

Computing

Advanced GCE A2 7820

Advanced Subsidiary GCE AS 3820

Mark Schemes for the Units

January 2008

3820/7820/MS/R/08J

OCR (Oxford, Cambridge and RSA Examinations) is a unitary awarding body, established by the University of Cambridge Local Examinations Syndicate and the RSA Examinations Board in January 1998. OCR provides a full range of GCSE, A level, GNVQ, Key Skills and other qualifications for schools and colleges in the United Kingdom, including those previously provided by MEG and OCEAC. It is also responsible for developing new syllabuses to meet national requirements and the needs of students and teachers.

This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by Examiners. It does not indicate the details of the discussions which took place at an Examiners' meeting before marking commenced.

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.

OCR will not enter into any discussion or correspondence in connection with this mark scheme.

© OCR 2008

Any enquiries about publications should be addressed to:

OCR Publications
PO Box 5050
Annesley
NOTTINGHAM
NG15 0DL

Telephone: 0870 770 6622
Facsimile: 01223 552610
E-mail: publications@ocr.org.uk

CONTENTS

Advanced GCE Computing (7820)

Advanced Subsidiary GCE Computing (3820)

MARK SCHEMES FOR THE UNITS

Unit/Component	Page
2506 Introductory Computer Systems	1
2508 Computer Systems Development and Practical Applications	6
2509 Systems Software Mechanisms	14
2511 Integrated Information Systems	20
Grade Thresholds	25

2506 Introductory Computer Systems

- 1 (a) (i) One bit of data at a time
- (ii) Multiple bits simultaneously/down multiple links
- (iii) Communication in one direction only
- (iv) Communication in both directions, but only one way at a time
- (v) Communications in both directions simultaneously.
(1 per dotted, max 5) **[5]**
- (b) - Processor must be able to send printer data
- Printer must be able to send interrupt to processor
- Not at same time.
(1 per -, max 2) **[2]**
- 2 (i) - Magnetic Ink Character Recognition/Characters written using ink which can be magnetised,
- Bank account number on cheques/some passport numbers
- Characters readable by humans and by computers/security because difficult to forge/faster input than manual input. **[3]**
- (ii) - Optical Character Recognition/shapes of characters recognised,
- Machine to read documents to the blind/turnaround documents/to read documents into software for manipulation/postcode recognition/passport number recognition
- Documents can be read by humans/larger character set available/faster than retyping **[3]**
- (iii) - Optical Mark Recognition/recognises position of marks,
- School attendance register/multiple choice examinations
- Requires no training/ information conveyable by position of mark/high volume/reduce error/faster data input than keyboard or manual work **[3]**
- 3 (a) String/alphanumeric/Text 10-50
String/alphanumeric/Text 10-20
Currency/Real/Floating Point/Integer 2/4/6/8
Integer 1/2/4
(1 per data type and 1 for all sizes correct) **[5]**
- (b) - Multiply by 2000
- Add 10%
- Convert to sensible units/sight of /1024
- Answer 49.4 to 176.2 Kbytes.
(1 per -, max 4) **[4]**

- (c) - A copy of a file at a particular point in time
 - Taken in case the master file is corrupted
 - Kept off site
 - Mention of transaction log to cover time since last copy made
 - If master file corrupted then transaction log and backup can be used to recreate master
 - Means that the company is not in danger of losing data which is crucial to it.
 (1 per -, max 3) **[3]**
- 4 (i) - Searches hard drive/files for viruses/prevents importing of viruses
 - Deletes/quarantines any that are found
 (1 per -, max 2) **[2]**
- (ii) - Stores and retrieves files
 - Carry out file copying/renaming/deleting/movement/merged/sorting **[2]**
- (iii) - (Programs) that set the rules
 - for handling of data in hardware devices/in data transmission between devices.
 - Eg print driver formats data for printing/ensure compatibility across system
 (1 per -, max 2) **[2]**
- 5 (a) (i) - 8 bits
 - Even number of 1's **[2]**
- (ii) - It has an even number of 1's **[1]**
- (iii) - If two bits are in error in the same byte
 - it will still have an even number of 1's. **[2]**
- (b) (i) - Set of rules
 - governing the transmission of data **[2]**
- (ii) If video is downloaded to watch later
 - then bit rate is virtually irrelevant
 - because time taken is not important
 If video is to be watched live
 - then bit rate must be high
 - because of large amount of data to be sent in given time/time sensitive/to avoid lag.
 (1 per -, max 4) **[4]**
- 6 - Processor fills buffer with data...
 - then continues with other tasks
 - Buffer is emptied to secondary storage/primary memory
 - When empty...
 - interrupt sent to processor requesting more data
 - Interrupt given a priority
 - When interrupt has top priority
 - Processor will interrupt its current task and refill the buffer.
 (1 per -, max 6) **[6]**

