



CANDIDATE
NAME

CENTRE
NUMBER

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CANDIDATE
NUMBER

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0417/12

February/March 2021

2 hours

You must answer on the question paper.

No additional materials are needed.

- 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.

- 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 **20** pages. Any blank pages are indicated.

- 1 Tick (✓) whether the following are examples of internal or external hardware devices.

| | internal (✓) | external (✓) |
|------------|-----------------|-----------------|
| Mouse | | |
| Video card | | |
| Printer | | |
| Actuator | | |

[2]

- 2 Geeta spends a great deal of time at work entering data into her computer.

State **three** items of hardware that Geeta should be provided with to help avoid RSI when she enters data into the computer.

- 1
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- 2
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- 3
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[3]

Question 3 starts on page 4.

- 3 Falyaz has created a diary using word processing software. The diary entry for 17th May 2020 is shown.

17th May 2020

First day of the holidays today and the family went to stay in a hotel near Cherai Beach in Kerala. This was a lovely place to spend the holidays with a long stretch of beach to play on. It is called the *Princess of the Arabian Sea*. We also visited a number of the lagoons in the area and met a lot of people. The weather was lovely, and the sun shone throughout most of the day.



- (a) Write down **four** formatting features of the word processing software used to make this diary entry.

Feature 1.....

.....

Feature 2.....

.....

Feature 3.....

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Feature 4.....

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[4]

- (b) The original diary entry typed into the word processing software did not include an image.

Describe the steps that would be carried out by Falyaz to include in his diary entry an image taken from his digital camera.

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[6]

- (c) Name **two** other sources of digital images apart from using a digital camera.

Source 1.....

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Source 2.....

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[2]

- (d) Tick (✓) whether the following statements about generic image files refer to jpg, png or gif file types.

| | jpg (✓) | png (✓) | gif (✓) |
|--|------------|------------|------------|
| This file type stores still or moving images | | | |
| This file type uses lossy compression | | | |
| This file type is used for storing photographs on a digital camera | | | |
| This file type is limited to 256 colours | | | |

[4]

- (e) Falyaz wants to add a header in his word processed diary.

Explain what is meant by a header and why it is needed.

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[4]

- 4 The table shows a comparison of two different types of fitness tracker. A fitness tracker contains a microprocessor, is worn around the wrist and monitors physical readings of the wearer.

| | | |
|-------------------------------|-------------|------------|
| Name of fitness tracker | Flexi-byt 6 | FitB 4 |
| Battery life in days | 20 days | 7 days |
| Method of internet connection | Bluetooth | WiFi |
| Water resistant | 100 m | 10 m |
| GPS | Y | N |
| Cost | INR 22 855 | INR 10 700 |

- (a) You have been asked to design a poster to show this data for the two fitness trackers.

Describe how you would use **six** different design features to enhance the data in this poster. The poster must be suitable for an audience of adult customers.

- 1.....
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- 2.....
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- 3.....
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- 4.....
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- 5.....
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- 6.....
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[6]

- (b) Describe the computer processing involved in the use of a microprocessor-controlled fitness tracker when displaying and monitoring the blood pressure of the user.

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[4]

- 5 A parent is concerned about his children sending texts. When sending a text, it is important to follow netiquette.

- (a) Explain what is meant by the term netiquette.

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[2]

- (b) The parent is planning to produce a number of rules to ensure that his children follow netiquette when texting other people.

Write down **four** rules that he could include in his list.

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4.....
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[4]

- 6 Complete the following sentences, using the most appropriate direct data entry device.

| | | | |
|-------------------|---------------|---------|--------------------------|
| a bar code reader | a chip reader | MICR | a magnetic stripe reader |
| OCR | OMR | PIN pad | RFID reader |

- (a) The device that reads data from a card in a contactless card system is called

..... [1]

- (b) The device that reads scanned text and converts it into a readable form is called

..... [1]

- (c) The device that reads the data made up of black lines and spaces on household goods is called

..... [1]

- 7 A school is planning to introduce a contactless card system for pupils to pay for school meals. Each card contains an amount of money which is topped up by parents. Parents transfer amounts of money into the school system and pupils place the card close to a reader to upload the money onto the card.

- (a) Discuss the benefits and drawbacks, to the pupils, of using a contactless card system rather than paying by cash.

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[6]

- (b) The terminals in the school use electronic funds transfer at point of sale (EFTPOS).

Describe the computer processing that takes place to pay for a meal at the EFTPOS terminal using the card.

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[6]

- 8 A computer system is being created to calculate the scores in a diving competition. Every dive by an athlete is awarded a score out of 10 by each judge.

