OCR
RECOGNISING ACHIEVEMENT

GCE

ICT

Advanced GCE

Unit **G063:** Systems, Applications and Implications

Mark Scheme for June 2012

Oxford Cambridge and RSA Examinations

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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.

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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			Two possible marks e.g. • a programming system (used by programmers) (1) • used to quickly build working programmes (1) • a number of tools to help build GUI's (1) • reduces development time (1) • can reduce amount of efficient executable code (1) • a software development methodology (1) • involves iterative development (1) • involves the construction of prototypes (1) • JAD/Timeboxing(1)	2	Do not allow less than 6 months on its own.
2			Must cover both for 2 marks, have a sensible match e.g.: • **requirements specification** is developed by the systems analyst (1) **design specification** is developed by the systems designer (1) • **requirements specification** clearly defines what the system is to do (1) **design specification** and how this will be achieved (1) allow examples, e.g. • **requirements specification** states what is to be stored(1) **design specification** gives table structure to storing (1)	2	

Question			Answer	Marks	Guidance
3	(a)		Maximum 2 marks e.g. Seat requested is locked (whilst order is processed) (1) booking is completed or the seat is released (1)	2	Candidate must cover the whole of second part of the answer.
	(b)		Four marks maximum e.g. • batch processing allows for the information to be prepared before processing (1) • batch processing does not need human intervention (1) • batch processing can be run when the processing load on system is at a minimum (1) • batch processing can be scheduled at the same time every month (1) • same process is applied every month/every time it is run (1)	4	
4			TWO marks available for each matched two part answer e.g. • security/anti-virus/back- up/software installation is not centralised (1) greater responsibility on the individual user (1) • data can be stored on any computer (1) makes data difficult to find (1) • each computer may fulfil more than one role such as printing or file sharing (1) increasing the load on processing (1) • If the peer is unavailable (1) access to the peripheral items on the peer is lost (1)	4	

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>5</td><td>(a)</td><td></td><td>
<table>
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<tr><td>3</td><td>One complete comparison and one individual point</td></tr>
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</table>
Topics for comparison may include e.g.

features
• the custom written software will do exactly what you want whereas an off-the-shelf solution will contain bloat ware.

memory
• there will be no unwanted functions with a custom written solution whereas an off-the-shelf solution will contain these, increasing the memory footprint.

development cost
• with custom written solution the development cost is paid by one person/organisation whereas an off-the-shelf solution cost is shared by many

support
• custom written software may need specialist support to correct bugs, train users and provide extended functionality whereas off-the shelf software is likely to have been tested by many people with wider support available via books and discussion groups.
</td><td>4</td><td></td></tr>
<tr><td></td><td>(b)</td><td>(i)</td><td>• phased changeover is when parts of a system are introduced one at a time (1) making sure that each subsystem is working before the next one begins/each phase could have a different changeover method (1).</td><td>2</td><td>Accept correctly labelled diagram</td></tr>
</table>

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<tr><th colspan="3">Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td></td><td></td><td>(ii)</td><td>• stock control system is [likely to be] one system (1) phased needs to have more than system(1)</td><td>2</td><td></td></tr>
<tr><td>6</td><td></td><td></td><td>
<table>
<tr><td>5–6</td><td>3</td><td>The candidate has described two or more services.
Subject specific terminology will be used accurately and appropriately.</td></tr>
<tr><td>3–4</td><td>2</td><td>The candidate has given a description of one service and a vague description/identified another service.
Some subject specific terminology will be used.</td></tr>
<tr><td>1–2</td><td>1</td><td>The candidate is able to only identify services.
The information may be poorly expressed and may be in the form of a list of points.
Subject specific terminology may be limited or missing.</td></tr>
</table>
Descriptions of services may include e.g.

Range of TV channels

pay per view
• payment
• preference selection
• viewing time.

voting
• charging
• votes not being counted.

game show participation
• viewer participation
• incorrect answers and progression.

camera angles
• viewers’ choice
• action missed
• replay choice.
</td><td>6</td><td>Headings are representative only, full marks may come from within one group</td></tr>
</table>

Question			Answer	Marks	Guidance
			feedback comments to TV studio • charging • aired opinions. **interactive recording and live pause** • monthly charges • simultaneous viewing • advanced recording without traditional devices • electronic programme guide • series link feature.		
7			Three from, e.g. • self-discipline needed to avoid being distracted at home (1) other jobs/activities take priority (1) • job credibility/others may not appreciate that working from home is a real job (1) demands upon time increase due to presence at home (1) • feeling of isolation (1) may miss the camaraderie of the office (1) • household bills may go up (1) heat, light, power etc needed for longer time (1) • less commitment/motivation (1) lack of interaction/face-to-face dialogue with colleagues can result in a lack of direction and de-motivation (1) • need appropriate technology, e.g. broadband/hardware/software (1) which attracts costs (1) • quality/availability of technical support (1) may not be able to get support when needed for hardware at home/for software at home (1).	6	Answers must relate to employees