- 7 (a) - Systems software is a set of programs which control the hardware
- Applications packages make the computer do something useful. [2]
- (b) E.g.
- Controls the instructions/during the processing cycle
- Synchronises the use of peripherals/by using the information in the drivers
- Provides means of communication between user and computer/name of an HCI
- Provides set of utility programs/procedure designed to carry out commonplace task/example
- Provides security/protects system from attack by using: password and ID's; virus checking; firewalls
- Provides memory management/ensures correct data and or instructions are available in memory
(2 per -, max 3 -, max 6) [6]
- (c) - Allows several applications to be...
- Available simultaneously
- Appears that many tasks are being executed together
- User switches freely between tasks
- Different tasks in different windows of a WIMP gives a good example/other example for a PC typically
(1 per -, max 3) [3]

8 (a)

Line	X	A	OUTPUT	CONDITION
	1	1		
4	1	1	1,1	
5	2	1		
6	2	1		
2	2	1		TRUE
3	2	4		
4	2	4	2,4	
5	3	4		
6	3	4		
2	3	4		FALSE
7	3	4		

(1 per pair of lines, max 4) [4]

(b) (i) WHILE X<3 Should change to WHILE X< 11 [1]

(ii) eg FOR X=1 TO 10
 OUTPUT X, X*X
 NEXT

Mark points:

- Use of FOR loop...
 - with correct condition
 - Use of OUTPUT to correctly output successive X's
 - Correct output of square of X.
- (1 per -,) [4]

9 (i) - A (self contained) set of code (which performs a given task) [1]

(ii) - Function returns a (single) value [2]
 - Procedure does not return a value

(iii) - Procedure contains a call to itself. [1]

- 10 (a) (i)** - Name of array
- Max size/bounds of array
- Data type
- Dimension of array
(1 per -, max 3) **[3]**
- (ii)** - Each row of the array
- treated as a record
- The records can then be stored as individual data items in a one dimensional array
(1 per -, max 2) **[2]**
- (b) (i)** - To find the position in an array
- of a given data item/search the array for a value **[2]**
- (ii)** - To identify that a match has been found
- and to stop the loop carrying on needlessly **[2]**
- (iii)** - To state that the required value is not in the array
- After the loop **[2]**

Total = 90 (86+4)

2508 Computer Systems Development and Practical Applications

1 (a) Any 3 from:

- Current software is outdated
- Current hardware/technology is outdated
- Current system is too slow/response times are slow for the user
- Current software does not perform its required task
- Current interface is not user friendly
- New facilities required
- Compatibility with other leisure systems/centres
- The leisure centre is expanding due to more customers
- Change in legal requirements

[3]

(b) (i) Any 6 from:

- Problem specification
- Feasibility study
- Analysis
- Design
- Coding/software development
- Testing
- Implementation/conversion
- Maintenance
- Review/Evaluation

[6]

(ii) Any 4 of the stages, max 2 for each
Problem Specification

- Existing problems identified
- User requirements
- As outlined by the leisure centre

Feasibility Study

- Is it technically feasible?
- Software/hardware available?
- Is it economically feasible?
- Is it socially feasible?
- Does the staff have the skills?
- Is it legal/within data protection legislation?
- Is it ethically ok?
- Does it meet environmental standards?