The system is being tested using live data. An athlete completes his dive with a difficulty of 3.4 and achieves the following scores, which are displayed in a spreadsheet.

| | A | B | C | D | E |
|----|---------------|----------------|-------------|-----|---|
| 1 | Athlete: | Shivani Nehwal | Difficulty: | 3.4 | |
| 2 | | | | | |
| 3 | | Score | | | |
| 4 | Judge 1 | 4.1 | | | |
| 5 | Judge 2 | 6.3 | | | |
| 6 | Judge 3 | 6.2 | | | |
| 7 | Judge 4 | 5.3 | | | |
| 8 | Judge 5 | 7.3 | | | |
| 9 | Judge 6 | 6.1 | | | |
| 10 | Judge 7 | 7.0 | | | |
| 11 | | | | | |
| 12 | Overall Score | | | | |

- (a) Before the overall score is calculated the judges' scores need to be sorted into ascending order.

Describe the steps that would be carried out to sort the data into ascending order.

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[3]

- (b) Cell B12 contains the formula, `ROUND((SUM(B5:B9)*D1),1)`.

Explain what the formula in cell B12 does.

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[3]

- (c) The judges' score column will be tested using normal, abnormal and extreme data.

Explain, giving examples of test data which would be used, what is meant by:

Abnormal test data.....

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Extreme test data.....

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[4]

Pupil Registration form

INSTRUCTIONS: Only use HB pencil when completing this form.

Example:

Pupil present ☒ [A]

Pupil absent [P] []

Pupil late [■ ■]

[illegible]

At the start of the registration period the teacher shades in a lozenge [P] on the register to show that a pupil is present and shades in a lozenge [A] for each pupil who is absent. If a pupil is late then the teacher shades in both the [P] and the [A] lozenges. The register sheets are sent to the school office to be processed and the data from them is stored in the computer's database.

- (a)** Describe the inputs and computer processing of the registers when they are sent to the school office, prior to them being stored on the computer's database.

[illegible]

[6]

- (b)** The headteacher of the school is considering modernising the registration system so that pupils can register using a facial recognition system.

Discuss the advantages and disadvantages of using a facial recognition registration system rather than the OMR system they currently use.

[illegible]

[8]

(c) Biometric data, like facial recognition, is an example of personal data.

Give **two** other examples of personal data that could be stored on the school registration database.

1.....

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2.....

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[2]

10 Computer data can be stored on physical storage devices. Data can also be stored in the 'cloud'.

- (a)** Explain what is meant by the cloud, giving **two** advantages of storing data in the cloud compared with physical storage devices.

Explanation.....

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Advantage 1.....

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Advantage 2.....

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[4]

- (b)** Tick (✓) whether the following storage devices are examples of optical, magnetic or solid state storage.

| | optical (✓) | magnetic (✓) | solid state (✓) |
|--------------------|-----------------------|------------------------|---------------------------|
| Flash drive | | | |
| Hard disk drive | | | |
| Blu-ray disc drive | | | |
| SSD | | | |

[4]

- 11 The owner of a bookshop has a database of all the books she has in stock. As some of the data is being entered into the database it is checked using validation checks.

An example of some of the records in the database is shown.

| Field name | Example data |
|------------------|-----------------------|
| Name of book | Brotherhood of Wisdom |
| Name of author | Colin Turner |
| ISBN | 471837951 |
| Date of purchase | 25/02/2021 |
| Number of copies | 10 |
| Type of book | E |
| Name of book | The Fourth Man |
| Name of author | Aadha Khatri |
| ISBN | 0718121753 |
| Date of purchase | 18/03/2019 |
| Number of copies | 53 |
| Type of book | H |
| Name of Book | Indian Temples |
| Name of author | Vihaan Laghan |
| ISBN | 978147183215 |
| Date of purchase | 12/02/2019 |
| Number of copies | 30 |
| Type of book | H |

Explain, using a field name and examples of the data stored in that field in the database, why validation checks must be appropriate to the data that is being checked.

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[4]

- 12** A company has placed a firewall between their Local Area Network (LAN) and their internet connection. This is used to increase security in their computer systems.

Discuss the effectiveness of using this firewall to increase security.

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[6]

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Cambridge IGCSE™

INFORMATION AND COMMUNICATION TECHNOLOGY

0417/12

Paper 1 Written Paper

March 2021

MARK SCHEME

Maximum Mark: 100

| |
|-------------------------|
| <p>Published</p> |
|-------------------------|

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 March 2021 series for most Cambridge IGCSE™, Cambridge International A and AS Level components and some Cambridge O Level components.

