Cambridge International AS & A Level

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INFORMATION TECHNOLOGY **9626/32**

Paper 3 Advanced Theory **October/November 2017**

MARK SCHEME

Maximum Mark: 90

Published

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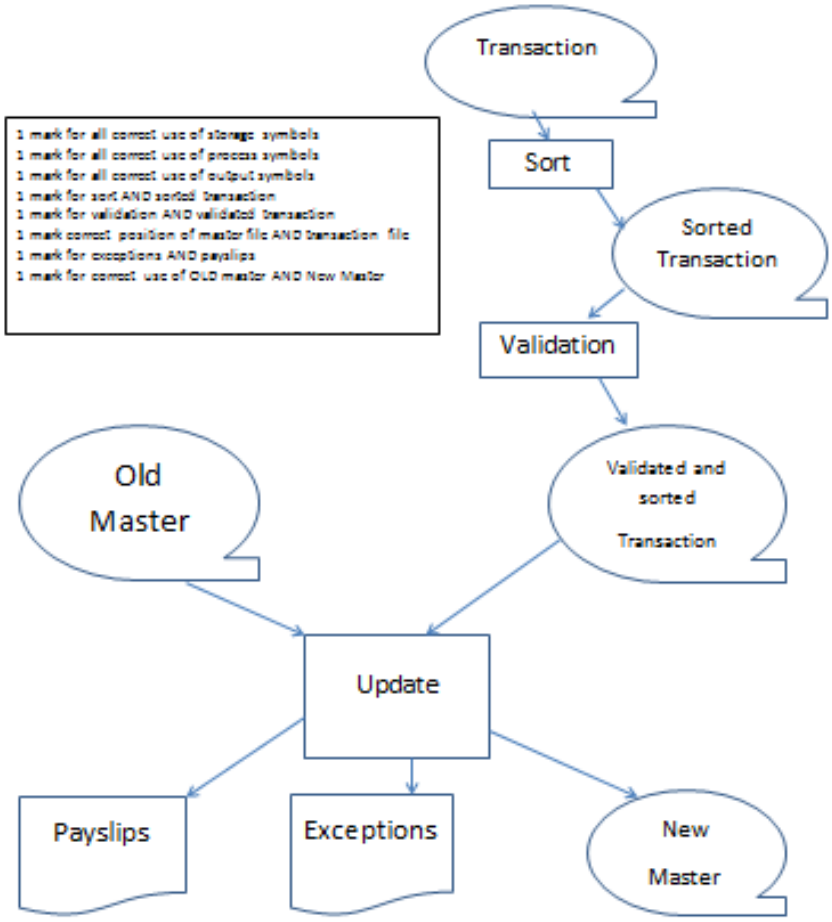
Question	Answer	Marks
1		**8**

Question	Answer	Marks
2	***Four*** *from:* Augmented reality is computer-generated supplement to real world …in real time ...reality is modified by/overlaid with artificial information ...used to e.g. project remote surgeons hands into real operation ...used to show (by means of handheld scanner) nurses/doctors Where arteries and veins are in body ...used to allow users/students to manipulate a skeletal model Which has augmented reality targets attached Virtual reality is computer-generated replacement of real world ...simulates physical presence in a real/virtual world ...used in 'exposure therapy' e.g. to overcome fears such as flying.	**4**

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Question	Answer	Marks
3	***Eight** from:* Create new canvas/image on which to compose the final image of the snail Copy and paste/scan all components into the new canvas so that they are ready for editing Ensure that all backgrounds of all shapes are set to transparent to allow overlap of components Shape 1 has part of the image cut out/erased to produce the eye shape Shape 1 is copied and pasted to produce two images for the eyes of the snail Shape 2 is inverted/flipped horizontally (across the vertical plane) and resized larger/enlarged for the shell Shape 3 is rotated by 90 degrees and inverted horizontally to form one of the antennae ...resulting shape is copied and pasted and stretched horizontally to form the second antenna Shape 4 is resized, filled with black to form the body of the snail All the shapes are positioned/aligned together/grouped to form the composite cartoon snail Brush tool with pencil/small size is used to ensure that the join between shape 2/shell and shape 3/body is complete/no gaps are left ...used to add dotted line at base of shell/shape 2 Text is added and rotated left by 90/right by 270 degrees ...text is positioned as shown Components are grouped and resized together to form final image.	**8**

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This question to be marked as a Level of Response.