Analysis

- Production of a requirements specification
- Detailing inputs needed
- And outputs required
- Specify user requirements
- Hardware/software needs
- Fact finding(questionnaire/interview/record inspection/observation etc)

Design

- Specification of system
- User Interface designed
- Specification of data structures
- Prototyping
- Algorithms
- Files/file structure
- Input/form design
- Output/report design
- Validation procedures
- Security of data

Coding/software development

- Production of programs
- Tailoring software
- Modification of code
- Production of documentation

Testing

- Production and the carrying out of a suitable testing strategy
- Production of test data
- Alpha/beta testing
- Different types of testing-extreme, normal, exceptional
- Specify expected results

Implementation/conversion

- Method of conversion/changeover (parallel, pilot, direct etc)
- Staff training
- Master file set-up (setting up data/transferring data)
- Installation of hardware
- Installation of software

Maintenance

- Debugging the system
- Modifications due to changing needs
- Improving current processes

Review

- Check against objectives stated
- Any limitations
- Any upgrades required

[8]**(c) Any 3 from:**

- The user is involved at the beginning of the life cycle
- During the feasibility study
- Assisting in producing a list of user requirements
- Fact finding
- Assisting in the evaluation stage
- Identifying possible future improvements
- Testing for errors
- User should be consulted at each stage of the life cycle
- User validates/checks each stage of the life cycle

[3]

(d) (i) Any 2 from:

Rule base

- Part of the knowledge base
- ...which is made up of all the rules
- ...known to the expert system

[2]

(ii) Any 2 from:

Inference engine

- Allows the computer to search the knowledge base
- Uses standard searching methods
- ...that are independent of the knowledge base
- Derives new facts from known facts
- ...by applying rules of logic

[2]

2 (a) Any 3 from:

- Direct changeover/Big Bang
- Old system stops
- And the new system begins
- No overlap between systems
- If new system fails
- Old system cannot be used
- New system is implemented at a quiet period

[3]

(b) Any 3 from:

- Pilot changeover
- New system could be used
- In a few restaurants initially
- The results could be compared
- Against the other restaurants that use old system
- Roll out the new system
- If successful (abandon the old system)

[3]

3 (a) Any 2 from:

Advantages of off-the-shelf.

- Readily available
- Third party user documentation available
- Shared development costs
- Tried and thoroughly tested
- Extremely reliable
- Third party training
- Compatibility with other users of the software

[2]

Any 2 from:

Disadvantages of off-the-shelf.

- It does not fit user requirements exactly
- Programs may not run on existing hardware
- You may have excess functionality
- Program maintenance may be more difficult

[2]

(b) (i) Database software/spreadsheet software/stock control**[1]****Any 1 from:**

For example:

- Can create a suitable record structure
- Can query/add/delete/amend stock details
- Can produce orders automatically
- Can produce reports automatically

[1]**(ii) CAD software****[1]****Any 1 from:**

For example:

- Automatic 3D generation (to show the different views/walk through of the building)
- Libraries of design objects
- Calculates stresses and strains (at various points within the structure of the building)
- Rotate/zoom features (to manipulate the finer detail of a building)

[1]**4 (a) (i) Any 4 from:**

- Weights are applied to each digit in the code
- Sum of the products is calculated
- divide sum by 11 and use remainder
- $11 - R = \text{Check digit}$
- Special cases (1) such as $R=1$ check digit $=X$

OR ACCEPT THE CALCULATION

0	3	5	1	6	3	6	2	7	7
10	9	8	7	6	5	4	3	2	1

0	+27	+40	+7	+36	+15	+24	+6	+14
---	-----	-----	----	-----	-----	-----	----	-----

(1 mark)

 $= 169/11$ (1 mark) $= 15 \text{ R } 4$ (1 mark) $\text{CD} = 11 - R = 11 - 4 = 7$ (1 mark)**[4]****(ii) Any 2 check descriptions from the 3 below, max 4**

- **Length check**
- whereby the book number has a fixed number of digits
- in this case 10 characters for each barcode
- **A character type check**
- to check only digits/X have been read
- only numeric/integer/data
- **Existence check**
- Checks the file of books
- To ensure barcode exists in the file

[4]

