



Advanced GCE

**INFORMATION AND COMMUNICATION
TECHNOLOGY**

Unit G063: ICT Systems, Applications and
Implications

Specimen Paper

G063QP

Time: 2 hours

Candidates answer on the question paper.



Candidate
Name

Centre
Number

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Candidate
Number

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INSTRUCTIONS TO CANDIDATES

- Write your name in the space above.
- Write your Centre number and candidate number in the boxes above.
- Answer all the questions.
- Write your answers in blue or black ink, in the spaces on the question paper.
- Read each answer carefully and make sure you know what you have to do before starting your answer.

INFORMATION FOR CANDIDATES

- The number of marks is given in brackets [] at the end of each question or part question.
- The maximum number of marks for this paper is 120.
- The quality of your written communication will be examined in questions 9 and 14.
- No marks will be awarded for using brand names of software packages or hardware.
- In Section 1 you will be expected to answer using knowledge learned from studying the entire specification for GCE ICT, including the AS units.
- In Section 2 you will be expected to apply and extrapolate the knowledge gained from studying the entire specification.

For Examiners Use

	Mark	Max
1		5
2		4
3		8
4		4
5		8
6		6
7		5
8		11
9		9
10		14
11		9
12		12
13		12
14		13
Total		120

This document consists of **18** printed pages and **2** blank pages.

(b) State **one** advantage and **one** disadvantage of belonging to such a body.

Advantage:

.....

.....

Disadvantage:

.....

.....

[2]

Section A Total [40]

(c) Describe **two** factors which should be considered when managing this change.

.....

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.....

.....

.....

..... [2]

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OXFORD CAMBRIDGE AND RSA EXAMINATIONS

Advanced GCE

**INFORMATION AND COMMUNICATIONS
TECHNOLOGY**

G063MS

Unit G063: ICT Systems, Applications and Implications

Specimen Mark Scheme

The maximum mark for this paper is **120**.

Section A		
Question Number	Answer	Marks
1	Five from: Definition of the problem (1) Investigation and analysis (1) Design (1) Development (1) Testing (1) Installation (1) Documentation (1) Evaluation (1) Maintenance (1)	[5]
2	An analogy is drawn between the processing and storage of a computer (1) with the perceptual, cognitive, motor and memory activities of a human (1) A visual or audible stimulus is captured (1) and the physical attributes of the stimulus are decoded (1) <u>Examples can be given full marks e.g.</u> (attention drawn to box on screen) (1) (human interprets the response needed) (1) a motor response is initiated (1) (clicks a mouse) (1)	[4]
3 (a)	A specified group of computers (1) can communicate with each other without detecting the presence of other stations on the physical network. (1) Even though other virtual networks may exist using the same physical connections (1) the user of one VN would not notice the others (1) A VN can exist across a number of physical LANs or across the Internet (1) Communication is only permitted between stations on the virtual net (1)	[4]
(b)	Satellite phones need a clear line of sight to a satellite (1). The signal is taken from the phone to the satellite (1) it is then beamed from the satellite to a base station (1) where it joins the normal phone network (1) Satellite phones work best out-of-doors with no building obstructions in the way (1) Because they often bypass the phone company of the call's origin calls are often cheaper than mobile calls (1)	[4]

Section A		
Question Number	Answer	Marks
4 (a)	The data may not be compatible across the systems if standards are not agreed (1) Data may not be transferred correctly (1) leading to incorrect data and the consequences of using incorrect data (1) Transfer protocols (1) will ensure quality and reliability of data (1)	[2]
(b)	A communication system similar to the Internet (1) The services are restricted solely to the company/organisation (1) Has better security than the Internet (1) Can only be used by authorised users (1) Allows secure email transmission (1)	[2]
5 (a)	An application of artificial intelligence (1) Human knowledge and experience are made available from a computer package (1) Contains a knowledge base (1) and an inference engine (1)	[4]
(b)	Management Information Systems (1)	[1]
(c)	Human (1) Technological (1) Accommodation (1)	[3]

