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**INFORMATION TECHNOLOGY**

**9626/13**

Paper 1 Theory

**October/November 2019**

MARK SCHEME

Maximum Mark: 90

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**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 **12** 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	You only have to gather as much or as little data as you need.	✓	4
	It allows data to be gathered from subjects to which the data gatherer does not have physical access.		
	You can obtain the data faster than using an indirect data source.		
	You have full control over the method used to collect the data.	✓	
	A much larger sample size can be used than is possible with indirect data sources.		
	A direct data source is quicker to search.		
	There may be an opportunity to sell the data to other people for them to use.	✓	
	You do not have to spend time interviewing people or giving out questionnaires.		
	A CD ROM of historical data is a direct data source.		
	The source of the data is known exactly, making it easier to judge its reliability.	✓	

Question	Answer	Marks
2	Pharming involves sending a website URL, inviting the receiver to go to the site.	
	Smishing involves using text messages to persuade people to give out personal information.	✓
	Phishing involves installing malicious software on the victim's computer.	
	Pharming involves creating a fake website that looks like an actual bank's website.	✓
	Phishing involves the sending of fake emails in order to advertise the bank.	
	Vishing involves the fraudster's computer redirecting a customer's phone call to his own phone.	✓
	Banks can ask you from time to time to send them your full password to check you are authorised to use that account.	
	Vishing involves receiving a phone call from a fraudster.	✓
	Vishing never involves getting the customer to phone the bank.	
	Smishing is the same as vishing but never involves the use of a phone.	
4		

Question	Answer	Marks
3(a)	The collection of physical components/devices that constitute/are used in a computer system	1

Question	Answer	Marks
3(b)	<p><b>Two</b> from:</p> <p>A program that helps perform maintenance in a computer system  A program that performs a very specific task usually related to managing system resources  Operating systems can contain a number of utilities for managing files and storage devices</p> <p><b>Two</b> from:</p> <p>Examples are:</p> <p>anti-virus software to remove viruses  back-up software to make copies for future use  data compression utilities to reduce the storage size of a file  disk defragmentation utilities to remove non-contiguous spaces on a disk  disk formatting is preparing a data storage device for initial use  file-copying utilities for the creation of a new file which has the same content as an existing file  deleting files, which is removing a file from a computer's file system</p>	<b>4</b>

Question	Answer	Marks
4	<p><b>Four</b> from:</p> <p>Dynamic data refers to data that is changed ...  The data's state is never expected to be the same when re-input  Data on a news website is updated regularly/ as and when necessary/ automatically/often up to date  There is an unlimited amount of information in a news website ...  ... it can have information added to it when new facts come to light  May be considered by some to be unreliable as data may be not authentic/rumour/may not have been verified/there can be many contributors to a dynamic data source/website so the information can be inaccurate</p>	<b>4</b>

Question	Answer	Marks
5(a)	<p>!lf([Living_in]="own home","own",!lf([Living_in]="landlord","rented","other"))</p> <p>,!lf( after "own" – 1 mark  [Living_in]= – 1 mark  "landlord" – 1 mark  ,"rented" – 1 mark  ,"other") comes immediately after "rented" – 1 mark  Second closed bracket added at end of statement – 1 mark</p>	<b>6</b>

Question	Answer	Marks
5(b)	<p><b>Five</b> from:</p> <p>Go to query design            Load/Select the table            Select the fields, Second_name, Name1, Living_in            In fourth column, in field row/ type the query expression            Replace Expr1 with Status            Make sure all fields have the Show option ticked            Save the query            Run the query</p>	<b>5</b>

Question	Answer	Marks
6(a)	<p><b>Four</b> from:</p> <p>A mental model is based on belief not facts            It is a form of internal symbol or representation of external reality            It is a model of what users know/think they know about a system            It is a representation of what the user would want/expect in an interface            Users create mental models very quickly, often before they even use the software or device            Users' mental models come from their prior experience with similar software or devices/user interfaces            A conceptual model is the actual model that is given to the user through the interface of the product            A description of why a mental model is important</p>	<b>4</b>
6(b)	<p><b>Five</b> from:</p> <p>How colour is to be used, which colour combination is most suitable/which colours would make it easier to read            The layout of the screen, such as positioning of elements to emphasise importance/positioning of elements to ensure readability/layout needs to look organised/grouping of similar items            Increase of font size to emphasise the importance of certain elements/to ensure readability of information/reduction in font size to conserve space/ to suit the age of the audience            Only display information the user needs to perform the current operation/limiting the information to that necessary for the user            Which controls will be required/ buttons, checkboxes, radio buttons, dropdown lists, list boxes, toggles, date field (at least two)            Which navigational aids will be required such as breadcrumb, forward/backward buttons, end of file button (at least two)</p>	<b>5</b>

