

Cambridge International AS & A Level

INFORMATION TECHNOLOGY**9626/12**

Paper 1 Theory

October/November 2024

MARK SCHEME

Maximum Mark: 70

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 **9** printed pages.

Generic Marking Principles

These general marking principles must be applied by all examiners when marking candidate answers. They should be applied alongside the specific content of the mark scheme or generic level descriptions 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)	<p>THREE from:</p> <ul style="list-style-type: none"> • Structure defines levels of access to records/data (1) • Uses <u>one-to-many</u> relationships (1) • Uses a structure (1) • Links are based on dependencies (1) • Links a number of records to one owner/parent (1) • The system is inflexible (1) • It is limited by using only one type of relationship (1st) so is confined to some very specific uses. (1) 	3
1(b)	<p>THREE from:</p> <ul style="list-style-type: none"> • Records would be stored in a fixed/structured format (1st) that allows different levels of access (1) <p>Up to TWO marks for examples (must be specific examples from the example)</p> <p>e.g.</p> <ul style="list-style-type: none"> • The managing director can see/access all records/departments (1) • One director can ONLY see/access Department A and Department B (1) <p>Up to THREE marks:</p> <ul style="list-style-type: none"> • The managing director can only be a parent record (1) • A worker can be a child record (1) • A director/department can be both a parent and a child record (1) 	3

Question	Answer	Marks
2(a)	<p>ONE from:</p> <ul style="list-style-type: none"> • New information is of a higher quality (accept converse argument) (any awareness shown) (1) <p>ONE from:</p> <ul style="list-style-type: none"> • Up-to date information leads to better decisions (1) • Out of date information leads to poor decisions (1) • Any relevant example used to exemplify out of date information. (1) 	2
2(b)	<p>THREE from:</p> <p>Max TWO from:</p> <ul style="list-style-type: none"> • Information needs to be relevant to the reason why/purpose it has been collected//must meet user needs (1) • Relevant information is good (1) • Irrelevant information is not useful (1) <p>Max TWO from:</p> <ul style="list-style-type: none"> • Irrelevant information leads to poor decisions/Relevant information leads to good decisions (1) • Wastes time as has to be sifted (1) • Irrelevant information can distract from the correct analysis (1) • Any relevant example used to exemplify irrelevance. (1) 	3

Question	Answer	Marks
3	<p>EIGHT marks available:</p> <p>Identification of control technology (1st mark) (Max FOUR) e.g.</p> <ul style="list-style-type: none"> • (Smart) traffic lights (1st) • Smart/reactive motorways (1st) • Pedestrian/user controlled lights (1st) • Pollution speed limits (1st) • Lane speed/closure displays/reactions (1st) <p>Evaluation of (2nd mark) (Max SIX) e.g.</p> <p>(Smart) traffic lights</p> <ul style="list-style-type: none"> • Fewer traffic jams (than preset controlled) (1) • Reduces waiting time (1) • Reduces accidents (1) • Drivers more likely to respect the lights (1) • Cost advantage/disadvantage (1) • Dependant on camera (1st) To track traffic (1) That may not be working (1) • Requires maintenance/recalibration (1) • Requires power/will not work if there is a power outage (1) <p>Pedestrian controlled lights</p> <p>e.g.</p> <ul style="list-style-type: none"> • Traffic flow only interrupted when a pedestrian requests to cross (1) • Smoother traffic flow (1) • Reduces accidents (1) • Fake pushes still stop traffic/no guarantee that anyone actually wants to cross the road (1) <p>Conclusion</p> <ul style="list-style-type: none"> • Overall, conclusive/evaluative statement about control technologies (1) 	8

Question	Answer	Marks
4	<p>Example solution:</p> <pre> graph TD START([START]) --> INPUT1[/INPUT Num/] INPUT1 --> SETMAX[SET MAX to Num] SETMAX --> SETTOTAL[Set Total to Num] SETTOTAL --> SETCOUNT[Set Count to 1] SETCOUNT --> COUNT21{Is Count = 21?} COUNT21 -- NO --> COUNTINC[Count ← Count + 1] COUNTINC --> TOTALSUM[Set Total to Total + Num] TOTALSUM --> MAXUPDATE{Is Num > MAX?} MAXUPDATE -- NO --> COUNT21 MAXUPDATE -- YES --> SETMAX2[Set MAX to Num] COUNT21 -- YES --> OUTPUT[/Output MAX, Avg/] OUTPUT --> END([END]) </pre> <p>SEVEN marks available:</p> <ol style="list-style-type: none"> 1 Start and End (accept STOP) terminators (1) 2 TWO Correctly drawn decision boxes with YES/NO decisions (1) 3 All YES/NO decisions (used) go to correct outcomes (i.e. all logic is correct) (1) 4 Input box and output box are both parallelograms (1) 5 Process box(es) are rectangles (1) 6 Two variables (e.g. MAX, COUNT, TOTAL, NUM) initialised/set to zero before loop (1) 7 Input value from user (attempt at) (1) 8 Total set to first input value (1) 9 Inputs limited to 20 values (attempt at use of logic to find) (1) 10 Sum all values input (1) 11 Set new MAX when input value > MAX in loop 12 Increment COUNT (1) 13 Correctly calculate average (must include process/calculation) (1) 14 Output MAX and average (1) (This may happen anywhere, but if in loop, must be after any new number is added). 	7