Section A		
Question Number	Answer	Marks
6	<p>Banded Response: High:5-6 Medium: 3-4 Low: 0-2</p> <p><u>High</u> Candidates have given several advantages and disadvantages and reached a summary or conclusion.</p> <p><u>Medium</u> Candidates have given a poorly argued case with few advantages or disadvantages. No conclusion is reached</p> <p><u>Low</u> List of points only with perhaps only disadvantages or advantages. No conclusion reached.</p> <p><u>Possible advantages</u> The software should have most of the bugs removed because it has been tested in the public domain for some time (1) There may be existing users / help groups / on-line help as the software is used by many other similar companies (1) The staff may already be familiar with the software so they will need the minimum / no training to use it (1) There will be little or no decrease in the efficiency of operations immediately after installation (1) It can be purchased / used immediately (1) Existing users can be contacted and asked about performance/ suitability (1) Training is probably available through third parties (1) It is relatively cheap to buy as it is already written and the costs effectively shared by a large customer base (1)</p> <p><u>Possible disadvantages</u> It may require significant changes in working practices (1) May not do exactly what is required and therefore involve further costs in having the software adapted (1) The software may have a larger memory footprint than custom-written (1)</p>	[6]

Section A		
Question Number	Answer	Marks
7 (a)	<p>To represent industry with government and other authorities (1)</p> <p>Set standards for members / provide a code of conduct for members (1)</p> <p>Provide its members with professional development (1)</p> <p>Provide support for its members (1)</p> <p>Keep members up-to-date with ICT developments (1)</p>	[3]
(b)	<p><u>Advantage</u></p> <p>Can receive updates (1)</p> <p>Can attend courses (1)</p> <p>Belonging gives status/helps job prospects (1)</p> <p>Helps police the profession (1)</p> <p><u>Disadvantage</u></p> <p>Only get one-sided view / could become reliant on professional body to give info (1)</p> <p>May not support your views (1)</p> <p>May restrict individualism / restrictive practices (1)</p> <p>Could be expensive (1)</p>	[2]
Section A Total		[40]

Section B		
Question Number	Answer	Marks
8 (a)		
(i)	The objectives/customer requirements (1) A contract (1) A timescale (1) User profile (1) Major constraints (1)	[4]
(ii)	The hardware the website will run on (1) The software it will be written with (1) Information about the people involved in the design (1) The way the pages will be organised (1) The links between pages (1) Data structures (1) Colours/fonts/sizes (1)	[4]
8 (b)	Gantt chart (1) A graph in which activities are plotted as bars (1) on a time scale (1)	[3]

Section B		
Question Number	Answer	Marks
9 (a)	<p>Banded Response: High:7-9 Medium: 4-6 Low: 0-3</p> <p>High (7-9) Candidates will accurately and clearly give a full discussion of differences between the systems, using appropriate examples The information will be well presented in a structured and coherent form appropriate to a discussion. Subject specific technology will be used accurately and appropriately. There will be few if any errors in spelling, grammar and punctuation Technical terms will be used appropriately and correctly</p> <p>Medium (4-6) Candidates will show an understanding of the problem and discuss satisfactorily the differences between the systems. The information will be presented in a structured format appropriate to a discussion and some subject specific terminology will be used. There may be occasional errors in spelling, grammar and punctuation</p> <p>Low (0-3) Candidates will demonstrate a limited understanding of the problem and are only able to discuss superficially the differences between the systems. Information may be a list of points, with no implications Information will be poorly expressed and the presentation of the information may not be appropriate for a discussion There will be a limited, if any, use of technical terms Errors of grammar, punctuation and spelling may be intrusive</p> <p>Answers may include: For batch processing the transaction data will be saved and then processed over a period of time For real-time processing the processing takes place at once Real time processing affects the database instantly The effects of batch processing are delayed Batch processing is often carried out when the systems are less busy such as at night A real-time system is needed when the customers are in the store and the system is very busy The company can use batch processing for calculating the wages of the staff at the end of the month Real time processing is ideal for automated stock control A mail shot to customers is most likely to be a batch processed task Both systems will find a place in the day-to-day running of the company</p>	[9]

Section B		
Question Number	Answer	Marks
10		
(a)	<p><u>Peer-to-peer</u> <u>Advantages</u> Inexpensive to set up/maintain (1) Fast/can share resources (1) No need to hire a network supervisor (1) <u>Disadvantages</u> Less security than client-server (1) Can only handle a small volume of traffic (1)</p> <p><u>Client-server</u> <u>Advantages</u> Security is easier as it is centrally controlled (1) Can handle requests from many clients at once (1) Easier to implement new technologies / software (1) <u>Disadvantages</u> Needs more staff (1) Relatively expensive to install (1) Problems if server goes down (1)</p>	[6]
(b)		
(i)	<p>A system to enable you to pin-point your position on the surface of the earth (1) Uses a receiver collecting signals from satellites (1)</p>	[2]
(ii)	<p>Each GPS satellite transmits data that indicates its location and the current time (1) The signals arrive at a GPS receiver at slightly different times (1) The signals given by the satellites are all synchronised (1) The distance to the GPS satellites can be determined by estimating the amount of time it takes for their signals to reach the receiver (1) The receiver estimates the distance to at least four GPS satellites and calculates its position in three dimensions (1)</p>	[4]