Question	Answer	Marks
7	<p><b>Eight from:</b></p> <p><b>Benefits</b>  Both groups of doctors will not waste time travelling to a conference/meeting with each other  Both groups of doctors will save expense of travelling to a conference/meeting with each other  All doctors will save time by not staying overnight  Doctors less likely to be fatigued if they have not had to travel long distances so able to perform better at the meeting  Saves doctors time printing out large amounts of documents  Doctors are less likely to misplace documents ...  ... as electronic documents can be viewed online  It is safer as accidents can happen on the roads  Meetings can be called at short notice saving doctors time in preparation for a meeting  It is more environmentally friendly as less car movement is needed  It makes it easier for the doctors who do not work in the hospital to liaise when necessary/allows hospital doctors to share new treatments with other doctors  Hospital doctors can demonstrate procedures/treatments to other doctors</p> <p><b>Drawbacks</b>  Confidential documents may need to be seen in their original form by both sets of doctors  There can be poor quality of the video because of bandwidth problems  Lack of bandwidth can lead to problems with time lag  Not all countries have sufficient bandwidth to support video conferencing  Interruption to, or breakdowns of, the transmission can occur  Power cuts/outages are common in some countries, leading to breakdown of transmission  Both sets of doctors may be concerned that hackers may attempt to hack into the video conference  Hackers could gain access to patient details  Some video conferences do not have a password/you can just dial into a video conference so hackers could gain access easily  Difficult to allow doctors to answer in turn  Might be difficult to see all doctors to see who is contributing  Doctors may be put off by the camera, as many people are self-conscious when being videoed  Doctors away from the hospital may incur costs due to obtaining video conferencing equipment</p> <p>At least two of each are required to obtain full marks  There must be a proper evaluation to obtain full marks</p>	8

Question	Answer	Marks
8	<p><b>Eight</b> from:</p> <p>A flat file database consists of a single table  A flat file database can contain many fields, often with duplicate data  When data is merged between two flat files relevant data needs to be copied and pasted from one file to the other  If there are two or more flat files containing the same fields, if data in one is changed the other has to be manually modified  Designing flat file databases is simple and requires little design knowledge  Designing a relational database takes more planning than flat file databases  With flat files information can be added as necessary  A relational database incorporates a number of tables with methods for the tables to work together  Building a relational database is dependent upon the ability to establish a relational model ...  ... which must fully describe how the data is organised, in terms of data structure, integrity, querying, manipulation and storage  Relational databases allow defining of certain record fields as keys to perform search queries, join table records and establish integrity constraints  Table records can be easily joined by the indexed values  Integrity constraints can be established to ensure that table relationships are valid.</p>	8

Question	Answer	Marks
9	<p><b>Five</b> from:</p> <p>A peer-to-peer network can consist of two or more PCs connected and sharing resources ...  ... without going through a separate server computer  It can also be a permanent infrastructure that links a half-dozen computers in a small office over copper wires  It can be a network on a much larger scale in which special protocols and applications set up direct relationships among users over the Internet  Each peer computer has equal privileges with each other  Peer computers allow a portion of their resources to be directly available to other peer computers ...  ... such as processing power, disk storage or network bandwidth.</p>	5

Question	Answer	Marks
10(a)	<p><b>Three</b> from:</p> <p>Forward chaining starts with the available data and uses inference rules to extract more data ... ... until a goal is reached An inference engine using forward chaining searches the inference rules until it finds one where the IF statement is known to be true When such a rule is found, the inference engine uses the 'Then' part to cause the addition of new information Inference engines will iterate through this process until a goal is reached Because the data entered determines which rules are selected and used, this method is called data-driven</p>	<b>3</b>
10(b)	<p><b>Three</b> from:</p> <p>Backward chaining starts with a list of goals/hypotheses and works backwards An inference engine using backward chaining would search the inference rules until it finds one which has a THEN part that matches a desired goal If the IF part of that rule is known to be true, then it is added to the list of goals Because the list of goals determines which rules are selected and used, this method is called goal-driven</p>	<b>3</b>

