

Cambridge International AS & A Level

INFORMATION TECHNOLOGY

9626/12

Paper 1 Theory

October/November 2020

MARK SCHEME

Maximum Mark: 90

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.

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This document consists of **10** 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) | <table border="1"> <tr> <td>Vishing involves mobile (cell) phone text messages persuading people to reveal their personal data</td> <td></td> </tr> <tr> <td>With vishing, a text message may include a telephone number that connects to an automated voice response system</td> <td></td> </tr> <tr> <td>Vishing involves installing a piece of malicious software on a customer's computer</td> <td></td> </tr> <tr> <td>Vishing involves a phone call to persuade people to reveal their personal data</td> <td>✓</td> </tr> </table> | Vishing involves mobile (cell) phone text messages persuading people to reveal their personal data | | With vishing, a text message may include a telephone number that connects to an automated voice response system | | Vishing involves installing a piece of malicious software on a customer's computer | | Vishing involves a phone call to persuade people to reveal their personal data | ✓ | 1 |
| Vishing involves mobile (cell) phone text messages persuading people to reveal their personal data | | | | | | | | | | |
| With vishing, a text message may include a telephone number that connects to an automated voice response system | | | | | | | | | | |
| Vishing involves installing a piece of malicious software on a customer's computer | | | | | | | | | | |
| Vishing involves a phone call to persuade people to reveal their personal data | ✓ | | | | | | | | | |
| 1(b) | <p>Three from:</p> <p>Never divulge or share any sensitive/personal information over the phone Do not answer phone calls from numbers you do not recognise Log on to your bank account on receiving a phone call to check account is in order/no suspicious activity Users should register their phone number with the 'national do not call registry'/'telephone preference service' Do not call a number sent in a voicemail Always check phone numbers of callers from the bank to check if number is legitimate/phone the bank from a different phone/number/phone the bank after a suitable time delay to allow fraudster to disconnect call</p> | 3 | | | | | | | | |
| 1(c) | <table border="1"> <tr> <td>With smishing, a text message is received which may include a website URL, inviting the receiver to go to the site</td> <td>✓</td> </tr> <tr> <td>Smishing is the use of video clips persuading people to reveal their personal data</td> <td></td> </tr> <tr> <td>Smishing involves using emails to persuade people to reveal their personal data</td> <td></td> </tr> <tr> <td>Smishing involves the receiving of a phone call</td> <td></td> </tr> </table> | With smishing, a text message is received which may include a website URL, inviting the receiver to go to the site | ✓ | Smishing is the use of video clips persuading people to reveal their personal data | | Smishing involves using emails to persuade people to reveal their personal data | | Smishing involves the receiving of a phone call | | 1 |
| With smishing, a text message is received which may include a website URL, inviting the receiver to go to the site | ✓ | | | | | | | | | |
| Smishing is the use of video clips persuading people to reveal their personal data | | | | | | | | | | |
| Smishing involves using emails to persuade people to reveal their personal data | | | | | | | | | | |
| Smishing involves the receiving of a phone call | | | | | | | | | | |
| 1(d) | <p>Three from:</p> <p>Avoid clicking on links within text messages, especially if they are sent from someone you don't know Don't respond to text messages that request/never include in a text personal / financial / your information If you get a text message that appears to be from your bank, contact them straight away to find out if they sent you a legitimate request Think before responding to a text message urging you to act or respond quickly Never call a phone number/respond to a text message sent by an unknown texter/suspicious number... ... such as your bank is going to cancel your credit card/you have won a prize</p> | 3 | | | | | | | | |

| Question | Answer | Marks |
|----------|------------------------------------------------------------------------------------------|-------|
| 2(a) | It is often more expensive to purchase goods online than from a shop. | |
| | The digital divide only relates to the use of personal computers | |
| | The quality of mobile(cell) phone reception is the same everywhere | |
| | The digital divide can exist between the educated and the uneducated | ✓ |
| 2(b) | The divide between regions of the world is referred to as the regional digital divide | |
| | The digital divide can exist between rich and poor people | ✓ |
| | The digital divide does not usually exist between developed and developing countries | |
| | Both urban areas and rural areas tend to have the necessary infrastructure for broadband | |

| Question | Answer | Marks |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 3(a)(i) | The total value of all the cars made by Dau... – 1 mark ...which were made after 2010 – 1 mark | 2 |
| 3(a)(ii) | It looked in the range A5:A15... ...for the value in I6 The value in I6 is Dau It then looks in the range G5:G15... ...for the values which are greater than that in I8 which is 2010 It adds up the Prices in E5:E15 where the Make in A5:A15 is Dau (I6) and the Year made is greater than 2010 | 6 |
| 3(b) | Select I6 and choose data validation from toolbar – 1 mark Choose Allow from a list – 1 mark In the source/entries window type the names of the three types of car – 1 mark | 3 |
| 3(c)(i) | It is a text file where every data item including empty data cells is separated by commas/tabs/spaces | 1 |
| 3(c)(ii) | The SUMIFS formula would be lost – 1 mark The Economy column would lose its formatting/18.0 would become just 18/price column would just be text, not currency – 1 mark Column widths would be standard/Column widths would be narrower/"Year made" would overlap into H1/Engine (litres) would be truncated//Economy (L/Km) would be truncated – 1 mark | 3 |

