Cambridge International AS & A Level

Cambridge Assessment International Education
Cambridge International Advanced Subsidiary and Advanced Level

INFORMATION TECHNOLOGY **9626/32**

Paper 3 Advanced Theory **May/June 2018**

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 May/June 2018 series for most Cambridge IGCSE™, Cambridge International A and AS Level and Cambridge Pre-U 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)	**Five** from: Use of validation (routine) to apply a format/picture check to email address Ensures that it has an email ID with @ symbol and domain name/conforms to accepted email format Use of a drop-down list to select the security question/mother's name from pre-set list of questions To select date numbers from drop down lists Numbers restricted to those appropriate for month/day/years allowed Check date selected is appropriate/before today's date/sensible age implied Use of radio buttons with two/Boolean choices/check gender against two possibilities Selects checked/unchecked for box for terms and conditions Check password for strength ...check length/content Compare the two password/email entries to check that they are identical/match Use of presence check ensures that all required fields are completed Customer visually reads form to check for possible errors When submit button pressed check is activated before passing the data to the website.	**5**
1(b)	Submit button to send the form to the store/store's database.	**1**

Question	Answer	Marks
2	**Eight** *from e.g.:* X-ray holography can be used for imaging internal organs of the body No need for invasive surgery Used for living biological specimens With very high resolution without the need for sample preparation Endoscopic holography is used for producing high resolution 3D imaging With no contact/non-destructive measurements inside the natural cavities of internal organs Ophthalmology use to correct problems with lenses implanted after cataract surgery In dentistry to store dental records of tooth prints as training aids for students In otology (ear studies) to study the vibrations forces/how the inner ear bones move In orthopaedics to measure strains/forces on fixation pins/rods 3D images of biological specimens can be created from a series of 2D radiological images Using holographic stereogram techniques/conical stereogram/ multiplex hologram Holographic contour generation is useful for measurements of biomedical specimens.	**8**

Question	Answer	Marks
3	**Eight** *from:* Pilot implementation where the system is introduced one branch/department at a time Clothing department has new checkouts installed before the others Staff in clothing department are trained to sell all goods ...and use the new checkouts Checkouts and staff performance is tested for some time Ensures that new checkouts are working correctly Ensures that staff in clothing department understand/can use new checkouts/sell all goods successfully Stock and accounting systems are correctly updated If new system works then staff from other departments can take turns working in the clothing department If new system does not work then only clothing department is affected Other departments can carry on as before until faults are corrected/new system does work The changeover may take a long time to implement in the whole store But there is no danger of having to close the whole store if one section fails to work properly.	**8**

Question	Answer	Marks
4(a)	**Five** *from:* Variables X and 'displayresult' are declared ...and cleared before use by loop Loop starts with X at 1 X is incremented by 3 each time it loops Continues until X reaches 10/while X is less than 10 Displays result as 1, 4, 7 With carriage return between each/on separate lines/underneath each other.	**5**

Question	Answer	Marks
4(b)	*Suitable code could be:* /JavaScript code follows <script> var X = 1; do { *document.getElementById("Number").innerHTML* += X + " "; X=X+3 } while (X < 10) </script> var X =1; 1 mark Do {...} 1 mark +=X 1 mark + “ ” 1 mark X=X+3 1 mark while (X < 10) 1 mark	**6**
4(c)	**Four** *from:* The code is executed by the web browser Not on the web server Web browser may not support the code language So the code may not execute properly/at all/produce errors Different browsers run code in different ways Developers must test all code with all browsers Same browsers on different operating systems behave differently Code may produce different results Code requires high processing power So webpages may display slowly/not at all Non-functioning code may deter viewers leading to loss of audience/sales via the website.	**4**

Question	Answer	Marks
5	**Eight** *from e.g:* Laptop has these features required for sales Physical keyboard for typing emails/product but smartphone usually onscreen keyboard Large storage capacity/500GB for local storage of files whereas smartphone has only 32GB/limited file storage Access to external/online storage for file exchange/backup Laptop usually has an optical drive for s/w and product updates whereas the smartphone does not Laptop has greater compatibility of software than a smartphone/can use most features of e.g. office applications Smartphone has these features required for sales people when away from office Smartphone can be used for SMS/text messages Can make voice calls whereas a laptop cannot Smartphone always available/can be carried easily/unobtrusively/smaller than a laptop Smartphone can use 3G/4G whereas laptop is restricted to WiFi/cable Smartphone can be used for internet access by laptop/tethering of laptop to smartphone for internet access Smartphone is not as good at office tasks as a laptop Can connect more readily/to more services Size of device may not be an issue as salesman will use a car/drive to visit.	**8**