Question	Answer	Marks
5	<p>SIX from:</p> <ul style="list-style-type: none"> • Highly educated people are often employed in jobs that offer exposure to IT (1) • Highly educated people will often undertake IT training as part of their education//have IT skills as a result of their education (1) • Highly educated people are often aware of IT/importance of IT/benefits of IT/possibilities of IT (1) • Highly educated people have more access to the higher paid jobs (1st) therefore can afford/access the (e.g.) higher speed internet/most up to date IT equipment (1) (accept converse argument) • People with lower levels of education often work longer hours, therefore have less time to access IT (1) • Lower educated people are less like to invest in IT (1) 	6

Question	Answer	Marks
6	<p>SIX marks available e.g.</p> <ul style="list-style-type: none"> • Computer is used to create the rules behind a simulation (1st) so that the simulation matches the real world (1) • Easier to try out a range of different scenarios//allows what-if analysis (1) • It is less costly than if a mistake is made in real life/it is costly to remedy mistakes (1) • More difficult to construct several designs in real life (1) • Can be used to check on/make predictions for complicated scenarios/scenarios with a lot of variables (1) • Can observe aspects that would be difficult to observe in real life (1) • Can save time (1st) more tests can be done in a shorter amount of time (1) a much greater number of tests can be performed (1) • Simulation modelling can be used to plan for infrequent/one off events (1) • Computer models are much safer than experimenting in real life (1) • Faster, can speed up variables that would impact on results e.g. climate change (1) 	6

Question	Answer	Marks
7	<p>FOUR marks available:</p> <ul style="list-style-type: none"> • Definition of personal information. – Personal information is any item of information that can make the process of identifying you easier. (1) • General statement about access to personal information being used for an illicit purpose (e.g., “it can cause identity theft/theft from bank/blackmail”) (1) • General statement about legal requirement for personal information to be kept confidential (1) <p>ONE mark per identified negative impact from an identified breach of confidentiality</p> <p>e.g.</p> <ul style="list-style-type: none"> • Identity theft because of leak of (e.g.) home address and name (1) • Unauthorised withdrawals/transfers after leak of (e.g.,) bank account number and PIN (1) • Future/current job affected because shared (e.g.) political affiliation (1) 	4

Question	Answer			Marks
8(a)	Field Name	Data Type	Example of Data	5
	Number_in_Stock	Integer (1)	199	
	Location	String/alphanumeric/text (1)	07.44.03	
	Reorder_Level	Integer (1)	250	
	Price	Currency (1)	\$203.50	
	Supplier_Telephone_No.	String/alphanumeric/text(1)	07700900819	

Question	Answer	Marks
8(b)	<p>SIX from:</p> <p>Three matched pairs:</p> <ul style="list-style-type: none"> • Number_in_Stock – Type check (1st) must be numeric (1) • Number_in_Stock – Range check (1st) between 0 and 250 (1) • Price – Limit check (1st) must be more than zero (1) • Price – Type check (1st) must be numeric/currency (1) • Location – Format check (1st) Must be three pairs of digits separated by a full stop/NN.NN.NN (1) • Location – Length check (1st) must be 8 characters (1) • Reorder_Level – Type check (1st) must be numeric (1) • Supplier_Telephone_No – Length check (1st) must be 11 characters/digits (1). 	6
8(c)	<p>FIVE from:</p> <ul style="list-style-type: none"> • Any awareness of normalising data (1) • Import the (two) tables into the relational database structure (1st) as separate tables (1) • Create/use a linking table (1) • Create/use/it needs Primary Keys for both/all tables (1) • Create/use/it needs Foreign Keys. (1st) These are needed to act as the link field between the tables (only award if BOTH of the previous two answers has been given) (1) • In the linking table (1) • Link the Primary Key(s) to the Foreign Key(s) (1) • Any awareness of one-to-many relationships (1) 	5

Question	Answer	Marks
9	<p>EIGHT from:</p> <ul style="list-style-type: none"> • This method gathers direct data, which is more up to date (1) <p>Benefits max 6:</p> <ul style="list-style-type: none"> • There is no significant time delay between question and answer (1) • Reporter can more easily ask extension questions based on answers (1st) that can add to the verbal answer from the interviewee (1) • People from (e.g.) all over the country (any awareness of wide location between two parties) can be interviewed (1) • Enables interviewers/reporters to contact people in restricted/remote areas (1) • No need to travel/no travel costs for reporter (1) • No time wasted/used by reporter in travelling to interview (1) • Interview can easily be recorded for later transcription/reference (1) <p>Drawbacks max 6:</p> <ul style="list-style-type: none"> • The reduction of social cues/cannot see interviewee (1st) so e.g. body language/eye contact cannot be used as a source of extra information (1) • The interviewer/reporter has no knowledge of the situation in which the interviewee is situated (1st) so less able to create a good interview ambience (1) • Telephone line/mobile signal quality can affect responses/interview (1) • Easier for interviewee to find excuse/make up excuse/find reasons to terminate the interview (1) • Can only interview one person at a time (1) • Interviewee may not pick up the phone (1) • Sample is restricted to those people who have a telephone (1) • No way to visually verify who you are interviewing (1) 	8

Question	Answer	Marks
10	<p>FOUR from:</p> <ul style="list-style-type: none"> • Contains the knowledge of many experts/zooologists/scientists (1) • Produce results quicker//reduces time taken to produce results (1) • No need to carry/have access to paper records/ information/ reference books/remember a great deal of information (1) • Outcome is consistent (1) • Fewer errors in identification of animal species (1) • Can enhance scientist's/zooologist's own knowledge (1) • Provide permanent record of identification of animal (1) • No need to check with other experts/zooologists/scientists if in doubt over findings. (1) • Expert systems provide justifications/explanations for decisions (1) 	4