/12

Paper 1 Written

October/November 2020

MARK SCHEME

Maximum Mark: 100

Published

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge International will not enter into discussions about these mark schemes.

Cambridge International is publishing the mark schemes for the October/November 2020 series for most Cambridge IGCSE™, Cambridge International A and AS Level and Cambridge Pre-U components, and some Cambridge O Level components.

This document consists of **9** printed pages.

Generic Marking Principles

These general marking principles must be applied by all examiners when marking candidate answers. They should be applied alongside the specific content of the mark scheme or generic level descriptors for a question. Each question paper and mark scheme will also comply with these marking principles.

GENERIC MARKING PRINCIPLE 1:

Marks must be awarded in line with:

- the specific content of the mark scheme or the generic level descriptors for the question
- the specific skills defined in the mark scheme or in the generic level descriptors for the question
- the standard of response required by a candidate as exemplified by the standardisation scripts.

GENERIC MARKING PRINCIPLE 2:

Marks awarded are always **whole marks** (not half marks, or other fractions).

GENERIC MARKING PRINCIPLE 3:

Marks must be awarded **positively**:

- marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate
- marks are awarded when candidates clearly demonstrate what they know and can do
- marks are not deducted for errors
- marks are not deducted for omissions
- answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.

GENERIC MARKING PRINCIPLE 4:

Rules must be applied consistently, e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

GENERIC MARKING PRINCIPLE 5:

Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen).

GENERIC MARKING PRINCIPLE 6:

Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind.

| Question | Answer | Marks |
|----------|---|-------|
| 1(a) | SSD Memory stick | 2 |
| 1(b) | Bar code reader Optical Character Reader | 2 |

| Question | Answer | | | | Marks |
|----------|--|-------------------------|-----------------------|----------------------------|-------|
| 2 | | behaviour (✓) | content (✓) | presentation (✓) | 4 |
| | This 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 | | ✓ | | |

| Question | Answer | Marks |
|----------|----------------------|-------|
| 3(a) | ROM/Read Only Memory | 1 |
| 3(b) | 3D printer | 1 |
| 3(c) | Sensor | 1 |

| Question | Answer | Marks |
|----------|--|-------|
| 4(a) | One mark per correct answer in correct order: Analogue Analogue to Digital Convertor Pre-set value Motor/Actuator | 4 |
| 4(b) | Numeric keypad Moisture sensor | 2 |

| Question | Answer | Marks |
|----------|---|-------|
| 4(c) | <p>Six from:</p> <p>Benefits Robots can work in sterile/hazardous areas where humans would need protective clothing Robots can work 24/7 Cheaper in the long run More accurate Cars will be more consistent Robots do the boring/laborious work Issues can be found quicker Higher productivity</p> <p>Drawbacks More expensive to buy//more expensive in the short term Maintenance is more expensive as maintenance staff needed Requires backup systems, which are expensive They replace skilled workers, leading to de-skilling They need constant observation which increases the cost of maintenance crews If something goes wrong, it may be difficult to find the error Workers need to be re-trained which is expensive</p> <p>To gain full marks there must be at least one benefit and drawback</p> | 6 |

| Question | Answer | Marks |
|----------|--|-------|
| 5(a) | <p>Eight from:</p> <p>Similarities Both are communication systems Both use internet technologies Both use HTML to write the web pages Both are information systems Both are networks</p> <p>Differences An intranet has private access whereas the internet has public access An intranet is policed whereas the internet anyone can post material The data on an intranet is moderate whereas /the internet is not moderated The data access on an intranet is more secure than the internet Internet has greater amount of information than intranet Intranet is within an organisation whereas the internet is world-wide Data in the intranet is more relevant/reliable than information found on the internet</p> <p>To gain full marks there must be at least one from each section</p> | 8 |

| Question | Answer | Marks |
|----------|--|-------|
| 5(b) | <p>Matched pairs:</p> <p>HTTP/HyperText Transfer Protocol Transfer data between a webserver and the browser//display/loads pages//connect to a webpage</p> <p>HTTPS/ HyperText Transfer Protocol Secure variant One from: Transfer data between a webserver and the browser <u>securely</u>//display/loads secure pages//connect to a secure webpage Secure variant of HTTP</p> <p>FTP/File Transfer Protocol Transfers files between computers/website</p> <p>VOIP/Voice Over Internet Protocol Makes phone calls over the internet</p> <p>SSL/TLS determines variables of the encryption for both the link and the data being transmitted</p> <p>SMTP Communication protocol for email</p> <p>SLS Protocol used on the internet</p> | 6 |

| Question | Answer | Marks |
|----------|--|-------|
| 6(a) | <p>B4+(B4*Plan!\$B13)</p> <p>Three from: Calculates the 2021 income in the Model sheet By increasing the 2020 income by 2.5% The 2.5% is taken from the Income Growth cell in the Plan sheet</p> <p>The \$ is needed as the column B needs to be retained when the formula is replicated – 1 mark</p> <p>The ! is needed to show that the data is being taken from a different worksheet – 1 mark</p> | 5 |
| 6(b) | <p>IF(B20>35000,"Y","N")</p> <p>The formula automatically displays a Y/can buy the car if the Savings cell/B20 is greater than \$35 000 otherwise it displays an N/cannot buy the car</p> | 3 |

