Cambridge International AS & A Level

Cambridge Assessment International Education
Cambridge International Advanced Subsidiary and Advanced Level

INFORMATION TECHNOLOGY **9626/12**

Paper 1 Theory **May/June 2018**

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.

Cambridge International is publishing the mark schemes for the May/June 2018 series for most Cambridge IGCSE™, Cambridge International A and AS Level and Cambridge Pre-U components, and some Cambridge O Level components.

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	Dynamic data is data that does not change.		**4**
	Data that is read from and not written back to a file is called static data.	✓	
	Data stored on a CD ROM is an example of dynamic data.		
	Data on a webpage that is updated from time to time is an example of dynamic data.	✓	
	It is very difficult to add information to a static information source after it has been created.	✓	
	There is a limited amount of information in a dynamic information source compared to a static one.		
	Dynamic information sources are never checked for accuracy.		
	A static information source can have information updated quickly.		
	The data in a static data source is always up to date.		
	There can be many contributors to a dynamic data source so the information can be inaccurate.	✓	

Question	Answer	Marks
2		**4**

Compilers and linkers are examples of system software.	✓
Device drivers and interpreters are examples of application software.	
Word processing and spreadsheets are examples of hardware.	
Software is another name for computer programs.	✓
Software is written in machine code before being converted to high-level language.	
Viruses are a type of software.	✓
Malicious bots are a type of hardware.	
System software directly operates the computer hardware.	✓
Operating systems are types of hardware.	
A mouse and keyboard are the basic software components of a computer.	

Question	Answer	Marks
3	**Six** *from*: Verification is checking that data that has been/is being entered into a computer has been copied correctly from the data source Validation is checking that the data entered is reasonable/sensible Neither method checks that data is accurate/correct Although verification helps to stop users from making mistakes when entering data it cannot check that the data was originally correct Validation is needed because although the data might be copied correctly, the original data might be invalid The date of birth might be in the form dd/mm/yyyy and the data might have been correctly copied as 1994/12/31 but this is not in the correct format… …a format check would have picked this up Common errors when copying data are transcription and transposition errors Verification would pick up a transposition error but most validation checks (except a check digit) would not Verification would pick up transcription errors but validation might not.	**6**

Question	Answer	Marks
4(a)	**Two** *from*: Scans the computer to make sure it is not infected with a virus/to find viruses Compares with existing viruses/detects changes in behaviour of files It may quarantine the infected programs It will ask the user whether or not they want to delete the infected programs (Does background scans of downloads and attachments for viruses) and informs the user if anything found.	**2**
4(b)	**Two** *from*: Creates (additional exact) copies of files, databases hard disks or network servers Use these copies to restore the original contents in the event of data loss Asks user to enter type of backup Asks if you wish to restore the backup Asks if you wish to verify the backup Asks when backup is to take place/frequency of backups.	**2**
4(c)	**Two** *from*: Rearranging files stored on a disk Causes data to occupy contiguous storage locations Physically organises the contents of the mass storage device used to store files Organises data into the smallest number of contiguous regions (fragments) Attempts to create larger regions of free space.	**2**

Question	Answer	Marks
5	**Three** matched pairs *from*: Induction loop When a vehicle goes over it sends a signal to the computer that a vehicle has passed Sound sensor In kerb stones constantly feeding back to computer sound level – if noise above preset value computer registers that a vehicle has passed (Video/Digital) camera Above traffic lights and registers car approaching and sends a signal to the computer Push buttons When a pedestrian presses the button, a signal goes to computer to register pedestrian is waiting to cross.	**6**

Question	Answer	Marks
6	**Six** *from*: It can be accessed via the internet It is accessed using web browsing software It was invented by (English scientist) Tim Berners-Lee (in 1989) HyperText Markup Language (HTML) is the markup (formatting) language for the world wide web Web pages are primarily text documents formatted and annotated using Hypertext Markup Language (HTML) Uses Uniform Resource Locator (URL) (an address that is unique and used to identify each resource on the world wide web) Uses Hypertext Transfer Protocol (HTTP) allowing for the retrieval of linked resources from across the world wide web Uses HTTPS to provide secure websites (In addition to formatted text,) web pages may contain images, video, and software components Hyperlinks allow users to navigate between web pages Comprises websites made up of a number of web pages (with a common theme) Is basically a system of web servers (that support specially formatted documents).	**6**