Question			Answer	Marks	Guidance
8			Three from: One mark for identification of application, one for expansion e.g. • car engine fault diagnosis (1) to identify problems with the car engine (1) • medical diagnosis (1) to find out the illness the person has (1) • broadband ISP fault diagnosis (1) to find out why the broadband is not working (1) • social services (1) to find out benefits entitlement (1) • HM revenue and customs (1) to determine the amount of tax due (1).	6	The expansion must relate to the context of the expert system identified

Question			Answer	Marks	Guidance
9			**Entities:** • APPOINTMENT • PATIENT • DENTIST • TREATMENT • PAYMENT Five of the above entities = 2 marks, OR Four of the above entities = 1 mark **Relationships:** • DENTIST - APPOINTMENT 1:M • PATIENT - APPOINTMENT 1:M • PAYMENT - APPOINTMENT 1:1 • TREATMENT - APPOINTMENT M:1 Four of the above relationships = 2 marks, OR three of the above relationships = 1 mark	4	If no diagram then 0 marks Allow alternative suitable names for entities Other correct diagrams/relationships are possible.
10	(a)		Two from: Max 4 e.g. • to make sure the system returns the expected results (1) any identified faults can be rectified (1) • to ensure the system meets the requirements (1) e.g. so that payment can be made etc (1) • to give end users confidence in the system (1) by proving it can cope with all eventualities (1) • to give a baseline for future amendments (1) by proving that the initial system works as intended (1).	4	

Question			Answer	Marks	Guidance
	(b)		Three possible sets of matched answers (1 for identification, 1 for expansion/example) e.g. • charges relating to support can be high (1) as no one else can support it as effectively as the authors (1) • the company that write the system may have a licence agreement preventing anyone else looking at the code (1) prevents third parties supporting it (1) • with a single firm knowing the system (1) if they ceased trading it would be very difficult to support (1) • documentation needs to be read and understood by others offering support (1) documentation might not be well laid out/explained (1).	6	
11	(a)		ONE from: • a measurement of the volume of data (1) per second/over time (1) • rate of transmission (1) in bps (1) • the difference between the maximum and minimum frequency of signal (1) that a communications channel can carry (1)	2	
	(b)	(i)	• infrared • wireless • cable	1	

Question			Answer	Marks	Guidance
		(ii)	TWO marks available 1 for identification, 1 for expansion e.g. • no physical connection (1) as data is transmitted by electro-magnetic waves (1) • line of sight is not required (1) devices can communicate from different locations within a specified distance (1) • smaller range of frequencies available (than for copper cable or fibre optics) (1) meaning the available bandwidth is less (1) • signal attenuated over a distance (1) restricts the useable range (1)	2	
		(iii)	e.g. Laser/fibre optic/optical/Bluetooth/satellite (1)	1	Not cable, infrared or wireless
	(c)		FOUR marks available for TWO matched answers: e.g. • reduces the need for data duplication (1) so the integrity of the data increases (1) • different users can have access to the same information (1) and so data can be exchanged (1) • peripherals can be shared (1) and output can be directed to a specific location/individual (1) • centralised back-up/storage (1) means data can be accessed from any node (1) • centralised security/virus checking (1) with software updates being rolled out easily (1). Allow examples related to the context.	4	

Question			Answer	Marks	Guidance
	(d)		Two from: e.g. • holds a routing table/holds (mac) addresses (1) • bandwidth can be limited on each port (1) • priority/quality of service given to applications requiring guaranteed bandwidth (1) • facilitates a virtual LAN through independent operation of ports (1).	2	
	(e)		Six marks available for three matched answers: One for identification to a max 3, second for description e.g. • signal reception can be affected (1) by obstructions such as furniture, floors, walls/distance (1) • multiple transceivers needed (1) to avoid black spots in coverage /to maintain coverage as signal passes through walls and floors (1) • network available outside the building (1) additional security/encryption required for internal traffic/potential for hackers to intercept data (1) • clients' details accessible (1) non-compliance with DPA (1) • concurrent downloads by multiple users (1) reduces bandwidth capacity (1) • coverage must be carefully planned (1) as each transceiver requires different frequency (1) • requires additional hardware (1) raising cost of installation (1) • other electronic equipment (1) can interfere with signal transmission (1).	6	

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<tr><td>2</td><td>One complete comparison</td></tr>
<tr><td>1</td><td>One individual point about either side</td></tr>
</table>
Topics for comparison may include e.g.