Section B														
Question Number	Answer	Marks												
(c)	A short-wave radio link (1) to allow devices to communicate without cable (1) It is an industrial specification for wireless personal area networks (PANs) (1)	[2]												
11 (a)	<p>This question will be marked using the P,E system.</p> <p><u>Points covered may include</u></p> <p>The consultants would discuss ways in which the computer interface could be designed (P) including GUI and purely textual systems (E)</p> <p>Because the employees would not want to spend a long time learning how to use the training system (P) they will discuss a system that is intuitive or simple to learn (E)</p> <p>Using a GUI system involves the use of icons which represent an idea already familiar to the employee (P) such as a dustbin for deleting or an X to close a window (E)</p> <p>In conclusion it is probably that the consultant will choose a GUI system that is that which the employees are most familiar with and would find the most enjoyable way to work (C)</p> <table border="1" data-bbox="416 1205 1272 1451"> <tbody> <tr> <td>P</td> <td>1 mark</td> </tr> <tr> <td>(P + P) or PE</td> <td>2 marks</td> </tr> <tr> <td>(P + PE) or PEE</td> <td>3 marks</td> </tr> <tr> <td>(PE + PE) or (P + PEE)</td> <td>4 marks</td> </tr> <tr> <td>(P + PE + PE) or (PE + PEE)</td> <td>5 marks</td> </tr> <tr> <td>C</td> <td>1 mark for a conclusion</td> </tr> </tbody> </table> <p>There is a mark for a conclusion (C) but a good answer can score full marks without a conclusion. Each good point scores a P and all elaborations on that point gain an E.</p>	P	1 mark	(P + P) or PE	2 marks	(P + PE) or PEE	3 marks	(PE + PE) or (P + PEE)	4 marks	(P + PE + PE) or (PE + PEE)	5 marks	C	1 mark for a conclusion	[5]
P	1 mark													
(P + P) or PE	2 marks													
(P + PE) or PEE	3 marks													
(PE + PE) or (P + PEE)	4 marks													
(P + PE + PE) or (PE + PEE)	5 marks													
C	1 mark for a conclusion													
(b)	<p>Computer assisted learning (CAL) (1) can be used at home or in own time (1)</p> <p>The staff can work at own pace (1), repeat sections as often as necessary (1)</p> <p>Management can monitor staff progress automatically (1)</p> <p>Computer based training (CBT) (1) could be used as part of a wider training programme, (1) perhaps involving interactive video training (1)</p>	[4]												

Section B		
Question Number	Answer	Marks
12 (a)	<p>Several computers on the network each hold part of the data (1) which is regularly synchronised (1)</p> <p>The entire database (1) is held on several computers at different sites (1)</p> <p>The central database holds an index to the entries (1) The data is held at different locations (1)</p>	[6]
(b)	<p>As access to the database is often from remote locations (1) then user authentication is important (1)</p> <p>Degradation of data being transmitted around the database system (1) is a possibility so checks must be in place to make sure it arrives accurately and securely (1)</p> <p>Physical danger to the data is possible (1) since not all parts of the database are necessarily in countries with good ICT legislation (1)</p> <p>Tampering with data or stealing the data (1) is a possibility and to avoid that a limited number of people should be given access to the whole system (1)</p> <p>The normal problems that apply to single databases also apply (1) such as hackers, viruses and criminal damage (1)</p>	[6]
13 (a)	<p><i>Any two from:</i></p> <p>Parallel (1) where both systems are run together for a time (1) until one system is gradually phased out (1)</p> <p>Pilot (1) where the system is tried out at one location first (1)</p> <p>Phased (1) where parts of the system take over a section at a time (1) until all the system has been replaced (1)</p> <p>Direct / big bang (1) where the old system ceases entirely as the new system takes over (1)</p>	[4]