Question	Answer	Marks
7	**Max five** *from*: **Three** *from*: Uses several one-to-many relationships Uses a tree structure Links a number of records to one owner or parent primary record It is not a versatile system It is limited by using only one type of relationship (so is confined to some very specific uses) **Three** *from*: The department can be used as a parent record The individual employees will represent secondary/child records Each child record links back to one parent record in a hierarchical structure Each director can be used as a parent record The individual departments will represent secondary/child records The managing director can be used as a parent record The individual directors will represent secondary/child records Most types of business databases today use more flexible models to accommodate more sophisticated types of data management.	**5**

Question	Answer	Marks
8(a)	**Six** *from*: It looks for the discount code in cells C3:D5/for each animal Looks for an exact match It reads the percentage discount from cells D3:D5, corresponding to the discount code Multiplies the percentage discount by the Price and subtracts from the original price The values in the lookup range/discount code must remain constant When the formula in cell E8 is replicated the range C3:D5 requires absolute cell referencing If relative referencing were used for cells C3:D5 the formula in cell E9 would contain C4:D6 This would produce an error as discount code A cannot be found in the range C4:D6 The lookup value cell reference (accept example) must increment for each successive row The Price cell reference (accept example) must increment for each successive row When the formula in cell E8 is replicated C8 (and) D8 need to increment to (C9, D9) which requires relative cell referencing.	**6**
8(b)	Highlight E8:E13/cells containing discounted price – 1 mark Select/use conditional formatting – 1 mark Manage rule/create rule if >40 format colour blue – 1 mark Add rule if between 30 and 40 format colour green – 1 mark Add rule if <30 format colour yellow – 1 mark	**5**
8(c)	Pie chart – 1 mark Select A8:A13 and using ctrl key select G8:G13 – 1 mark Go to Insert chart – 1 mark Select pie chart – 1 mark	**4**

Question	Answer	Marks
9	**Six** *from*: A rules base is a set of rules which an inference engine uses The inference engine uses the data or facts in the knowledge base, to reason through the symptoms Inference engine is able to find possible diagnoses by using a form of reasoning The reasoning involves forward chaining, backward chaining or a combination of both User interface asks questions (about illness) Patient/doctor type in answers/types in symptoms to the user interface Inference engine compares symptoms to those in the knowledge base Inference engine uses the rules base of IF…THEN… rules/comparisons/ rules base consists of IF…THEN rules Knowledge base editor enables the knowledge engineer to edit rules/and facts (within the knowledge base) Description of forward chaining Description of backward chaining Possible/suggested diagnoses are output to user interface Explanation system produces reasons for suggestions Reasons for suggestions output using the user interface.	**6**

Question	Answer	Marks
10(a)	Title  Customers second names beginning with query  Price of car query  Customers form  All cars in stock report  Price less than $20 000 report Appropriate title – 1 mark Appropriate spacing – 1 mark 5 consistent buttons with appropriate labels – 1 mark Exit button – 1 mark	**4**

Question	Answer	Marks
10(b)	**Four** *from*: *Allow follow through from* ***10(a)*** *C*ustomers *second names beginning with query* – allow you to enter one letter and all names beginning with that letter displayed *Price of car query* – allow you to enter a price/range of prices and all cars of that price/range will be displayed *Customers form* – opens a form showing customer details/allows you to edit data/add new customer record using form entry *All cars in stock report* – will give you a printout/display in report form of all cars in the showroom *Price less than $20 000 report* – will give you a printout/display in report form of all cars lower than $20 000 in price Exit button – will close the switchboard/application.	**4**
10(c)	**Eight** *from*: Select create Select query design Add all tables into query design window In first column of query select from Cars table (from drop down list) and choose Make (from drop down list) In second column select Cars table (from drop down list) and choose Model (from drop down list) In next column select Customers table (from drop down list) and choose first name (from drop down list) In fourth column select Customers table (from drop down list) and choose second name from (drop down list) In next column select Orders table (from drop down list) and choose Order_No (from drop down list) In first column next to criteria type in (Like) Frod In fourth column in the Or row In the 4th column type in (Like) B* Save the query.	**8**

