Cambridge Assessment International Education

Cambridge International AS & A Level

INFORMATION TECHNOLOGY **9626/33**

Paper 3 Advanced Theory **October/November 2020**

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 October/November 2020 series for most Cambridge IGCSE™, Cambridge International A and AS Level and Cambridge Pre-U components, and some Cambridge O Level components.

[Turn over

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:* Is a network management protocol Automatically assigns a network configuration to a device Automatically assigns an IP address Automatically assigns a gateway address Automatically assigns a subnet mask Creates/stores a database to avoid addressing conflicts.	**2**
1(b)	**Two** *from:* Provides peer-to-peer file sharing Provides web seeding to allow use of HTTP sources Can provide (automatic) RSS feeds via 'broadcatching' (for content distribution) Used by social media/microblogs to distribute updates to servers Used to stream videos Used to transfer large files using minimum bandwidth.	**2**
1(c)	**Two** *from:* Sends messages/data (in datagrams) using Internet Protocol/IP Provides checksums/port numbers for source/destination (of datagram) Connectionless communication No reporting to sender of lost/damaged packets Used when delivery of datagrams is not important to the service Avoids overheads of processing of error checking/delivery status No handshaking No guarantee of delivery/order of datagrams No error checking.	**2**
1(d)	**Two** *from:* Sends messages/data (in datagrams) using Internet Protocol/IP Provides checksums/port numbers for source/destination (of datagram) Connection-oriented communication/point to point Reporting to sender of lost/damaged packets Establishes how data is transferred over network Manages flow control Handshaking is carried out to establish connection. Used when delivery of datagrams is important Error checking.	**2**

Question	Answer	Marks
2	**Six** *from:* Different access rights/permissions given to different individuals/groups of individuals Set up as Access Control Lists Works on files/folders/directories Permissions on folder/directory may be cascaded down to files contained within Files within a folder/directory do not (necessarily) have same permissions as parent folder If a permission/access right is not explicitly set, the right is denied Read permission allows only viewing of file/directory/folder Write permission allows modification of files/deletion/creation/renaming of files (within folder/directory) Execute permission allows file to run/executed Permissions must be set/mandatory if OS is able to run/execute file for user.	**6**

Question	Answer	Marks
3	**Six** *from:* Encryption protects information by scrambling it using an algorithm with an encryption key to create data Data cannot be understood/decrypted without the key (Asymmetric encryption) uses public keys which can be accessed by anyone so no need to send key to specific user Private key is known only to recipient so no risk of key interception by unauthorised persons Protects data transferred over the internet between web browser and servers reducing possibility of financial data being stolen Secures email/text messages to prevent confidential data being read by unauthorised persons Protects cloud storage from outside attacks to prevent confidential data/information being read/used by unauthorised persons Prevents the loss/theft of data on USB and external drives Used in VPNs for secure data transfer across public networks Prevents use of stolen passwords to protect personal data from use in e.g. identity theft.	**6**

Question	Answer	Marks
4	**Eight** *from:* *Positive effects:* Workers have autonomy so can control when to work/have control over their own time management Workers can (easily) work for companies who are remote/long distance from them/in other cities/countries Workers are/can be more motivated to work/happier in work Workers save on costs/time of travel to/from (office/company) work place Workers can become more productive as they can choose when to work/have no office distractions Disabled workers are able to work/can be employed to work in own/adapted/familiar surroundings *Negative effects:* Workers may not feel able to perform as well when not supervised so will not complete their work on time/satisfactorily/may become despondent Workers can feel/become disconnected/isolated from the company/employer/have no working relationship with employer Workers may incur extra expenses for e.g. computers/internet access/specialised software Workers may not be able to stop working/may work longer hours Workers may be distracted by factors in home environment. *Must be at least one of each for full marks.* *1 mark is available for a reasoned conclusion.*	**8**

Question	Answer	Marks
5(a)	**Six** from: Script embedded in HTML code/in body of HTML code …. between <script> </script> tags Variables *x* and *y* declared Values stored in *x* and *y*/*x* stores 12 and *y* stores 6 window.alert(*x* + *y*); function adds/sums *x* and *y* to produce 18 window.alert(*x* + *y*); function creates/displays an alert box (on web page) Appears as popup (window) User must press OK to clear.	**6**
5(b)	JavaScript does not have its own built-in capabilities/lacks capability for displaying its output.	**1**

Question	Answer	Marks
6	**Six** *from:* Used to recognise when an item is purchased by a customer Used to ensure that shelves are stocked with right/appropriate amount of items Use of stock database to automatically flag items for restocking on shelves/moving from stock room to shop floor Automatic reordering of items (at appropriate time) when stock re-order level is reached Automatic ordering of re-order quantities when restocking Automatic production of reports to management/reports from database show amount of stock Automatically uses stock numbers to change advertising/out of stock labels Seasonal adjustments to stock re-order quantities (e.g. more heavy boots in winter) Used to track items by automatic data capture systems when sold/received from suppliers/where stored in warehouse Use of bar codes/RFID tags on (all) items containing data about item ID/product code Bar code/RFID tags read at delivery with numbers of items received and input into stock database Bar code/RFID tags read each time item is sold and input into database Readers can be placed/positioned to check for stock being stolen/removed without going through checkout There is no need to explicitly scan code close up/can be discreetly hidden in goods.	**6**