Question	Answer	Marks
6(a)	**Three** *from:* Defining the project in terms of what is to be developed Gathering user requirements via focus groups/workshops Defining data flow Plan processes for managing project e.g. Risk assessment/communication between development team/quality of product Planning tasks/activities.	**3**

Question	Answer	Marks
6(b)	***Two** phases from, max **4** per phase:* *Data Modelling/Requirements phase:* Review/analysis of data from business model/requirements phase To create sets of data objects Define relationship between data objects Define test plans Define training strategies where required Determine implementation methodology *Process Modelling/User Design phase:* Conversion of data objects from previous phase into detailed data flow Define process for any changes/enhancements to data object sets Define processes for adding/deleting/modifying a data object Users interact with system analysts to develop models/early prototypes *Application creation/construction phase:* Development/construction of prototype by expert programmers Coding may be automated Coding of components carried out simultaneously/in parallel User evaluation of prototype ...repeatedly/iterative testing by users ...users suggest improvements/changes to prototype as it is developed update/modification of prototype *Implementation/testing/cutover phase:* Carrying out the test plan by testing the data flow ...testing interaction/interfaces between components Testing the complete system User training where required/writing training/help notes Rollout of 'app' to users *DNA business modelling/requirements phase – stated in part (a).*	**8**

Question	Answer	Marks
7	**Eight** *from:* Can provide greater bandwidth to provide faster rate of data transfer Can carry thousands more connections c.f. electrical cable so not so many cables required Lower signal losses over distance so less need for amplifiers/repeaters so less maintenance Can span longer distances so is used to cross difficult areas/gaps/seas/oceans No interaction with other cables as resistant to electrical interference/ground currents ...can be used in areas of high electromagnetic activity No crosstalk with adjacent cables so no distortion of signals Lighter in weight so can be more suitable for use in aircraft No sparks produced if faulty/cut so safer in high risk areas Resistant to corrosion so less maintenance required Smaller cable size so can be used in confined spaces Difficult to 'hack'/listen/tap into so more secure Can go around corners/bends unlike laser beams Can be more expensive to install than copper cables Specialist test equipment is needed Specialist tools are required for joining optical fibres Physical damage is more likely to interfere with signal transmission compared to similar with copper cables Wildlife prefer the covering of optic fibres for nesting materials compared to those around copper cables Underwater fibre optic cables are more susceptible to chemical damage than copper ones e.g. hydrogen will degrade them Cannot have 90^{o} corners unlike copper cables. *Max six for all positives or all negatives.* *1 mark available for a reasoned conclusion/opinion.*	**8**

Question	Answer	Marks
8(a)	**Two** *from:* Internet-based exchange medium Allows for instantaneous transactions Type of electronic money.	**2**

Question	Answer	Marks
8(b)	**Eight** *from e.g.:* Bank transfers are faster/cheaper than with real currency Leads to increased business activity Movement of money around the globe/world is easier than with real currencies Increase movement of money leads to increase in commerce worldwide People in poor economies can use digital credits on smartphones obviating need to carry real currency/have conventional bank accounts Physically safer than carrying currency so allowing people to retain wealth/money Easier to use for e-commerce so e-business can flourish e-business in underdeveloped countries can easily trade world-wide Allows use of smart contracts/programmable money due by automation/automated systems Linked to e.g. stock markets where money can be paid out depending on movements of share prices/sales Currency does not physically exist/difficult to track/trace transactions Value can fluctuate uncontrollably/without warning/for no apparent reason Susceptible to/used for criminal activities If digital currency is lost through e.g. file corruption it can be lost for ever. *Max six for all positives or all negatives.* *1 mark available for a reasoned conclusion/opinion.*	**8**

Question	Answer	Marks
9	**Eight** *from:* Students can connect to students all around the world Students see and hear real people in different classrooms Students can collaborate on projects/share resources/ideas Courses can be made available to others Students can attend remotely Students living in remote rural areas can attend school No need to make difficult/lengthy travel arrangements Students can take virtual field trips to dangerous/remote areas in safety Students can experience remote testing by instructor ...before travel to be properly tested ...increasing chance of positive results Students who are home-based through e.g. illness can be included in classes Education does not unduly suffer.	**8**

Question	Answer	Marks
10	This question to be marked as a Level of Response. **Level 3 (7–8 marks)** Candidates will discuss in detail the advantages and disadvantages of software-based training methods. 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 advantages and disadvantages of software-based training methods. 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 advantages and disadvantages of software-based training methods. 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.:* Can learn at own pace Can stop/start at any point Can use multimedia Can choose level of course/learning Progress can be tracked Interactive games/tests available Can set personal targets Can receive feedback/assistance from tutors online Little interaction with other students/learners May not be enough pressure/motivation to meet deadlines parts of course/work may be skipped due to lack of supervision Some learning cannot be done using software e.g. swimming/driving... …although s/ware can be supportive.	**8**