bandwidth
• both ADSL and leased lines offer large bandwidths which allow more data to be sent at the same time meaning large volumes of data can be handled at once.

contention
• a leased line has no contention ratios (as the connection is direct between one router and another) whereas ADSL from a household may experience contention ratios ((despite a provider's claims) as a number of households share the same fibre-optic link from street to provider).

symmetry
• leased lines are symmetrical (meaning the same amount of upstream and downstream bandwidth is available) whereas ADSL is asymmetric (meaning downstream has a much higher bandwidth than upstream).

cost
• a leased line is installed especially for an organisation which vastly increases set-up costs whereas ADSL connections utilise the provider's infrastructure which limits set-up costs to just local connection.
</td><td>4</td><td></td></tr>
<tr><td>12</td><td>(a)</td><td></td><td>Data is separated based on fields.</td><td>1</td><td></td></tr>
</table>

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td></td><td>(b)</td><td></td><td>
<table>
<tr><td>5–6</td><td>3</td><td>The candidate has described how consistency and integrity are maintained within the context of the question.

Subject specific terminology will be used accurately and appropriately.</td></tr>
<tr><td>3–4</td><td>2</td><td>The candidate has given a general description of how consistency and integrity are maintained

For the bottom end of the band, one description may be limited to an identification or a weak description.

Some subject specific terminology will be used.</td></tr>
<tr><td>1–2</td><td>1</td><td>The candidate has given a description/definition of either term.

The information may be poorly expressed and may be in the form of a list of points.

Subject specific terminology may be limited or missing.</td></tr>
</table>

Descriptions may include:

Consistency – the process of making sure that the data in all partitions is the same

• location of fields
• data linking between fields.

Integrity – ensures that the data entered is truthful and correct

• changes to the primary key
• effects caused to the other fragmented parts of the database.
</td><td>6</td><td>NB. Candidate may argue, correctly, that if a database has integrity, then it must by definition have consistency</td></tr>
</table>

Question			Answer	Marks	Guidance
13			e.g. • no need for an expert to staff the helpline (1).	1	
14	(i)		**chronic pain experienced in the arms, shoulder or back** **health problem** • repetitive strain injury/RSI (1) allow 'backache/Upper Limb Disorder'. **possible cause (one mark only) – accept reverse answer** e.g. • repetitive actions in same position (1) • poor posture whilst working (1) • maintaining a fixed force position (1).	2	
	(ii)		**blood clot found in the leg** **health problem** • deep vein thrombosis/DVT (1). **possible cause (one mark only) – accept reverse answer** e.g. • sitting in a chair which puts pressure on back of knees (1) • poor posture whilst sitting in chair/caused by chair when working at computer terminal (1) • lack of leg movement at regular intervals (1).	2	

Question			Answer	Marks	Guidance
	(iii)		**pressure on the median nerve in the wrist producing numbness in hand.** **health problem** • carpal tunnel syndrome/CTS/Median Neuropathy at the wrist (1). **possible cause (one mark only) – accept reverse answer)** e.g. • repeated wrist movements (1) • incorrectly positioned keyboards (1).	2	DNA Ulnar Neuritis
15	(a)		TWO marks for a matched answer e.g. • less training time is required (1) because it will be what they expect (1) • increased productivity (1) as less training is required (1) • less resistance to using the new site (1) as it operates the way they think it should (1) • users bring their own preconceptions to the interface (1) interface needs to take account of this so users can operate it successfully (1) • most users will learn to use the interface by trial and error (1) if the interface is inconsistent with the mental model the user will get lost using the interface (1) • mental model of the online ordering system should follow manual ordering system (1) subsequent stages are anticipated and users are not surprised by the next step (1).	2	

Question			Answer	Marks	Guidance
	(b)		Two marks available for a matched answer e.g. • (draws an analogy between) the processing and storage of a computer (1) with the perceptual, cognitive, motor and memory activities of a human (1) • based on the human information processing model (1) describes the cognitive process that people go through between perception and action (1) • humans have their own audio and visual processor (1) and (cognitive) short-term working memory (1) • (cognitive) processor draws upon long term memory (1) to produce an output/motor response (1).	2	Accept diagram or an example.
	(c)		Two marks available for each matched two part answer One mark for point, one for expansion e.g. • a logical order (1) to the inputs will be initiated (1) • a flashing cursor (1) will indicate where the user is to enter data (1) • a beep may sound (1) when a mistake is made (1) • a visual or audible stimulus is captured (1) for example attention drawn to box on screen (1) • the physical attributes of the stimulii are decoded (1) for example the human interprets the response needed (1) • a motor response is initiated (1) the human clicks a mouse (1) • many colours have meaning to people (1) and so account needs to be taken of these prejudices (1)	4	Answer may refer to mental model OR Model Human Processor model