Question	Answer	Marks
7	**Eight** *from:* Parallel running requires the new system to run/be used alongside the old system for a period of time. *Benefits:* Can ensure that the new system is running without errors by comparing results to the existing system Can resolve any errors by checking with the old system to find any modifications needed If the new system fails then the old system is still operating so there is no loss of data/functions/work Staff can be trained on the new system in batches as the old system is still operating/not all new staff need to use the new system at once Staff may be more confident in using the new system if they can check against the old system *Drawbacks:* Costs of running both systems at the same time can be expensive/prohibitive Staff may have to use two/both systems and require extensive training Staff may have to do twice the amount of work Maintenance and checking can be frequent and time-consuming Data has to be duplicated and input twice Data has to be carefully checked to ensure that the same data is going into both systems. *Must be at least one of each for full marks.*	**8**

Question	Answer	Marks
8	**Eight** *from*: **Four** *from:* Bitmap image files consist of data about the pixels and metadata Pixel data consists of number of pixels/colour depth Metadata consists of data about other data e.g. data about image source/copyright File format may allow compression Compression may be lossless/description of lossless compression …or lossy/description of lossy compression …be variable depending on user settings **Four** *from:* *Advantages/disadvantages of different bitmap file formats from:* *e.g.:* *JPEG* Allows both lossy and lossless compression to be used Widely supported by web browsers Suffers image degradation/artefact when repeatedly edited and saved Requires more processing power than some other formats due to compression techniques Does not (easily) support transparency Does not encode large uniform areas of colour well *PNG* Free/open source so can be used by anyone without recrimination Supports transparency Works well in web browsers Performs well with large uniform colour areas Works well when streamed/progressively downloaded *BMP* File sizes can be large Widely acceptable to Microsoft Windows applications *GIF* Supported by web browsers Supports animation Does not support colour management across different devices so colours may alter Only support up to 256 colours *TIFF* Can store 24-bit colour by using up to 48 bits per colour Uses lossless compression/LZW compression for no data loss Not widely supported by web browsers File sizes can be large Does not support interlacing Does not support animation.	**8**

Question	Answer	Marks
9(a)	A condition that needs to be met is defined If the defined condition is met, then specific information is selected If the defined condition is not met, then different information is selected	**3**
9(b)	**Three** *from:* Used to compare two values Compares the contents of the data field and a value Can use different comparison operators, e.g. equal to Result of comparison determines whether or not the next record should be merged into the document.	**3**
9(c)	Used to compare the contents of a data field to a value If the comparison is true, the current data record is not included in the letter/is omitted/skip to next record.	**2**

Question	Answer	Marks
10(a)	**Six** *from:* List of all the activities needed to complete/finish the project A breakdown of e.g. resource allocation/work schedules Duration of each activity Dependencies between activities in the project End points of each activity and what can be completed at that point (Specific)Measurable/observable milestones during the project Duration of project including float variables.	**6**
10(b)	**Three** *from:* A visual/graphical representation of the whole project Earliest/latest start dates for project tasks/activities in project Longest path/time that will be taken for project Expected project end date Any near/almost critical paths that may be possible alternatives in project The shortest possible time to complete the project.	**3**

Question	Answer	Marks
11(a)	**Four** *from:* Identify/create a list of documents to explore/examine (e.g. population, samples, respondents, participants) Consider how documents will be accessed with attention to linguistic or cultural barriers. Acknowledge and address biases in documents Consider strategies for evaluating suitability/relevance of documents Be clear about the data that she is searching for Consider ethical issues (e.g. confidential documents) Consider alternative sources if requested documents are not available.	**4**

Question	Answer	Marks
11(b)	**Four** *from:* Gather relevant documents Develop an organisation and management method of work Produce a data flow diagram Determine the source and destination of the documents/ask questions about document Make copies of the originals for annotation Assess the authenticity of documents Examine documents' contents/purposes/biases Examine background information Examine the content Keep records/notes of findings/observations.	**4**

Question	Answer	Marks
12(a)	**Two** *from:* Allow/enable wireless/Wi-Fi connections from devices Connected to the wired network/LAN by ethernet Extend the network so that computers do not need to be in a fixed place/at a network outlet Provide secure access using password/network key.	**2**
12(b)	**Six** *from:* Hide the service set identifier (SSID)/cloak the network so that it does not appear in the list of wireless networks Use of SSID hiding provides limited protection Filter MAC addresses to allow only those known/preconfigured to connect Ensure that the WAP is not issuing IP addresses to unknown devices Use encryption for the traffic between WAP and connected devices Use an (up-to-date) encryption protocol such Wi-Fi protected Access (WPA) and (later variants) Avoid using out-of-date protocols such as Wired Equivalent Privacy (WEP)/Temporal Key Integrity Protocol (TKIP) Require users to enter a 'network key'/security key/passphrase when connecting Use a key that should be at least 14 characters long to make it 'uncrackable'.	**6**