Evaluation requires that advantages and disadvantages be discussed and weighed up in importance.

Answers may make reference to e.g.:

Tape-based:
established technology
- huge storage capacity
- serial access
- cheap per GByte
- can be slow to create backup
- can be slow to recover files
- tapes can be fragile
- tapes may not work in different tape drives.

Hard disk-based:
- quick to produce backup
- quick to recover files
- direct access
- cost per GByte varies/can be expensive
- large capacities
- hard disk can fail losing large amounts of data.

'Cloud'-based:
- off-site technology used so not so vulnerable to on-site disasters
- hardware/maintenance/service costs borne by supplier
- security arranged by supplier
- security of data issues
- unlimited capacity available
- reliable internet connection required
- high bandwidth connection preferred.

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Level 3 (7–8 marks)

Candidates will evaluate in detail the options for creating backups.
The information will be relevant, clear, organised and presented in a structured and coherent format.
There will be a reasoned conclusion/opinion.
Subject specific terminology will be used accurately and appropriately.

Level 2 (4–6 marks)

Candidates will evaluate the options for creating backups.
For the most part, the information will be relevant and presented in a structured and coherent format.
There may be a reasoned conclusion/opinion.
Subject specific terminology will be used appropriately and for the most part correctly.

Level 1 (1–3 marks)

Candidates will describe the options for creating backups.
Answers may be in the form of a list.
There will be little or no use of specialist terms.

Level 0 (0 marks)

Response with no valid content.

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Question	Answer	Marks
5(a)	***Six** from:* Waterfall/traditional is a linear approach to software development Determine the software/system/game requirements ...produce a requirements document for the game application Analyse the requirements ...produce a model/overview of what is required for the game application Design the software ...produce e.g. system flowchart/DFD for the game application Create the code ...program, document and test the code ...unit test the source code/modules for the game application ...integrate the units/modules into the whole system/game Carry out whole system testing of the game application remedy any errors/bugs found ...revisit any code with improvements/alterations as a result of testing Carry out user acceptance testing (UAT) install ...remedy any issues discovered Develop support mechanisms for users of the game application Deliver/implement the finished product.	**6**
5(b)	***Eight** from:* *Benefits:* Problems can be found and fixed early in the processes Emphasis on full documentation (requirements documents, design documents) means that individual team members can be replaced/no team member is irreplaceable/new teams can complete/carry on the work Enforces a structured approach through separate/discrete stages... ...stages easy to understand ...provides identifiable milestones *Drawbacks:* Requirements not fully known before working software created ...clients may change their requirements ...requirements may not cover all details ...clients may not know exactly what they want/all the details required ...leading to increased costs due to redesign/redevelopment/retesting Designers may be unaware of future difficulties of designing a new software product/feature. *Max 6 marks for all benefits or all drawbacks.* *1 mark is available for a reasoned conclusion.*	**8**

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Question	Answer	Marks
6	***Six*** *from:* Audio quality improves with increasing bit rate ...two examples from: ...800 bit/s is minimum for speech to be recognised 32 kbit/s – generally acceptable only for speech 96 kbit/s – generally used for speech/low-quality streaming 128 or 160 kbit/s – mid-range bit rate quality 192 kbit/s – a commonly used high-quality bit rate 320 kbit/s – highest bit rate level supported by the MP3 standard ...lossy compression to reduce bit rate can introduce artefacts ...caused by data/quantisation errors ...distortion of sound ...perceived/heard as 'bubbling/burbling' ...stuttering/jerky/blanks/silences in sound.	**6**