(b) Any 6 from:**Operational**

- used for day to day decision making
- such as planning resources/manpower
- ...check to see what books are being borrowed
- ...checking stock levels of different categories of books
- daily information maybe required
- such as the number of a certain type of book eg children's' fact books borrowed

Tactical

- Data is processed to allow for tactical decisions
- Used for short to medium term planning
- Summary reports on loans and book requests

For example:

- ...Increase/decrease the number of books that can be borrowed by a user
- ...planning for staff training
- ...analysing weekly/monthly overdues

Strategic

- Used for long term planning
- ...by senior managers
- To support "What if" decision making by management
- ...decision support
- Such as... acquiring new libraries
- ...creating new e-libraries
- ...predicting future changes

[6]

(c) Any 3 risks with methods from below, max 6

- Repetitive strain injury (RSI)

For example:

- Employee needs to take regular breaks

- Radiation from VDU

For example:

- Fitting of anti-glare screen/filters

- Posture problems

For example:

- Appropriate furniture for users

- Eye problems

For example:

- Employer pays for eye tests

- Epilepsy

For example:

- Use of interlaced screens

[6]

5 (i) **Scanner****Any 4 from:**

- Passes a beam of bright light over an image
- Sensors are used to collect data about the amount of light reflected from different parts of the picture
- This can separate the light intensities and the colour
- This data is used to produce a digital image of the picture
- This image can then be saved, and edited using image editing software
- The resolution of the picture is determined by the file format, eg JPEG

[4]

(ii) **Video Capture card****Any 4 from:**

- Specialised analogue-to-digital converter
- Reads video signals from video tapes/video cameras in analogue form
- And converts to digital form
- Reads a frame at a time to allow for manipulation
- Digitises the signal and stores in a computer
- Uses CODEC (compression/decompression) techniques

[4]

(iii) **Digital Camcorder****Any 4 from:**

- Records digital images onto video tape/small DVD's/memory card
- Can record still pictures
- You can adjust the lens/focus
- Images are taken by converting light passing through the lens of the camera
- Grids of tiny light sensors can convert light to binary patterns
- Each binary pattern represents a colour or shade of light
- The image captured can vary in resolution
- The video can be viewed immediately and stored or deleted
- The contents of the camera's memory can be transferred to a PC for storing, editing etc

[4]

6 (a) **Any 3 factors from below, max 6**

- **User friendly**
- Meaningful icons/colour/font etc
- Well organised/uncluttered screen
- Common features with other packages
- Intuitive feel

- **Help available for novices/inexperienced users**
- Tutorials/demos
- Wizards
- Tips
- Concise, easy to read error messages
- Context sensitive help

- **Facilities for experienced users**
- Providing "short cuts" users
- Customising menus
- Customising toolbars
- Function keys
- Command line

- **Making use of human memory**
- Making use of human long-term/short term memory
- Such as function keys (f1 help)
- Recognisable icons

- **Technophobia**
- How the system helps overcome people's fear
- Using computers and trying things out

- **Accessibility**
- Suitable contrast
- Sound output if required

- **Hardware design**
- The mouse/keyboard are ergonomically acceptable

[6]

(b) Any 3 factors from below, max 6

- **Windows**
- Screen is organised as a series of windows/overlapping frames
- That can be viewed singularly or in combinations

- **Icons**
- To allow easy recognition of images
- Used as a short cut for the user/no need to type in commands

- **Menus (Pop-up/pull down)**
- To select features
- From a predefined list of options

- **Pointer/pointing device**
- To control the cursor on the screen
- To allow the user to interact with the GUI

- **Help facility**
- User can enter key words/phrases
- Package will provide guidance to carry out an activity

- **Hot keys**
- To activate commands
- As an alternative to a mouse/pointing device

- **Dialogue boxes**
- Allows for user interaction
- Controlled responses including default value

- **Toolbars**
- Allows short cuts for users
- Using meaningful icons

- **Ability to use a command line**
- To enter instructions/macros

[6]

- (c) Any four of the above x 1 mark.
 Any other relevant example, award 1 mark.
 Example must be linked to student and Data Protection Act to achieve mark.