| Question | Answer | Marks |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 4 | <p>Examples:</p> <p>A limit check could not be carried out on the payroll number... ... as it is a text field/it starts with a letter</p> <p>A limit check on each part of the date joined could be carried out</p> <p>A limit check could be carried out on the day part of the date, as day could not be more than 31</p> <p>A limit check could be carried out on the month part of the date, as month could not be more than 12</p> <p>Limit check would prevent years greater than 2020 from being entered/a date later than a given date being entered</p> <p>Limit check would not prevent days or months less than 1 being entered</p> <p>Limit check would not prevent unacceptably early years being entered (e.g. 1900)</p> <p>Limit check would not prevent dates like 30/2/2000 or 31/06/2000 being entered</p> <p>If months were entered as 01, 02 etc. it might make them text, making limit check impossible</p> <p>Format check could be used on payroll number – must be one letter followed by 5 digits</p> <p>Format check would pick up errors such as no starting letter/2 letters at start/extra/fewer digits/letter in wrong place (accept examples)</p> <p>Format check would pick up incorrect lengths (accept examples)</p> <p>Format check could be used on date joined – must be two digits followed by a slash followed by two digits followed by a slash followed by 4 digits/dd/mm/yyyy</p> <p>Format check would pick up errors such as dates written as dd/month(name)/yy (accept examples)</p> <p>Format check would not pick up day joined greater than 31</p> <p>Format check would not pick up month joined greater than 12</p> <p>Format check would not pick up year joined greater than 2020</p> <p>Format check would not pick up payroll numbers starting with letters not used by the company</p> <p>Format check would not pick up payroll numbers where digits had been transposed</p> <p>There must at least one valid statement for each of limit check and format check for full marks</p> | 8 |

| Question | Answer | Marks |
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| 5 | <p>Eight from:</p> <p>First record in the transaction file / D20992 is read First record in the master file / D15609 is read These two records are compared If records don't match, the computer writes the master file record to the new master file Records don't match so the next record of the master file/ D20992 is read As it matches, a transaction is carried out The transaction is D so Quantity is added to the number in stock in the master file Using Number of 145 from master file Using Quantity 40 from transaction file Number_in_stock is now 185 Processed record is written to the new master file Next record, D43487, is read from transaction file and compared to the next master file record, D43487 As it matches, a transaction is carried out The transaction is S so Quantity is subtracted Using Number of 120 from master file Using Quantity 45 from transaction file Number_in_stock is now 75 and the processed record is written to the new master file This continues until the last record from the transaction file, record T49443, is read After processing the last record of the transaction file, T49443, all the remaining old master file records are written to the new master file, in this case, one record, T88350</p> | 8 |

| Question | Answer | Marks |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 6 | <p>Six from:</p> <p>Josefine tests to make sure microphone and webcam, if being used, and internet connection are working correctly (must have two) She positions the webcam, if being used, so that she can be seen She communicates with every person being invited informing them of the conference/sends invitation to participants/reminder to participants She sends login/password details to the engineers/users She uploads any necessary documents for the meeting She sends a link to the website She loads the software She enters her user name and password (obtained from the provider) She selects a start time and end time In the meeting area, she types an agenda She uses the software to select participants She selects an appropriate meeting space/room using software She selects those participants who can enter automatically and those who have to be admitted She chooses which participants can be presenters/can modify documents She limits the participation of participants/mute volume/disable messaging/disable cameras</p> | 6 |

| Question | Answer | Marks |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 7 | <p>Six from:</p> <p><i>Compiler – four max from:</i> Translates the whole program as one complete unit/at once Translates the program into machine code Creates an executable file Produces a report of errors in the code after compilation Can optimise source code to run as fast or as efficiently as possible</p> <p><i>Linker – two max from:</i> A linker takes one or more object files and combines them... ...into a <u>single</u> executable file Replaces symbolic addresses with real addresses</p> <p>Five max from compiler and linker sections</p> <p><i>Both needed – two max from:</i> Many programming languages allow the writing of different pieces of code/modules separately Programming tasks are simplified as large programs can be broken into smaller, more manageable pieces... ...the linker is used to put all the modules together Without the compiler the linker would have no object files to combine</p> <p>At least one point from each section must be made to gain full marks</p> | 6 |

