Cambridge International AS & A Level

Cambridge Assessment International Education
Cambridge International Advanced Subsidiary and Advanced Level

INFORMATION TECHNOLOGY **9626/32**

Paper 3 Advanced Theory **March 2019**

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 March 2019 series for most Cambridge IGCSE™, Cambridge International A and AS Level 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(a)	**Two** *from:* A colon (:) is shown instead of a semi-colon (;) in line 6 ...this is a syntax error Syntax errors prevent JavaScript from being executed/are fatal errors in code The web browser displays nothing at all from this code The variable 'tableout' has not been declared before it is used Some browsers will ignore/compensate/interpret this differently from others Results can be different/unexpected in different browsers.	**2**
1(b)	**Five** *from:* Add specific code to deal with the errors transparently/without affecting the web browser Specify block of code to be tested Add some code produce output that depends on (the type of) error encountered Use try() block of code to be tested Use catch() to define the error handling code Use final() to allow code to be executed/run Use throw() to display information about the error/error message Specify the text to be displayed on screen as a result of the error.	**5**

Question	Answer	Marks
2(a)	**Two** *from:* A self-study activity Has a specific learning outcome Delivered via internet/network.	**2**
2(b)	**Four** *from:* Recorded tutorial uses video/audio only in a linear sequence/one route through Interactive tutorial is a set of structured (web) pages/slides Navigated by different routes/routes chosen by the learner Interactive can use any combination of text/images/video/audio/animations in any order No user input required in recorded/user input required/mandatory in interactive tutorials.	**4**

Question	Answer	Marks
3	*Command word: Evaluate: discuss the importance of, weigh up, the advantages and disadvantages, judge the overall effectiveness, weigh up your opinions.* This question to be marked as a Level of Response. **Level 3 (7–8 marks)** Candidates will evaluate/explain in detail the benefits and drawbacks of the use of quantum cryptography when transmitting confidential data over public networks. 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 explain the benefits and drawbacks of the use of quantum cryptography when transmitting confidential data over public networks. 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 a benefit and/or drawback of the use of quantum cryptography when transmitting confidential data over public networks. 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. *Answers may make reference to e.g.:* Allows use of cryptographic tasks that would be deemed impossible without the use of quantum cryptography, e.g. the guarantee that any interception/viewing/eavesdropping on/disturbance of the data is detected Calculations can be carried out extremely rapidly so much higher bi-length for keys can be used so increasing security of data when encrypted Does not do away with conventional cryptographic keys i.e. a mathematical algorithm is still needed for the actual encryption of the data Uses photons to carry data in terms of their ‘spin’ which is difficult to control/generate consistently/precise filters to determine the spin are difficult to manufacture/deploy Requires extremely pure fibres to transmit photons intact/undisturbed over anything but short distances – maximum so far is about 60 km/far shorter distance than conventional fibre use can reach Requires a new type/generation of computers to become a viable reality In theory, quantum techniques can break any encryption in a usefully short time.	**8**

Question	Answer	Marks
4(a)	**One** *from:* Level at which an object/file is placed in an image Represents part of a graphic/image as pixels (in a bitmap).	**1**
4(b)	**Four** *from*: Can have transparency to allow other layers to show through/be seen Can be overlapped to create a composite image Can be replicated to show multiple instances of same image/object Can be replicated to hide/mask parts of an image Can be used to adjust the brightness/saturation of other layers.	**4**
4(c)	*Command word: Discuss: give important arguments for and against. Often requires a conclusion.* **Eight** *from e.g.:* Editing can enhance attractiveness/look/appearance of items/models Editing can attract attention of viewer to compensate for reduction in attention span in recent years Editing can make poor photos appear neat/presentable to clients/customers to increase sales Less expensive than taking exact/precise/perfect photographs Removing blemishes, wrinkles, flabby parts/altering body shape is flattering to the model/clothes A false/unrealistic body image can be created Viewing of only perfection in clothes/models can lower viewers self-esteem ...cause eating disorders ...cause unnecessary pressure to confirm to unrealistic ideals Editing can be time consuming /tedious and slow down production.	**8**

Question	Answer	Marks
5(a)	**Two** *from:* No need to wait for real/native blood vessels to grow into implanted /repaired tissue Allows oxygen/O_2 to be supplied immediately to implant which is more likely to survive/grow Vessels can be customised for the individual organ which is more likely to fit Less likely to be rejected by recipient than real blood vessels.	**2**