This document consists of **11** 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 | | internal | external | 2 |
| | Mouse | | ✓ | |
| | Video card | ✓ | | |
| | Printer | | ✓ | |
| | Actuator | | ✓ | |
| | 2 marks for 4 correct ticks 1 mark for 2 or 3 correct ticks 0 marks for 0 or 1 tick | | | |

| Question | Answer | Marks |
|----------|---|-------|
| 2 | Three from: Ergonomic keyboard Ergonomic mouse Microphone Wrist rest | 3 |

| Question | Answer | Marks |
|----------|--|-------|
| 3(a) | Four from: Bold on date Superscript on the date Left aligned on date Fully justified Text/word wrap Highlighted text Italics | 4 |

| Question | Answer | Marks | | | | | | | | | | | | | | | | | | | | |
|--|---|-------|-----|-----|-----|--|--|--|---|---------------------------------------|---|--|--|--|---|--|--|--|--|--|---|---|
| 3(b) | <p>Six from:</p> <p>Plug in/Bluetooth the digital camera to the computer//Plug in the SD card/memory card</p> <p>Select the image to be uploaded</p> <p>Upload the image to the computer</p> <p>Save the image on the computer</p> <p>Load/open the word processing software</p> <p>Load the diary entry file</p> <p>Place the cursor where you want the image to be</p> <p>Click insert...image</p> <p>Choose/find/browse the image from the folder</p> <p>Insert the image in the text</p> <p>Reformat/resize/crop the image</p> <p>Reposition/place the image</p> <p>Click word wrap/text wrap</p> <p>Save the document</p> | 6 | | | | | | | | | | | | | | | | | | | | |
| 3(c) | <p>Two from:</p> <p>Internet</p> <p>Scanned images</p> <p>Images stored on: Smartphone/Mobile phone/PC/Tablet/SD card/Smartwatch</p> <p>Clipart libraries</p> <p>Screenshot</p> | 2 | | | | | | | | | | | | | | | | | | | | |
| 3(d) | <table><tr><td></td><td>jpg</td><td>png</td><td>gif</td></tr><tr><td>This file type stores still or moving images</td><td></td><td></td><td>✓</td></tr><tr><td>This file type uses lossy compression</td><td>✓</td><td></td><td></td></tr><tr><td>This file type is used for storing photographs on a digital camera</td><td>✓</td><td></td><td></td></tr><tr><td>This file type is limited to 256 colours</td><td></td><td></td><td>✓</td></tr></table> | | jpg | png | gif | This file type stores still or moving images | | | ✓ | This file type uses lossy compression | ✓ | | | This file type is used for storing photographs on a digital camera | ✓ | | | This file type is limited to 256 colours | | | ✓ | 4 |
| | jpg | png | gif | | | | | | | | | | | | | | | | | | | |
| This file type stores still or moving images | | | ✓ | | | | | | | | | | | | | | | | | | | |
| This file type uses lossy compression | ✓ | | | | | | | | | | | | | | | | | | | | | |
| This file type is used for storing photographs on a digital camera | ✓ | | | | | | | | | | | | | | | | | | | | | |
| This file type is limited to 256 colours | | | ✓ | | | | | | | | | | | | | | | | | | | |
| 3(e) | <p>Max two from:</p> <p>It is an area of a document on <u>every</u> page</p> <p>At the top of a page</p> <p>The area is between the top of the page and the top of the margin</p> <p>Max two from:</p> <p>To show consistency on each page</p> <p>To ensure that each page has the same data in the header</p> <p>Saves time for the author typing out the data on each page</p> | 4 | | | | | | | | | | | | | | | | | | | | |

| Question | Answer | Marks |
|----------|---|----------|
| 4(a) | Six from: Different size/style of font for the title/features in the table Clear font colour for the title/text in the table Clear fonts for the title/text in the table Use of bold to highlight keywords Use of italics to highlight keywords Poster fills the page Data is shown in the comparison table/chart More text than images Contrasting colours for font and background colour Use of white space Use of borders to make the text stand out | 6 |
| 4(b) | Four from: The data is sent to/read by the microprocessor The data is stored by the tracker Convert the raw data into blood pressure data Compare the data with pre-set values If out of range <u>send data</u> to an alert system The data is <u>sent to</u> the screen | 4 |