Question	Answer	Marks
11	To be marked as a level of response: **Level 3 (7–8 marks)** Candidates will describe the benefits and drawbacks of monitoring for both employer and employee. 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. **Level 2 (4–6 marks)** Candidates will describe the benefits and drawbacks of monitoring for both employer and employee although development of some of the points will be limited to employer/employee. 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. **Level 1 (1–3 marks)** Candidates may only address one side of the argument, and give basic benefits/drawbacks. Answers may be simplistic with little or no relevance. There will be little or no use of specialist terms. **Level 0 (0 marks)** Response with no valid content.	**8**

Question	Answer	Marks
11	Candidates may refer to e.g.: Employer benefits: Employers can keep track of the amount of time an employee spends away from the computer or idle time at the terminal Video monitoring can deter theft thus maintaining security Video monitoring can monitor employee productivity/work is up to standard/employees are working efficiently Provides an opportunity to watch for mistakes and errors throughout the workday to help an employee cut down on his mistakes in the future by pointing out ways he can improve Use Global Positioning Systems (GPS) devices to track employees in employer-owned vehicles If employees understand that the monitoring system is not being used solely to point out weaknesses, they may become more accepting of being monitored Can have video monitoring to catch all safety issues and so able to bring safety issues to the forefront Catching blatant disregard for safety on video may also save employer from potential lawsuits Can catch those who willingly violate company policy and immediately employ disciplinary action Can increase productivity if employees know they are being monitored Software can also be used to monitor or track employee activity and productivity... ...ensuring data is secure by using the software to block certain websites With a GPS device, dispatchers can give drivers very specific driving directions to a location saving time and money for fuel If dispatchers know where every van is they can dispatch the one closest to a particular job By tracking which drivers are exceeding the speed limit companies can educate those drivers about the result of speeding, and discipline them as necessary Vehicle fleet managers can also improve efficiency by tracking and eliminating employees' unauthorised breaks	

Question	Answer	Marks
11	Employer drawbacks: Software is expensive to purchase System is expensive to set up Can lend itself to lawsuits for infringement of privacy Can make employees resentful (and less productive) of infringement of privacy Mistrust of their employer leads some workers to leave and thus creates increased turnover of employees Employee benefits: A company may also use video monitoring in a parking garage as a security measure for employee safety Provides employer with detailed snapshots of how an employee is going above and beyond the call of duty and can acknowledge employee excellence Employee drawbacks: Most computer monitoring equipment allows employers to monitor without the employees' knowledge... ...although some employers do notify employees that monitoring takes place Messages sent within the company as well as those that are sent to another company or from another company to employee can be subject to monitoring by employer.	

Question	Answer	Marks
12	**Eight** *from*: Benefits: Calculations can be performed more quickly/more easily/recalculated automatically What if statements can be asked without rebuilding a model from scratch each time the test is carried out Models provide quick answers to events that may take months to actually happen Graphs that are produced to help understand the result will automatically change (as new values are added/old values altered) Graphs can be produced automatically/more quickly/no manual method required They provide consistent results/not affected by user's inconsistent decisions There are templates for regularly used spreadsheet models Spreadsheets can also interact with databases Data can automatically be imported (from a database) into a spreadsheet Data can be entered more accurately because of computer-based validation and verification Drawbacks: You cannot account for every possible variable in a financial model Banks cannot model exactly how much money they think people will save or borrow There is no way of predicting the effect that financial crises will have on real life behaviour Many variables need to be considered and it is easy to omit some Some situations will need purpose-built software/technical expertise which is expensive to buy.	**8**