OCR
RECOGNISING ACHIEVEMENT

GCE

Computing

Advanced Subsidiary GCE

Unit **F451:** Computer Fundamentals

Mark Scheme for June 2013

Oxford Cambridge and RSA Examinations

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This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by examiners. It does not indicate the details of the discussions which took place at an examiners' meeting before marking commenced.

All examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the report on the examination.

OCR will not enter into any discussion or correspondence in connection with this mark scheme.

Annotations

Annotation	Meaning
^	Omission mark
BOD	Benefit of doubt
C	Subordinate clause/Consequential error
Cross	Cross
E	Expansion of a point
FT	Follow through
NAQ	Not answered question
NBOD	Benefit of doubt not given
P	Point being made
REP	Repeat
/	Slash
Tick	Tick
TV	Too vague
ZERO	Zero (big)

Question			Answer	Marks	Guidance
1	(a)	(i)	The following are example answers. Any device should be accepted if the purpose is reasonable in the context of a payroll system • Keyboard/card scanner/… • To allow the operator to input changes to particular workers' circumstances/to allow workers to log in and log off from work/…	2	Only give device if reason is acceptable
		(ii)	• Printer/monitor/… • To print the pay slips for the workers/to allow the workers to check that their card has been correctly scanned/…	2	Only give device if reason is acceptable
		(iii)	• Hard drive/DVD writer/… • To store the personnel records/to take a copy of the files for use as backup/…	2	Give one mark for named device even if none given for reason Accept either description of data or size of data
	(b)	(i)	• In a batch operating system the data is collected first/then processed together • In a real time operating system the data is processed immediately.	2	
		(ii)	The following are example answers and any reasonable example from a payroll system should be accepted. • The production of the payslips • The pay cannot be calculated for a worker until all the data from that week has been collected/all done at same time/weekly/all need same processing	2	
		(iii)	• Dealing with an enquiry from a single worker about previous pay • The worker requires the information immediately.	2	

Question			Answer	Marks	Guidance
	(c)	(i)	• Contains data no longer in use in case it is needed again, or… • …contains a snapshot of the data at a particular time in case it is needed for auditing • Frees up space on the storage of the system • Stored in a secure location/away from the computer system • E.g. Sales file may be archived as sales that have been dealt with are not active but may be needed for tax purposes • E.g. Customer file may be archived to allow for marketing even to lapsed customers. (1 per bullet, max 3)	3	Watch for description of back-up Not a copy of a file
		(ii)	• Backups taken every day/hour • because frequently changing • Backup files stored on removable storage/CDRW/memory stick • so that it can be stored away from the master file • Backup stored away from main system • so that it is not affected by the same conditions that the master file may suffer • Transaction file kept • to ensure that master file can be recovered completely from the backup version. (1 per bullet, max 6)	6	Marks for incremental back-up… …just backing up the changes from the day Accept tape/cloud Nothing for a description of an ancestral filing system although other marks may be earned. Accept 'Mirrored hard disks' for a mark Accept RAID, but not RAID0

Question			Answer	Marks	Guidance
	(d)		• Customer has the right to see the data and to ask for it to be corrected if wrong so that they are not responsible for incorrect data • Data must be lawfully collected so that customer rights are not flouted • Data can only be accessed by/changed by authorised people so that malicious alterations are not made • Authorised people must be notified to the DPR so that they are accountable • Data is only used for the specified purpose so that junk mail is not encouraged • Data collected should not be excessive so that irrelevant data is not stored • Data should be accurate and up to date so that customers are not held responsible for goods they have not bought • Data should not be kept longer than necessary so that customers can leave an organisation • Data should be protected by adequate security measures so that people with malicious intent cannot gain access • Data should not be transferred out of the EU so that data remains subject to DPA. (1 per bullet, max 7)	7	Not just 'Cannot pass on or sell data' Accept Access to DPR if not satisfied with responses from company
	(e)	(i)	eg • DTP/to produce leaflets, posters,… • Presentation software/to design and show slideshows to audiences • Database/to store details of customers. • Spreadsheet to store customer records (2 per bullet, max 2 bullets, max 4)	4	
		(ii)	eg • Spreadsheet/to store accounts of individual customers • Word processing/to send letters to customers about the state of their accounts • Database/to store details of customer accounts. (2 per bullet, max 2 bullets, max 4)	4	