| Question | Answer | Marks |
|----------|--|----------|
| 5(a) | Two from: Internet etiquette Set of social conventions They show common courtesy when communicating online | 2 |
| 5(b) | Four from: Do not use capital letters as it relates to shouting Do not use abusive/vulgar language/threatening behaviour Be clear in the text sent Always check spelling and grammar Remember that sarcasm does not communicate well Respect other's privacy Respect other people's views Do not use too many emoticons Do not use text language/slang Do not spam Do not send inappropriate links | 4 |

| Question | Answer | Marks |
|----------|-------------------|----------|
| 6(a) | RFID reader | 1 |
| 6(b) | OCR | 1 |
| 6(c) | a bar code reader | 1 |

| Question | Answer | Marks |
|----------|---|-------|
| 7(a) | <p>Six from:</p> <p>Benefits</p> <p>Fast throughput of pupils at the tills</p> <p>Fast transaction as only the card is presented</p> <p>If the card is stolen it can be blocked</p> <p>One card is less bulky than money</p> <p>Using the card is more secure because the money can only be used in the canteen</p> <p>Drawbacks</p> <p>Tendency to spend more as it is a card</p> <p>Difficult to keep track of your spending as no physical money</p> <p>If the card is damaged/lost the pupil cannot buy food/lose all their money</p> <p>Card needs topping up regularly</p> <p>Cards will need to be purchased by the pupils and can be expensive</p> <p>Parents can see what the pupils buy</p> <p>If there is an issue with the machine not easy to see mistakes</p> <p>Easier to misplace than cash/coins</p> <p>Parents can limit how much is spent on food</p> <p>Pupils can only spend the money in the canteen and on food</p> <p>To gain full marks there must be at least one benefit and at least one drawback</p> | 6 |
| 7(b) | <p>Six from:</p> <p>The cost of the meal is totalled</p> <p>The reader <u>reads the details</u> from the card</p> <p>The amount of money on the card is checked</p> <p>The total is compared to the amount of money on the card</p> <p>If it is greater the transaction is rejected</p> <p>If it is less than or equal to then the transaction is accepted</p> <p>Checked whether card it is correct type/stolen/blocked</p> <p>The cost is deducted from the amount on the card</p> <p>The amount/total balance on the card is updated following the transaction</p> <p>The amount is credited to the school system</p> <p>The details of the receipt are prepared//The receipt is produced//Rejection slip is produced//Message is prepared</p> | 6 |

| Question | Answer | Marks |
|----------|---|-------|
| 8(a) | <p>One from:</p> <p>Highlight cells A4 to B10</p> <p>Click anywhere in the range</p> <p>Highlight A4 to A10 and click expand the selection</p> <p>Highlight B4 to B10 and click expand the selection</p> <p>Two from:</p> <p>Click on the down arrow//Click on Custom Sort</p> <p>Select column B</p> <p>Select smallest to largest/A ↓ Z</p> | 3 |

| Question | Answer | Marks |
|----------|---|----------|
| 8(b) | Three from: Totals cells B5 to B9 Multiplies by cell D1/difficulty/3.4 Rounds the value to 1 decimal place | 3 |
| 8(c) | Matched pairs Abnormal – data that is outside the range//Unacceptable data//Data of the wrong type Example: greater than 10, negative numbers, letters, symbols Extreme – data that is on the boundary of acceptability Example: 10 | 4 |

| Question | Answer | Marks |
|----------|---|----------|
| 9(a) | Six from: OMR sheets are scanned in using an optical mark reader//Reader reads the lozenge Data is sent to the computer A template of the register is loaded into the computer A value is assigned to each lozenge A light passes through the scanner and shows position of each filled in lozenge//Comparing dark spots with lighter areas//Use X Y coordinates The position is compared to the template/pre-determined data If the lozenge shaded is [P] then the pupil is recorded as present If the lozenge shaded is [A] then the pupil is recorded as absent If both lozenges [A] and [P] are shaded then the pupil is recorded as late. If no lozenge on a line is shaded the result is discarded | 6 |