Data protection provision

- Personal data must be obtained and processed lawfully.
- Personal data must be held for specified purpose.
- Personal data must be accurate and up-to-date.
- Personal data must be relevant.
- Personal data must not be kept longer than necessary.
- Personal data should be held securely, with no unauthorised access.
- Personal data should not be transferred outside the EU.

Example

- Using student details/consent of student
- To assist the school while the student is attending.
- Such as student exam results.
- Only data about the student's education should be held.
- While the student is still registered with the school.
- From other non-admin staff in the school.
- Student details should not be transferred to other educational establishments outside EU.

[4]

Total = 90 (86+4) marks

2509 Systems Software Mechanisms

Each bullet point is worth one mark, up to the maximum for that section, unless stated otherwise.

1	(i)	<ul style="list-style-type: none"> • an “order of importance”... • assigned to a job • to maximise efficiency/increase throughput. 	[max 2]
	(ii)	<ul style="list-style-type: none"> • a signal/message to the processor • generated by a source • may cause a break in execution (of the current routine)... • so it can be resumed later 	[max 2]
	(iii)	<ul style="list-style-type: none"> • P starts... • as it has higher priority • when P cannot continue... • Q has processor time... • until an interrupt from P... • when P gets processor time... • this cycle repeats until one of the programs finishes then other program runs to completion 	[max 4]
2	(a)	<ul style="list-style-type: none"> • convert from source code / high level language / language used by humans... • to object code / low level / executable code / intermediate code / machine code • identifies errors 	[max 2]
	(b)	<ul style="list-style-type: none"> • accepts output from lexical analysis • statements are checked.. • against the rules of the language • errors are reported... • as a list at the end of compilation • diagnostics may be given • some reported errors may be spurious • if no errors, code is passed to the code generator 	[max 4]
	(c)	<ul style="list-style-type: none"> • interpreter stops at first error • an error message is produced • error would be corrected (by programmer) • program can restart from any point • this is repeated... • ...until all errors are removed... • ...when program will run 	[max 4]

3	(a)	<ul style="list-style-type: none"> • single control unit / processor manages program control • one instruction at a time in linear sequence • program stored with data (in the same format)
		[max 3]
(b)	(i)	<ul style="list-style-type: none"> • fetch • decode • execute • reset
		[max 3]
	(ii)	<ul style="list-style-type: none"> • multiple processors are used together... • to perform different parts of the program (at the same time) • program is split into a number of tasks... • each of which may be processed by any available processor
		[max 2]
	(iii)	<p>advantage:</p> <ul style="list-style-type: none"> • speeds up the processing of the program • so that time sensitive processes can be completed <p>disadvantage:</p> <ul style="list-style-type: none"> • programs are going to be more complex • because they are dealing with a large number of processors • program has got to be written especially
		[max 4]
4	(a)	<pre> graph TD dog --> cat dog --> rabbit rabbit --> fish rabbit --> turtle fish --> mouse </pre>
		<p>marks for</p> <ul style="list-style-type: none"> • root • left subtree • right subtree
		[max 3]

(b)		2	5	6	9	3	17	1	
	no change:	2	5	6	9	3	17	1	
	insert 3:	2	3	5	6	9	17	1	
	no change:	2	3	5	6	9	17	1	
	insert 1:	1	2	3	5	6	9	17	
[1 mark each row to max 4]									
5	(a)	<ul style="list-style-type: none"> • type of structured programming • problem is defined simply... • ...then split into smaller sections • ...each section is split further • ...until small enough to be programmed 							[max 2]
	(b)	<ul style="list-style-type: none"> • may be included in subroutine library... • ...so ready to use • easier to test a small section of code • different programmers can work on sections of the program... • according to their expertise... • so the program is completed more quickly/to a higher standard • called more than once in a program 							[max 3]
	(c)	<ul style="list-style-type: none"> • position from where procedure call is made is pushed on to the stack • values of parameters are put on stack • addresses of parameters are put on stack • values are reallocated to variables • stack is unwound by popping return addresses from top of stack • problem – overflow (especially with recursion) 							[max 4]