Question	Answer	Marks
7	***Eight*** *from:* *Benefits:* Allows tester to look inside system ('introspection') ...can identify system objects in code ...can reduce the failure rate of test code provided object names do not change Can be more stable/allow re-use of test code provided object names do not change More thorough/complete testing of code ...all aspects of code are tested ...every interaction in code/objects is tested ...all routes through code are tested *Drawbacks:* White box testing must be closely integrated with the system ...must be installed in the system to be tested ...cannot be sure that the testing is not causing the errors/problems it flags up ...cannot be sure that all platforms support the white box testing system changes to objects/code of system may cause white box testing to fail ...white box testing code is highly integrated with system code ...requires high degree of script maintenance Tester must have in-depth knowledge of system ...be highly skilled programmer. *Max 6 marks for all benefits or all drawbacks.* *1 mark is available for a reasoned conclusion.*	**8**

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Question	Answer	Marks
8(a)	***Four*** *from:* *(Derived from section 7, sixth principle of Act:* *'personal data shall be processed in accordance with the rights of data subjects under this Act':)* A right of access to a copy of the information held in their personal data ...told whether personal data is being processed ...given a description of personal data ...given reason(s) for processing ...given details of source of data A right to object to processing that is likely to cause/is causing damage/distress A right to prevent processing for direct marketing A right to object to decisions being taken by automated means A right (in certain circumstances) to have inaccurate personal data rectified, blocked, erased or destroyed A right to claim compensation for damages caused by a breach of the Act.	**4**
8(b)	***Two*** *from:* Failure to register when required ...and to keep personal data if not registered ...failure to provide accurate information/providing false information when registering Failure to comply with provisions/stick to reasons for storing data supplied when registering Processing data if not registered To fail to provide Data Commissioner with updated address failure to comply with enforcement order ...prohibition notice e.g. not to send data overseas/supply data to third party ...information notice e.g. supplying false information/not all of information when ordered to do so.	**2**

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Question	Answer	Marks
9	***Eight*** *from:* Other devices can cause interference ...remove other devices e.g. microwave ovens/cordless telephones on same frequency which can interfere with signal ...WiFi uses 2.4Ghz and/or 5GHz frequency Ensure that access points do not use same frequencies/channels... ...other access points may use same WiFi channel and interfere with user's channel Restrict use of e.g. Bluetooth® ...Bluetooth® signals can cause interference Restrict use of mobile phones... ...mobile telephone systems can cause interference Adjust wireless access point settings... ...wireless access point rate control set too high ...results in many retries Wireless devices can only send or receive but not both at the same time ...effectively cuts the bandwidth in half give devices with already established connections higher priority ...e.g. video streaming ...other devices appear to have slower access times/data transfer rates Radio waves are slowed/blocked/'bent' by objects ...walls/insulation/metal objects may degrade/block WiFi signals so use materials that are transparent to wireless signals Restrict choice of channels... ...automated channel choice can cause 'channel hopping' ...too many changes slows access times Restrict use of 'legacy' bands for WiFi ...routers are slower if they have to broadcast on several bands simultaneously Set access point antennas to optimum position/orientation ...may be set too low/wrong angle/hidden.	**8**

Question	Answer	Marks
10	***Six*** *from:* Technical documentation for programmer is needed Program listing so she can see full details of the code List of variables to follow the parameters as they are used Program flowchart to see an overview of the program Notes for future programmers so she knows where to start Test plans and the results so these can be checked Known errors/bugs so she can/attempt to correct these Purpose of the software including reasons for choosing pieces of existing software instead of the programmer having to write new code Input and output data formats so she can write code to match.	**6**

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Question	Answer	Marks

11(b)	***Six*** *from:*
	
	An example code is:
	
	if (timenow <12) {
	  welcome = 'Sorry, we are closed';
	} else if (timenow < 22) {
	  welcome = 'Hello, we are open now';
	} else {
	  welcome = 'Please try again tomorrow';
	}
	
	1 mark per correct line.
		6

Question	Answer	Marks
12	***Eight*** *from:* Using the four frames as key frames ...filling in of frames between frames 1, 2, 3 and 4 ...using variable frame frequency depending on content ...fewer frames between frames 1 and 2 than e.g. between 2 and 3 ...as background is stationary then lower frame rate than foreground characters May be low frame rate so makes motion jerky/unrealistic Need to add at least 8 frames in order to create smooth movement Need to add enough frames so that frame rate is below 'flicker fusion' threshold… ...else movement will appear to flicker and illusion of movement is destroyed Motion blurring of the figures between frames 1 and 2 etc. can simulate faster movement.	**8**

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