| Question | Answer | Marks |
|----------|---|----------|
| 9(b) | <p>Eight from:</p> <p><i>Advantages</i></p> <p>Faces are unique therefore greater security</p> <p>Data entry is faster as it does not need to be sent to the office for entry</p> <p>Data entry is more accurate the teacher could enter the wrong data on OMR sheet</p> <p>Greater security as the pupil needs to be present to register</p> <p>More difficult to fake biometrics</p> <p>OMR data sheets can be forgotten or lost</p> <p><i>Disadvantages</i></p> <p>Facial injuries/facial hair/glasses/masks can affect the data entry</p> <p>The cost of setting up a new system is higher as extra hardware and software needs to be purchased//Setting up the system is more expensive</p> <p>Time consuming to set up all the pupils</p> <p>The data will need to be updated regularly due to facial changes as pupils get older</p> <p>Higher error rate</p> <p>System is more complex therefore may cost more to maintain//Maintaining the system is more expensive</p> <p>The environment and usage may affect the reader</p> <p>Biometric systems are not 100% accurate</p> <p>Less flexibility as the OMR sheets can be used anywhere in the school</p> <p>Biometric data harder be reset if incorrect/if change needed</p> <p>Greater invasion of privacy as biometric data has to be stored on the computer</p> <p>To gain full marks there must be at least one advantage and one disadvantage</p> | 8 |
| 9(c) | <p>Two from:</p> <p>Name</p> <p>Address</p> <p>Gender</p> <p>Date of birth</p> <p><u>Personal</u> contact details, such as Email address and phone number</p> <p>ID card/roll number</p> <p>Race//Ethnic origin</p> | 2 |

| Question | Answer | Marks | | | | | | | | | | | | | | | | | | | | |
|--------------------|--|-----------------|--------------------|-----------------|--------------------|-------------|--|--|---|-----------------|--|---|--|--------------------|---|--|--|-----|--|--|---|---|
| 10(a) | <p>Two from:</p> <p>Data is stored on offsite servers Many servers in many locations Data is stored on more than one server Uses data redundancy Cloud is an <u>online</u> service/data storage</p> <p>Two from:</p> <p>The cloud has greater storage capacity than other methods The data could be sent directly to the cloud from any device Access the data from any device/anywhere Easier to add storage capacity Lower capital outlay The owner would only pay for the storage they used Backup up tends to be automatic Cloud is more robust Cloud is more secure as it is password protected</p> | 4 | | | | | | | | | | | | | | | | | | | | |
| 10(b) | <table><tr><td></td><td>optical</td><td>magnetic</td><td>solid state</td></tr><tr><td>Flash drive</td><td></td><td></td><td>✓</td></tr><tr><td>Hard disk drive</td><td></td><td>✓</td><td></td></tr><tr><td>Blu-ray disc drive</td><td>✓</td><td></td><td></td></tr><tr><td>SSD</td><td></td><td></td><td>✓</td></tr></table> | | optical | magnetic | solid state | Flash drive | | | ✓ | Hard disk drive | | ✓ | | Blu-ray disc drive | ✓ | | | SSD | | | ✓ | 4 |
| | optical | magnetic | solid state | | | | | | | | | | | | | | | | | | | |
| Flash drive | | | ✓ | | | | | | | | | | | | | | | | | | | |
| Hard disk drive | | ✓ | | | | | | | | | | | | | | | | | | | | |
| Blu-ray disc drive | ✓ | | | | | | | | | | | | | | | | | | | | | |
| SSD | | | ✓ | | | | | | | | | | | | | | | | | | | |

| Question | Answer | Marks |
|----------|--|----------|
| 11 | <p>Max two examples, for each example: 1 mark for a <u>correct</u> field names and data examples 1 mark for the reason</p> <p>Matched pairs Type of book Can use length/lookup check as only one letter is input for example E or H Cannot use a type check as only one letter used</p> <p>ISBN Can use check digit as a way of checking that digits are not transposed Cannot use a length check as they are different lengths</p> <p>Date of purchase Can use a format check as all dates are the same format.</p> <p>Number of copies Can use a range/limit check as the lowest number is 1 Can use a type check as only numbers are accepted</p> <p>Name of book/Name of Book Cannot use a length check as names can be any length Cannot use a type check as any character can be used</p> <p>Name of author Cannot use a length check as names can be any length</p> | 4 |

| Question | Answer | Marks |
|----------|--|----------|
| 12 | <p>Six from:</p> <p>Benefits</p> <p>Monitors traffic into and out of the network to make sure that all data passing is safe.</p> <p>Checks whether the data passing through it meets a given set of rules... ...if they do not then the data is blocked</p> <p>Can block the unwanted traffic in and out of the network</p> <p>It can log all incoming and outgoing traffic to check later</p> <p>Can block certain undesirable websites/IP addresses</p> <p>Keeps a list of desirable IP addresses/websites</p> <p>It can block IP addresses to stop hackers</p> <p>Drawbacks</p> <p>It cannot stop individuals on internal networks by-passing the firewall</p> <p>It cannot stop employees hacking the computer from within the system</p> <p>Users own devices can by-pass the firewall therefore meaning the computer/network is in danger</p> <p>It cannot stop hackers only devices that hackers are using</p> <p>To gain full marks on the question at least one benefit and drawback are needed</p> | 6 |