6	(a)	<table border="1"> <thead> <tr> <th>Statement</th> <th>DDL only (✓)</th> <th>DML only (✓)</th> <th>Both (✓)</th> </tr> </thead> <tbody> <tr> <td>It is used with databases</td> <td></td> <td></td> <td>✓</td> </tr> <tr> <td>It is a high level language</td> <td></td> <td></td> <td>✓</td> </tr> <tr> <td>It is used to create new tables</td> <td>✓</td> <td></td> <td></td> </tr> <tr> <td>It can query data</td> <td></td> <td>✓</td> <td></td> </tr> <tr> <td>It is used to define primary keys</td> <td>✓</td> <td></td> <td></td> </tr> <tr> <td>It can update existing data</td> <td></td> <td>✓</td> <td></td> </tr> </tbody> </table>			Statement	DDL only (✓)	DML only (✓)	Both (✓)	It is used with databases			✓	It is a high level language			✓	It is used to create new tables	✓			It can query data		✓		It is used to define primary keys	✓			It can update existing data		✓	
		Statement	DDL only (✓)	DML only (✓)	Both (✓)																											
		It is used with databases			✓																											
		It is a high level language			✓																											
		It is used to create new tables	✓																													
		It can query data		✓																												
		It is used to define primary keys	✓																													
		It can update existing data		✓																												
[1 mark each correct row, max 6]																																
(b)	<i>marks in pairs:</i> <ul style="list-style-type: none"> less duplication of data (1) so less storage wasted/needed /no need for multiple updates (1) data integrity/consistency (1)/only one version of data (1) program-data dependence avoided (1) so easier to change data format (1) easy to obtain new reports (1) as system is more flexible (1) security (1) because you can restrict access to tables/audit trails (1) can create views (1) for security/to suit different types of user (1) 																															
		[max 4]																														
(c)	(i)	<ul style="list-style-type: none"> one-many 																														
		[1]																														
	(ii)	<ul style="list-style-type: none"> a primary key ensures uniqueness primary key of Patient (eg PatientId)... is used in Appointment as foreign key to provide relationship (between entities) 																														
		[max 3]																														
	(iii)	<ul style="list-style-type: none"> avoid many-many relationship diagram is not in 3NF 																														
		[max 1]																														
	(iv)	<ul style="list-style-type: none"> an attribute used for searching for a group of records/indexed eg DOB... to identify group of patients in particular age range eg medication... to identify patients receiving particular drug (or other explained example for Patient entity) 																														
		[1 for meaning plus 2 for explained example, max 3]																														

7	(a)	(i)	<p>Mary Tom Anu Jay</p> <p>front rear</p> <p>marks for</p> <ul style="list-style-type: none"> all names present in correct order both pointers correct 	[max 2]
		(ii)	<p>Anu</p> <p>front rear</p> <p>mark for</p> <ul style="list-style-type: none"> front & rear pointing to Anu (other data may remain) 	[1]
	(b)	(i)	<ul style="list-style-type: none"> last in, first out/LIFO/data added & removed from the same end 	[1]
		(ii)	<pre> eg begin if stack_is_empty then output "Stack empty" else begin output "Item removed was" data(stack_pointer) stack_pointer := stack_pointer - 1 end end end </pre> <p>marks for</p> <ul style="list-style-type: none"> test for empty stack output error message correct data item output change value of stack pointer if..then..else used correctly/begin..end structure used correctly/indents used as in example 	[max 5]
	(c)	(i)	<ul style="list-style-type: none"> static size is fixed (when structure is created)/dynamic size changes (during use) 	[1]
		(ii)	<ul style="list-style-type: none"> storage requirements are known easier to write program programming errors are less likely 	[max 2]

8	(a)	(i)	<ul style="list-style-type: none"> likes (tom, omar) is true and likes (omar, tom) is true 	[1]
		(ii)	<ul style="list-style-type: none"> likes (harry, emma) is false 	[1]
(b)	(i)	<ul style="list-style-type: none"> is_girlfriend (X, tom) find someone who is Tom's girlfriend 	[max 1]	
		(ii)	<ul style="list-style-type: none"> Y is instantiated to tom (in the goal) 	[1]
		(iii)	<ul style="list-style-type: none"> Y = tom female(X) X = jackie likes (tom, jackie) succeeds – jackie female (X) 2nd time X = emma likes (tom, emma) fails only value obtained is Jackie 	[max 6]
				Total=86+4=90