| Question | Answer | Marks |
|----------|---|----------|
| 6(c) | <p>Pie chart – 1 mark</p> <p>Five from: Select Plan sheet Highlight A5:A10 Press CTRL and highlight D5:D10 Click on insert chart Select pie chart Choose style of chart Add a title Add data/axes labels Add legend Add a name for the new sheet</p> <p>Right click on the chart and move to a new sheet//copy and paste in the new sheet – 1 mark</p> | 7 |

| Question | Answer | Marks |
|----------|--|----------|
| 7(a) | <p>Six from:</p> <p>Benefits Gives the opportunity for the member to give more honest answers The questions can be expanded/modified//added to following previous questions/answers Allows more detailed answers to be given rather than questionnaires Questions can be explained Can see the body language</p> <p>Drawbacks Takes a long time to interview all the members using this method Both the members and the interviewer have to be free at the same time This method is expensive as the system's analysts time is expensive The member cannot remain anonymous, so they cannot express themselves properly The member feels that they give comments that the interviewer wants to hear</p> <p>To gain full marks at least one benefit and drawback must be given</p> | 6 |
| 7(b) | <p>Numeric: Integer Boolean/logical Date Numeric: Currency</p> <p>Must be in this order</p> | 4 |
| 7(c) | <p>Two from: The field would not be used for calculations There is a leading zero in the data Text fields take up less space than numeric fields</p> | 2 |

| Question | Answer | Marks |
|----------|--|----------|
| 7(d) | Six from: Open/load the word processor Click on mailings/mail merge Load/create the membership card template/master document Tags/field/place holders are placed in the membership card Select/locate the data/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 replaces the tags/field/place holders Preview results Check spelling/proof read The membership cards are saved/printed/sent | 6 |

| Question | Answer | Marks |
|----------|---|----------|
| 8(a) | Four from: Costs are reduced as less staff have to be employed in the store Less physical shops are required therefore the costs of running the stores are reduced The customer base is increased as the internet is global There are increased costs due to employing more drivers/staff in the packing departments Increased costs in setting up and maintaining the online shopping website Reduction in customer loyalty as customers tend to shop around Change in jobs from instore to delivery drivers//increase in delivery drivers/staff have to be re-trained Increased costs as employees have to be trained on new technology | 4 |
| 8(b) | Five from: Use <u>up to date</u> anti-spyware/anti-virus to stop phishing and pharming attacks Using websites that encrypt data when sent/green padlock/use HTTPS/SSL Ensuring that strong passwords are used Passwords used for the online shopping account should be different to other passwords you use Check all transactions carried out with the store/receipts Type in the web address of the supermarket rather than copy and paste/click on links from an email Do not buy from untrusted websites/apps Ensure that the wireless password to the router is strong Report any phishing attempts Disable cookies/delete cookies frequently | 5 |

| Question | Answer | | | | Marks |
|----------|--|------------------------|------------------------|------------------------|----------|
| 8(c) | | pharming (✓) | phishing (✓) | smishing (✓) | 4 |
| | 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 | | | ✓ | |

| Question | Answer | Marks |
|----------|---|----------|
| 9 | Four from: <u>Making a copy</u> and giving it away to a friend or colleague/streaming without permission <u>Making a copy</u> and lending it without permission <u>Making a copy</u> and selling it without permission Using a single copy with multiple simultaneous use on a network Using coding from the original copy in your own programs/modifying the original code Renting out the original copy without permission | 4 |

| Question | Answer | Marks |
|----------|--|----------|
| 10(a) | Two from: Link from an image or word Link containing a URL//URL code When clicked on it takes you to a web page or position in a webpage | 2 |
| 10(b) | Two from: Internet Service Provider A company that provides users with <u>access</u> to the internet/internet services Usually broadband | 2 |

| Question | Answer | Marks |
|----------|---|----------|
| 11(a) | Three from: Use a flat screen monitor to reduce the eye strain Use matt finish/anti-glare screens to stop glare Use screens that can be tilted to reduce neck pain Use screens that have height adjustment Turn the monitor 90 degrees to a window to reduce glare Use LCD monitors to reduce screen flicker Use screen filters//lower the brightness Do not sit too close to the screen Use LED to reduce eye strain | 3 |

| Question | Answer | Marks |
|----------|---|----------|
| 11(b) | Two from: Use wrist/hand rests to reduce RSI Use ergonomic keyboards to reduce RSI Use voice activated software to reduce the use of the keyboard Ensure correct posture when typing on the keyboard Take breaks/use stretching exercises | 2 |

| Question | Answer | Marks |
|----------|---|----------|
| 12 | Four from: With a CLI Instructions must be typed to get a computer to carry out an action The user needs to remember/learn/understand the commands in a CLI The instructions need to be entered correctly in CLI With a CLI you have to remember the exact path and name of application With a CLI it is more important that users understand how a computer works With a GUI you just click on an icon In the GUI the instructions are pre-determined GUI is more user-friendly GUI uses more processing power GUI uses more memory | 4 |