| Question | Answer | Marks |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 8(a) | Text/alphanumeric string as the leading 0 would disappear if stored as a number/no calculations are required so no need to store it as a number | 1 |
| 8(b) | A real number/decimal as it is not a whole number so integer would not be suitable/it will probably be used in calculations so a text data type would not be suitable. | 1 |
| 8(c) | An integer as a real number data type would occupy too much storage space/it will probably be used in calculations so a text data type would not be suitable/there cannot be fractions of a child so a real number data type not needed | 1 |
| 8(d) | Boolean as the data could be converted to true/yes (employed) or false/no (not employed) and a text field would occupy more storage space | 1 |
| 8(e) | Currency as you can set a currency symbol preceding the value and it has a fixed number of decimal places unlike real or integer/the \$ symbol would not be displayed if data type not currency/calculations could not be performed if it was a text field | 1 |

| Question | Answer | Marks |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 9 | <p>Six from:</p> <p>In questionnaires and interviews the questions may not be very clear and the respondents may misunderstand them The questions might be badly phrased... ...so that the respondent thinks they know the answer the questioner wants... ...this may result in similar answers from different respondents Interviews can/questionnaires cannot expand on what the question means leading to higher/lower quality information Questions may be open-ended allowing the respondent to produce answers which cannot be quantified In a multi-choice type question, there may not be a sufficient number of alternative responses The respondents selected for the study may not be very representative There is the possibility that the people collecting the data may make errors when collecting it People can make errors when entering the collected data into the computer If data is being collected automatically by sensors the computer/microprocessor/sensors needs to be set up properly to accurately interpret the readings Observation – when people know they are being observed it may cause them to adopt working patterns which are different to the way they work normally Examining documents – there may be too much information to quantify</p> | 6 |

| Question | Answer | Marks |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 10 | <p>Six from:</p> <p>Advantages File size is small so takes up little storage space As the file size is smaller the processing time is quite short Can be opened by more applications than if saved in a specific file format Data can be exchanged between different kinds of applications Data can be exchanged between different computers and operating systems It is human readable and easy to edit manually</p> <p>Disadvantages There is no distinction between text and numeric values Documents must be reformatted/lose formatting Can't embed images/graphics/videos Cannot have tables Resulting layout may make it difficult to read</p> <p>Must have at least one from each for full marks</p> | 6 |

| Question | Answer | Marks |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| 11 | <p>Six from:</p> <p>To help them with their decision making</p> <p>To help them with project management</p> <p>To gather and analyse information about various aspects of the organisation...</p> <p>... such as personnel, sales, inventory and production</p> <p>To create reports/charts/present data</p> <p>To evaluate their company's performance at regular intervals</p> <p>To compare daily, weekly or monthly reports to previous reports</p> <p>To spot trends, such as revenue/profit growth or reduction</p> <p>To assist them in making predictions about the department/company's future</p> | 6 |

| Question | Answer | Marks |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| 12(a) | <p>Two from:</p> <p>The programs used to direct the operation of a computer and related hardware/to allow communication between computer and hardware</p> <p>Two types of software, application software and system software</p> <p>Application software uses the computer system to perform specific tasks</p> <p>System software manages computer hardware</p> | 2 |
| 12(b) | <p>Six from:</p> <p>Without system software a computer cannot work/system software performs core functions of the computer</p> <p>Application software are programs that people use to carry out specific tasks on a computer</p> <p>Examples of application software are word processors, spreadsheets and databases (must have at least two)</p> <p>Before they can use applications users require a computer to have system software</p> <p>System software coordinates the activities and functions of hardware and software</p> <p>System software controls the operations of computer hardware</p> <p>Examples of system software are operating system /compilers /interpreters /linkers /device drivers /utilities (must have at least two)</p> <p>Operating systems act as an interface with application programs</p> <p>System software can run independently of application software</p> <p>Application software can't run without the presence of system software</p> <p>System software makes data transfer possible between the memory and disks and manages the output to display devices</p> <p>Application software makes use of system software to save and load documents</p> <p>Application software makes use of system software to print documents</p> <p>System software is needed to control security</p> | 6 |

| Question | Answer | Marks |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| 13 | <p>Six from:</p> <p>Benefits VPNs offer a much higher level of secure communication compared to other remote methods of communication/are needed to ensure security A VPN can save an organisation money by eliminating the need for expensive long-distance leased lines A VPN reduces an organisation's costs for remote access servers and long-distance dial-up network connections A VPN allows organisations to outsource the needed support to third-party service providers VPNs are very flexible in terms of growing with the company and adding new users to the network VPNs allow remote workers to check in at the office securely</p> <p>Drawbacks It is difficult to find an ISP that can guarantee minimal downtime Putting in place the required security means organisations need to pay somebody with a high level of expertise, which is expensive When creating additional infrastructure to cater for new users the solutions can become incompatible, causing technical issues if a different supplier is used/ using current supplier can increase costs The use of mobile devices by remote workers to initiate connectivity to the VPN can cause security issues (especially if the connection is wireless) The company has little control of the VPN</p> <p>Must have at least one of each to gain full marks</p> | 6 |