2511 Integrated Information Systems

1 Give 1 mark for type and 1 mark for appropriate use x 4

- Word processor
 - to write letters
 - Database
 - to keep details of customers
 - Spreadsheet/accounting
 - to keep accounts
 - Desk top publishing
 - to produce fliers
- [8]**

2 (a) Give 1 mark per point

- Special purpose written to solve a specific problem
 - Common generic software can solve many problems
- [2]**

(b) (i) Inputs – give 1 mark per point to a maximum of 3
 Processing - give 1 mark per point to a maximum of 2
 Outputs - give 1 mark per point to a maximum of 2

Inputs:

- Position of houses
 - ...with their addresses
 - Distances
 - Maps
 - One way streets
 - Cul-de-sac
 - Day/date of cleaning
- [3]**

Processing:

- Create subset of houses for a particular day/choose the houses for the bins to be delivered
 - ...with maximum of 50
 - Calculate distances
 - Compare results
 - Choose minimum
 - Use a routing algorithm
- [2]**

Outputs:

- Lists of routes
 - ... with details of which houses to visit/addresses
 - ... in the order in which they are to be visited
 - Times
- [2]**

(ii) Give 1 mark per point to a maximum of 2

- There isn't time to keep running the simulation
 - ... with different inputs every time
 - Inputs are too variable
 - Too many variations that can take place
 - Current routes are no longer optimal
- [2]**

- 3 (a) Give 1 mark per point for indexed sequential file to a maximum of 4
Give 1 mark per point for random access file to a maximum of 4

Indexed sequential file:

- An index is searched
- ... until correct index is found
- ... then serially search
- ... block pointed to by index
- Mention of more than 1 index [4]

Random access file:

- Calculate expected position of record
- Check that position for empty
- ... or correct record
- If not empty go to next free location/overflow bucket
- If not record searched for try successive locations
- ... until record is found
- ... or back to starting position
- Mention of error messages [4]

- (b) Give 1 mark per point to a maximum of 3

- Large quantity of similar data
- Same processing
- No human intervention
- Can be done overnight
- Results not needed urgently [3]

- (c) Give 1 mark for definition of term and 1 mark for reason in each case

Back up – A copy of files at a particular instant
Reason – To restore files in case of loss/corruption [2]

Archive – a copy of data that is not likely to be changed
Reason – legal/in case of enquiries/free space on storage [2]

- (d) Give 1 mark per point to a maximum of 2 for hardware and 1 for software

Hardware:

- Modem
- Broadband connection/ADSL/DSL
- Telephone (line) [2]

Software:

Communications software/browser [1]

- (e) Give 1 mark per utility to a maximum of 3

- Compression software
- Defragmentation software
- Anti-virus software
- File manipulation
- Anti-spyware
- Firewall software [3]

- 4 (a) (i) Use of the Internet to do business [1]
- (ii) Give 1 mark per point to a maximum of 4
- Worldwide markets
 - No need for shops
 - 24/7 working
 - Can test customers needs without expensive market research
 - Shortens time between ordering and dispatching
 - Can keep adverts up-to-date
 - No need for cash/cheques
 - ... because money can be directly transferred [4]
- (b) (i) Give 1 mark per point to a maximum of 2
- It sits between a LAN/PC and a WAN
 - ... and uses menus/IP addresses/applications in the incoming messages
 - ... to validate incoming data
 - ...and to block unwanted data [2]
- (ii) Give 1 mark per point to a maximum of 4 for encryption
Give 1 mark per point to a maximum of 2 for authentication
- Encryption:
- Apply a mathematical function
 - ... using a key value
 - ... to scramble a message
 - Sender has public key to encrypt
 - Receiver has private key to decrypt [4]
- Authentication:
- Uses a digital signature
 - ... which is a code attached to the message
 - Mention of digital certificates [2]
- (c) Give 1 mark per point to a maximum of 3
- Shared software
 - Shared hardware
 - Shared data
 - Single Internet connection [3]