Question	Answer	Marks
5(b)	**Four** *from:* Chemical components of the drug can be customised at molecular level to individual patient Drug can be customised to deal with patient specific issues/ethnic origin/DNA A chemical blueprint can be created so that the drug can be printed at any pharmacy/druggist/drug store ...using specific components/compounds Drug can be personalised for/targeted to a specific illness/infection.	**4**
5(c)	**Four** *from:* Human errors in use of blueprints/mislabelling can lead to incorrect drug being created ...incorrect dosage being used Difficult to validate/verify drug creation so, e.g. incorrect base materials may be used Difficult to regulate use of the drug/printing machines across (international) borders Difficult to regulate the supply of the drugs once blueprint is published/available to patient Bio-safety/hygiene/sanitary/cleanliness of production difficult to control at home Could be used/customised to produce illegal drugs.	**4**

Question	Answer	Marks
6	**Eight** *from:* *Max **Five** for column headings from e.g.:* Test Number/No. What is being tested Type of test data used Expected result Actual result Comments on results Action (to be) taken *Max **Four** for Tests from e.g.:* Use of normal, extreme and abnormal data for inputs a and b/in cells B2 and B3 Example data given/used for test Test of (any) message that appears when invalid data entered Calculation of area by formula in cell B6 Calculation of total price by formula in cell B8. *Maximum of 8 marks in total.*	**8**

Question	Answer	Marks
7	*Command word: Evaluate: discuss the importance of, weigh up, the advantages and disadvantages, judge the overall effectiveness, weigh up your opinions.* **Eight** *from:* Use of anti-spyware software will prevent spyware being installed May not detect spyware already installed May not detect spyware disguised as legitimate feature of another program/application Use of antivirus software – will detect and remove some spyware but not all, so has limited effectiveness when used on its own Real time scanning of incoming programs/applications/data can provide protection by blocking spyware from entering the system provided the spyware is recognised/in its database/can be analysed to be spyware Dedicated anti-spyware can detect and remove spyware provided all areas of system are regularly scanned Lists of spyware must be up to date Options may include option to manually delete files if anti-spyware is 'uncertain' of status of detected file/data Spyware may resist attempts to be deleted/uninstalled… May recreate another running process to reinstall itself once deleted by anti-spyware software Using alternative web browsers may prevent spyware being installed as some are more vulnerable than others… Web browsers are not designed to detect spyware Using reputable sources for download of software may help prevent spyware being installed Reputable sources can be 'infected' Use of combination of methods is most successful but takes awareness and time to implement Using a firewall to prevent spyware from returning data to the spyware source *One mark is available for a valid reasoned opinion/conclusion.*	**8**

Question	Answer	Marks
8	**Eight** *from:* Install and start the new system alongside the old system Copy/set up all accounts services to the new system Allow some staff and some/new customers to use services on new system Switch all services to new system once it is installed and running Compare results from new system/performance of new system with old/current system over a period of time Period of time long enough to test/try all provided services Keep old/current system running to ensure that no features are lost/in case new system fails Ensure that all services are duplicated properly/in full No perceived difference in services by staff or customers Revert to old/current system if new system needs to be updated/amended/maintained during testing/parallel running time period Once new system has proved successful complete switch to new system Retain old system as backup in case of failure of new system for a period of time/archive.	**8**

Question	Answer	Marks
9	*Entities with attributes include:* **Four** *from e.g.:* Item — text Quantity — real number — validation Type of packet — text Price — real number/currency — validation Cost per 1 kg/1000 g — real number/currency — formula Sell by date — date — validation **Four** *from e.g.:* Name of supplier — text Address line 1 — text Address line 2 — text Address line 3 — text Address line 4 — text Zip/Postal code — text — validation ***Mark allocation:*** max 5 goods entities max 4 supplier entities max 3 for correct attributes max 3 for correct indication of any validation required.	**8**

Question	Answer	Marks
10	**Eight** *from:* Packet switching breaks the message into discrete data packets whereas message and circuit may not do so Packet switching can introduce delays as packets may travel via different routes whereas message and circuit switching do not Packet and message switching make more efficient use of the capacity of the transmission medium than does circuit switching Circuit switching keeps the circuit connected for the whole of the duration of the transmission whereas message and switching do not Circuit switching uses the full bandwidth of the transmission medium whereas message and packet switching do not Circuit switching can guarantee a higher quality of service compared to the other methods Message switching can be less secure because messages are stored (temporarily) at nodes Circuit switching can guarantee a higher level of security of data compared to the other methods Others can use the same communication channel when packet switching is used whereas this is not possible when message and circuit switching is used.	**8**

Question	Answer	Marks
11	**Six** *from:* Occur in real time so no delay in obtaining input from participants Can provide a secure online environment for discussion with numbers of participants Can be restricted to only those chosen to participate Participants can be in any location around the world Participants do not have to travel/incur costs of travel/leave their home/work location Employees are not removed from their work place so can continue working once chat is over The (text-based) discussion can be saved for future reference.	**6**