Section B		
Question Number	Answer	Marks
(b)	<p>Adaptive maintenance (1) will be needed if changes in working practices are identified in a review (1) or an increase in the number of customers (1) to adapt the system if new legislation is introduced (1)</p> <p>Perfective maintenance (1) if new technology shows that the performance of the system could be improved. (1) For example improving speed of searches (1)</p> <p>Corrective maintenance (1) for fixing bugs (1)</p>	[6]
(c)	<p>Staff capability (1) company will need to consider amount of training required for staff (1)</p> <p>Staff views (1) make staff feel more involved and more likely to accept changes (1)</p> <p>Equipment existing/required (1) compatibility with new equipment / software (1)</p> <p>Accommodation (1) enough space for additional equipment/cabling</p>	[2]

Section B		
Question Number	Answer	Marks
14	<p>Banded Response: High:10-13 Medium: 5-9 Low: 0-4</p> <p>High (10-13) Candidates will show a clear understanding of the problem and answer the question with a detailed and clear discussion on developments and the way they will change how the company runs in the future The information will be well presented in a structured and coherent form appropriate to a discussion Subject specific terminology will be used accurately There will be few if any errors in spelling, grammar and punctuation. Candidates will have considered the sales force, warehouse workers and factory production methods Candidates will accurately and clearly, as a minimum give both positive and negative implications Not limited to existing system trends</p> <p>Medium (5-9) Candidates will show an understanding of the problem and discuss satisfactorily hardware and software developments The information will be well presented and some subject specific technology will be used There may be occasional errors in spelling, grammar and punctuation Candidates may only have considered some of the methods Candidates may only give either positive or negative implications Candidates may have limited their answer to existing system</p> <p>Low (0-4) Candidates will demonstrate a limited understanding of the problem and discuss superficially developments in hardware or software Information may be a list of points, with no implications Information will be poorly expressed and the presentation of the information may not be appropriate for a discussion There will be a limited, if any, use of subject specific technology Errors of grammar, punctuation and spelling may be intrusive</p> <p><u>Answers may include</u> Factory production could become completely automated Distribution in the warehouse could be completely automatic Customers could use the internet to order the goods from anywhere in the world Holograms would allow customers to view 3-D versions of the goods online Workers would become an extension to the system, perhaps wearing virtual reality suits at work</p>	[13]

Section B		
Question Number	Answer	Marks
	<p>Working conditions are improved</p> <p>All workers wear jackets/back-packs covered with solar cells so that their mobile video phones, personal music payers or other devices necessary for their work are charging continuously and never need to be removed from the person</p> <p>Artificial intelligence devices could carry out quality control cutting out human error</p> <p>Heuristic programs improving the design of the implements could be used following customer feedback and then shown to the customer for comment using an iterative design process</p> <p>Goods might be automatically packed and placed ready for collection using bar codes to track the process from warehouse to delivery and robotic devices to move goods around the warehouse, thus removing human intervention with improvements in safety.</p> <p>Customers could experiment with different colours or sizes in virtual reality before ordering from the online catalogue thus improving the profits of the firm by reducing the numbers of unsatisfied customers and returned goods</p> <p>Virtual reality gives the workers the impression that they are moving about the factory or manufacturing/testing the products, when in fact they never leave their chairs, though this could make them lazy and may have health implications</p> <p>Reasons for improved working conditions could include</p> <ul style="list-style-type: none"> • intelligent chairs that mould themselves to the employee's bodies and remember them for next time • atmospheric conditions monitored by computer setting the perfect humidity, sound and heat combination for producing the best work possible <p>Energy efficient devices help to reduce consumption of fossil fuels and decrease global warming.</p> <p><u>Conclusion</u></p> <p>In conclusion I predict that the rapid advance of software and hardware will continue and that many developments will help to make production more efficient and quality of products higher. Some workers may lose their jobs but those still employed will have a high level of job satisfaction</p>	
	Section B Total	[80]
	Paper Total	[120]

Assessment Objectives Grid (includes QWC)

Question	AO1	AO2	Total
1	5		5
2	4		4
3(a)	4		4
3(b)	4		4
4(a)	2		2
4(b)	2		2
5(a)	4		4
5(b)	1		1
5(c)	3		3
6(a)	4		4
6(b)	2		2
7(a)	3		3
7(b)	2		2
8(a)(i)	4		4
8(a)(ii)	4		4
8(b)	3		3
9(a)		7	7
9(b)	2		2
10(a)		6	6
10(b)(i)	2		2
10(b)(ii)	4		4
10(c)	2		2
11(a)		5	5
11(b)		4	4
12(a)		6	6
12(b)		6	6
13(a)	4		4
13(b)		6	6
13(c)		2	2
14		13	13
Totals	63	57	120

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