Question			Answer	Marks	Guidance
16			**Level 4 [9 – 11 marks]:** The candidate is able to discuss clearly the impact and consequences. Candidates will show a detailed level of understanding and be able to explain in detail both the impacts **and** consequence**s** of more than one position. Logical arguments are produced to demonstrate a clear understanding of the question. Ideas will be expressed clearly and fluently using specific knowledge to support and inform the discussion. There may be a reasoned conclusion. Subject specific terminology will be used accurately and appropriately. **Level 3 [6 – 8 marks]:** The candidate is able to discuss the impact(s) and consequences(s) Candidates will show a limited understanding and be able to explain, at least one impact **and** associated consequence of a given position, however explanations may lack specific detail and/or concentrate on either an impact or consequence with a limited explanation of the other. Subject specific terminology will be used accurately and appropriately. **OR** Candidates will have described a range of impacts to how external change may affect Awburn House Surgery and explained how the impact affects/has affected/will affect the Surgery. Subject specific terminology will be used accurately and appropriately. **Level 2 [3 – 5 marks]:** The candidate is able to explain the impact(s) or consequences(s) Candidates will show a limited understanding and be able to explain, at least one impact **or** consequence of a given position, however explanations may lack specific detail. The explanation, though informed, may stray from the point but specific knowledge will be evident. Some subject specific terminology will be used. **OR** Candidates will have described a range of impacts to Awburn House Surgery and described how the impacts affects/has affected/will affect the Surgery.	11	Level 1 – identified Level 2 – Explain impact or consequence **OR** describe range of impacts Level 3 – Explain impact and consequences of one position (positive or negative) **OR** explained range of impacts Level 4 – explained impact and consequences from more than one position (could be positive/negative)

Question			Answer	Marks	Guidance
			Level 1 [0 – 2 marks] The candidate is able to identify the impact **or** consequences. The information may be poorly expressed and may be in the form of a list of points. Subject specific terminology may be limited or missing. Points may include for example: • changes in the economy • changes in international markets for supplies • changes in individual spending patterns and effect on treatment/prescriptions • external changes in technology • changes in legislation • pressure from shareholders • competition.		

Question			Answer	Marks	Guidance
17			**Level 4 [9 – 11 marks]:** The candidate is able to discuss clearly the impact and consequences. Candidates will show a detailed level of understanding and be able to explain in detail both the impacts **and** consequence**s** of more than one position. Logical arguments are produced to demonstrate a clear understanding of the question. Ideas will be expressed clearly and fluently using specific knowledge to support and inform the discussion. There may be a reasoned conclusion. Subject specific terminology will be used accurately and appropriately. **Level 3 [6 – 8 marks]:** The candidate is able to discuss the impact(s) and consequences(s) Candidates will show a limited understanding and be able to explain, at least one impact **and** associated consequence of a given position, however explanations may lack specific detail and/or concentrate on either an impact or consequence with a limited explanation of the other. Subject specific terminology will be used accurately and appropriately. **OR** Candidates will have described a range of impacts of how hardware and software developments are changing/might change the way Awburn House Surgery treats patients and explained how the impact affects/has affected/will affect the surgery. Subject specific terminology will be used accurately and appropriately. **Level 2 [3 – 5 marks]:** The candidate is able to explain the impact(s) or consequences(s) Candidates will show a limited understanding and be able to explain, at least one impact **or** consequence of a given position, however explanations may lack specific detail. The explanation, though informed, may stray from the point but specific knowledge will be evident. Some subject specific terminology will be used. **OR** Candidates will have described a range of impacts to Awburn House Surgery and described how the impacts affects/has affected/will affect the Surgery.	11	Level 1 – identified Level 2 – Explain impact or consequence **OR** describe range of impacts Level 3 – Explain impact and consequences of one position (positive or negative) **OR** explained range of impacts Level 4 – explained impact and consequences from more than one position (could be positive/negative)

Question			Answer	Marks	Guidance
			Level 1 [0 – 2 marks] The candidate is able to identify the impact **or** consequences. The information may be poorly expressed and may be in the form of a list of points. Subject specific terminology may be limited or missing. Points may include for example: • health advice via apps • 3-D imagery for treatments • multimedia presentations as distractions • robotic physiotherapy • combating cyberchondriacs • artificial implants • txt reminders for appointments and course of tablets • embedded micro sensors in band-aids • smartphones and device consolidation • phone attachments to utilise cameras and send images • interfacing with pharmacies • remote monitoring, diagnosis and consultation • virtual procedures in training • sensors in prosthetics • demographic mapping of symptoms • e-records • self-barcodes during difficult treatment • robotic feedback of progress of treatment • ingested microchips as a form of control • implanted sensors connecting to mobile phones to alert staff.		

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