Question			Answer	Marks	Guidance
2	(a)	(i)	• 00100011.	1 cao	
		(ii)	• 10100101.	1 cao	
	(b)	(i)	• 11001000. (allow ft from (a))	1	
		(ii)	• Two types of data in same binary value… • …which must be treated differently • Makes arithmetic algorithms very complex • Extending from 1 byte to 2 bytes is very difficult. (1 per bullet, max 3)	3	1 mark available for clearly realising that the problem is caused by having one bit for the sign
	(c)	(i)	• The characters that are recognised by the computer • Each character is represented by a unique binary number • Often matches the characters available on a keyboard/accept reasonable description of data (1 per bullet, max 2)	2	'…unique ASCII code…' is worth nothing for ASCII but one mark for unique code.
		(ii)	• UNICODE is a coding system that assigns a unique code… • …to all the possible symbols available throughout the world • All symbols in different languages/platforms/programs have unique codes • Continues to grow as it is not a fixed size set, currently over 100000 symbols represented. (1 per bullet, max 2)	2	Not 'Used by a computer…' Accept Unicode uses 16/32 bits
3	(a)		• A copy of the received data… • …is transmitted back to sender • The data is then compared with that which was sent • If an error is found then the (entire block of) data is retransmitted. (1 per bullet, max 3)	3	

Question			Answer	Marks	Guidance
	(b)	(i)	1 0 0 1 0 0 1 1 0 1 0 1 0 0 1 1 0 1 1 0 1 1 0 0 1 0 1 0 0 1 0 0 1 0 1 0 0 1 0 1 0 1 0 1 0 1 0 1 1 0 1 0 1 0 1 0 0 1 0 1 0 1 1 0 Parity Byte	1	
		(ii)	• Even parity has been used because all but one byte has an even number of ones • Fourth byte has an odd number of ones • Sixth column has an odd number of ones • Bit in position 4,6 is wrong. (1 per bullet, max 3)	3	
		(iii)	• There are four errors… • …at the corners of a rectangle within the block.	2	Give one mark for the concept of multiple errors cancelling each other out
4	(a)		• The stages are all presented in order • The stages need to be completed to produce a working system • At any stage in the cycle previous stages may need to be/can be revisited in order to improve the solution. (1 per bullet, max 2)	2	

Question			Answer	Marks	Guidance
	(b)		**Mark band 6–8. Higher level response** Candidate has described a full range of stages required in the design stage of the life cycle and has explained the use of prototyping as part of the process. There will be a logical order to the stages or they will be related to each other. Candidate has used appropriate technical terminology throughout. There are few if any spelling errors or errors of grammar. **Mark band 3–5. Medium level response** Candidate has described a number of stages required in the design stage of the life cycle and has outlined the use of prototyping as part of the process. There will be little attempt to produce a coherent structure, the items explained being presented as individual items not linked to each other. Candidate has used some appropriate technical terminology in the response. There may be spelling errors or errors of grammar in the response but they are not obtrusive. **Mark band 0–2. Low level response** Candidate has named and/or described/explained at least one stage in the design of a problem solution or has described a feature of prototyping that is appropriate. Candidate has failed to use appropriate technical terminology. There are likely to be spelling errors and/or errors of grammar, which will disrupt the flow of the response. Explanations to be made re the design may include: • Design of input screens/methods of input • Design of the output screens/hard copy outputs/other forms of output • Design of the data structures to be used to hold data • Design of the processing required to change the input data into acceptable output. • Data flow diagram/to show how data moves through the system including where it will come from, what processing is carried out and	8	