- 5 (a) Give 1 mark per advantage to a maximum of 2
- Wide customer base
 - Cheap advertising
 - Information can be kept up-to-date
- [2]**
- (b) Browser's title - OCR GCE Computing **[1]**
- Main heading – COMPUTING **[1]**
- <p> and </p> - Start marker (for paragraph)
 ... and end marker (for paragraph) **[2]**
- File name - A_computer.jpg **[1]**
- Printed – Computer **[1]**
- Picture title - A Personal Computer **[1]**
- Link – OCR or in a different colour **[1]**
- 6 (a) Give 1 mark for each point to a maximum of 4
- Each stage needs to be verified against
 ... what was defined in the previous stage
 ... and earlier stages
 This may lead to changes in current stage
 ... and possibly earlier stages
 Each change then needs to be verified again **[4]**
- (b) Direct changeover – Everything changes at once/big bang
 Advantage – It's quick/no duplicate systems
 Disadvantage – Nothing to fall back on if error occurs
- Parallel changeover – Old and new systems work along side each other
 Advantage – If anything goes wrong, can revert to old system
 Disadvantage – Can be timing consuming/expensive
- Phased changeover – System introduced in some areas only/parts of the new system brought in followed by others
 Advantage – If anything goes wrong the whole system doesn't crash/gradual training
 Disadvantage – Can be a slow process **[9]**

(c) Give 1 mark for each point to a maximum of 7

- User request needs to be very clear
- ... with no ambiguities
- Initial study needs to clarify user needs
- ... with all staff involved
- Systems analysis needs to clarify I/O's
- ... make sure user requirements are known precisely
- ... and included in specification
- System design needs to be regularly checked with user
- Use prototypes
- ... to show user what is to be done
- ... and to check it satisfies user
- Check implementation against user requirements
- Thorough testing

[7]

Grade Thresholds

Advanced GCE Computing (3820/7820)
January 2008 Examination Series

Unit Threshold Marks

Unit		Maximum Mark	A	B	C	D	E	U
2506	Raw	90	67	59	52	45	38	0
	UMS	90	72	62	54	45	36	0
2507	Raw	120						
	UMS	120						
2508	Raw	90	62	56	50	44	38	0
	UMS	90	72	62	54	45	36	0
2509	Raw	90	71	64	57	50	44	0
	UMS	90	72	62	54	45	36	0
2510	Raw	120	98	87	76	65	54	0
	UMS	120	96	84	72	60	48	0
2511	Raw	90	66	59	52	45	39	0
	UMS	90	72	62	54	45	36	0

Specification Aggregation Results

Overall threshold marks in UMS (ie after conversion of raw marks to uniform marks)

	Maximum Mark	A	B	C	D	E	U
3820	300	240	210	180	150	120	0
7820	600	480	420	360	300	240	0

The cumulative percentage of candidates awarded each grade was as follows:

	A	B	C	D	E	U	Total Number of Candidates
3820	4.9	26.8	56.1	82.9	97.6	100	41
7820	0	0	80	80	100	100	5

46 candidates aggregated this series

For a description of how UMS marks are calculated see:
http://www.ocr.org.uk/learners/ums_results.html

Statistics are correct at the time of publication.

OCR (Oxford Cambridge and RSA Examinations)
1 Hills Road
Cambridge
CB1 2EU

OCR Customer Contact Centre

14 – 19 Qualifications (General)

Telephone: 01223 553998

Facsimile: 01223 552627

Email: general.qualifications@ocr.org.uk

www.ocr.org.uk

For staff training purposes and as part of our quality assurance programme your call may be recorded or monitored

Oxford Cambridge and RSA Examinations
is a Company Limited by Guarantee
Registered in England
Registered Office; 1 Hills Road, Cambridge, CB1 2EU
Registered Company Number: 3484466
OCR is an exempt Charity

OCR (Oxford Cambridge and RSA Examinations)
Head office
Telephone: 01223 552552
Facsimile: 01223 552553

© OCR 2008