Question	Answer	Marks
11(a)	<p>=COUNTIFS(\$M\$3:\$M\$20,\$A3,\$L\$3:\$L\$20,1)</p> <p>=COUNTIFS() – 2 marks (COUNTIF – 1 mark) (\$M\$3:\$M\$20 – 1 mark , \$A3 – 1 mark , \$L\$3:\$L\$20 – 1 mark , 1) – 1 mark</p> <p>or</p> <p>=COUNTIFS(\$L\$3:\$L\$20,1,\$M\$3:\$M\$20,\$A3)</p> <p>=COUNTIFS() – 2 marks (COUNTIF – 1 mark) (\$L\$3:\$L\$20 – 1 mark , 1 – 1 mark , \$M\$3:\$M\$20 – 1 mark , \$A3) – 1 mark</p> <p>\$ signs before <u>letters</u> are optional</p>	<b>6</b>
11(b)	<p>=VALUE(LEFT(I3,3))/O3</p> <p>=VALUE() – 1 mark (LEFT() – 1 mark I3, – 1 mark 3) – 1 mark /O3 – 1 mark</p> <p>All cell references must be relative but can have \$ in front of letters</p>	<b>5</b>

Question	Answer	Marks
11(c)	<b>Four</b> from: Highlight M3:M20 Click on data then on data validation Ensure Settings is highlighted and click on drop down menu under Allow Click on list then go to Source window Type in =\$A\$3:\$A\$10 / individual codes for countries separated by commas and click OK	<b>4</b>
11(d)	Highlight cells H3:Q20 ... ... Sort on column K ascending ... ... add a level and sort on Column I descending	<b>3</b>

Question	Answer	Marks
12	<p>To be marked as a level of response:</p> <p><b>Level 3 (7–8 marks)</b></p> <p>Candidates will describe the advantages and disadvantages of both types of software The issues raised will be justified. The information will be relevant, clear, organised and presented in a structured and coherent format. Specialist terms will be used accurately and appropriately</p> <p><b>Level 2 (4–6 marks)</b></p> <p>Candidates will describe the advantages and disadvantages of at least one type of software although development of some of the points will be limited For the most part the information will be relevant and presented in a structured and coherent format. Specialist terms will be used appropriately and for the most part correctly.</p> <p><b>Level 1 (1–3 marks)</b></p> <p>Candidates may only address one side of the argument, and give basic advantages/disadvantages Answers may be simplistic with little or no relevance. There will be little or no use of specialist terms.</p> <p><b>Level 0 (0 marks)</b></p> <p>Response with no valid content.</p> <p>Candidates may refer to e.g.</p> <p><b>Benefits of spreadsheets</b> The amount of learning required by the principal to use spreadsheets is not as much as that for databases ... ... it's easier to use spreadsheets and get solutions straight away Spreadsheets are easier to use to store student data/perform numerical calculations on exam scores/format cells/adjust layouts to generate output and reports Easier to create complex formulae such as exam scores per teaching group in spreadsheets Easier to use functions to calculate average exam scores in spreadsheets Repeated data such as names or classes can be easier to enter using spreadsheet software Charts to show student progress are easier to produce using spreadsheets</p> <p><b>Drawbacks of spreadsheets</b> As work gets more complex, such as an increase in the number of students, spreadsheets become more difficult to change and manage Spreadsheets are good for creating one-time analysis such as exam scores for one year, but become problematic as the data grows and evolves over time As new rows and columns are added for extra scores and students, ranges and formulas may need to be modified or new ones created</p>	8

Question	Answer	Marks
12	<p>Benefits of databases</p> <p>Data structure and normalisation are available through multiple tables</p> <p>Data and referential integrity is inbuilt</p> <p>Queries and reports on student progress/exam score trends are easier to create with databases</p> <p>Drawbacks of databases</p> <p>They take more skill and training for the principal to use well</p> <p>Structuring the information so it's easy to edit, query, view, and report can be difficult for the principal (if normalisation is employed)</p> <p>Creating a database is more complicated for the principal than just entering data in the cells of a spreadsheet</p> <p>It is not as easy to copy and paste blocks of data</p> <p>A hybrid solution where data from a database is exported or copied to a spreadsheet is often the best solution</p>	