Question			Answer	Marks	Guidance
			where the results will go to including the storage of data as required • System flowchart/showing how the data will flow through the processes and the individual programs necessary to produce the desired results/specific types of hardware may be stated. • Other types of diagram may include mention of information flow diagram/Entity relationship diagram/a hierarchical structure diagram. Points to be made about the use of prototyping in the design stage include: • A simple version of the program produced to illustrate a feature of the software • Normally used to illustrate input and output screens • The screens are dummies in that they elicit no action • Used to show client/manager/future user the way that the system will look/allow issues to be spotted • To allow client/manager/future user to be part of the design process/to give feedback • May include a storyboard to show linking of screens • Used to research new ideas • Used to refine prototype/design. Higher level responses will include an awareness that the output is the requirement and that the other requirements that result from the analysis stage start from there. Points to be made include: • Data required is dependent on outputs required which in turn dictates the required input to the system • The processing required dictates the type of storage to be used and the data structures required • The form of the output will dictate the peripheral devices that are used.		

Question			Answer	Marks	Guidance
5		(i)	• Stores OS • Stores data (currently in use) • Stores software(currently in use)/boot program/operations/instructions. (1 per bullet, max 3. Do not award 3 marks if 'in use' not mentioned)	3	
		(ii)	• Carries out arithmetic operations/calculations • Carries out logical instructions/decisions • Acts as a conduit through which all I/O to computer is done/gateway to the processor. (1 per bullet, max 3)	3	
6	(a)	(i)	• Data is only transmitted in one direction.	1	
		(ii)	• Data can be transmitted in both directions but only one at a time.	1	
		(iii)	• Data is sent one bit at a time/down a single wire.	1	
		(iv)	• Multiple bits are transmitted simultaneously/down more than one wire.	1	

Question			Answer	Marks	Guidance
	(b)		• Cable/coaxial • …description/twisted pair/mention of interference to signal • Optical fibre • …transmits data using light beams/signal is free of interference • Infrared • …used to control robots/remote keyboards/needs uninterrupted line of sight • Microwave • …used by businesses to connect networks on different sites/line of sight necessary • Wireless • …used over short distances/not secure because anyone can tap in/subject to interference/signal blocked/frequency • Bluetooth • …wireless communication over very short distances. (2 per pair, max 3 pairs, max 6)	6	
7	(a)	(i)	• A signal (generated by a device (or by software))/instruction (not a program instruction)… • …which causes a break in the execution of the current routine.	2	
		(ii)	• An area of temporary storage (normally in a computer memory)… • …used to compensate for the different working speeds of the computer and the device/allow CPU to continue with another task	2	
	(b)	(i)	• Buffer is filled by the computer with job which needs to be done • Printer then downloads contents of buffer and carries out printing • This is necessary to allow the computer to continue with other work while the printer is occupied.	3	
		(ii)	• Operating system needs to know when the buffer has been emptied/filled… • …so that it can be refilled • The interrupt is sent from the buffer/accept printer to the computer requesting more data to be transferred.	3	(accept processor for OS) Give mark for ‘So that the printer does not run out of data’

Question			Answer	Marks	Guidance
8		(i)	• Reduces size of files • When work is sent electronically to college… • Videos will be compressed when downloaded and will need to be decompressed on arrival • To reduce the size of files for archiving purposes/reduce amount of storage taken up.	3	
		(ii)	• Ensures that the system remains virus free/identify viruses • Many files will be downloaded from Internet which need checking • Files which are sent from his system need to be virus free to stop them infecting other systems.	3	
		(iii)	• Automatically makes copy of files • To prevent loss of videos/course work • Protects important work by ensuring that copies made on different hardware/at regular intervals • Incremental backups used. (1 per first bullet plus two other indented bullets per dotty, max 3 per dotty, max 9)	3	

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