



ASSESSMENT and  
QUALIFICATIONS  
ALLIANCE

# Mark scheme

# June 2003

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## GCE

# Computing

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**The following notation is used in the mark scheme**

- ; - means a single mark;
- // - means alternative response;
- / - means alternative word or subphrase
- A. – means acceptable creditworthy answer;
- R. – means reject answer as not creditworthy;
- I. – means ignore.

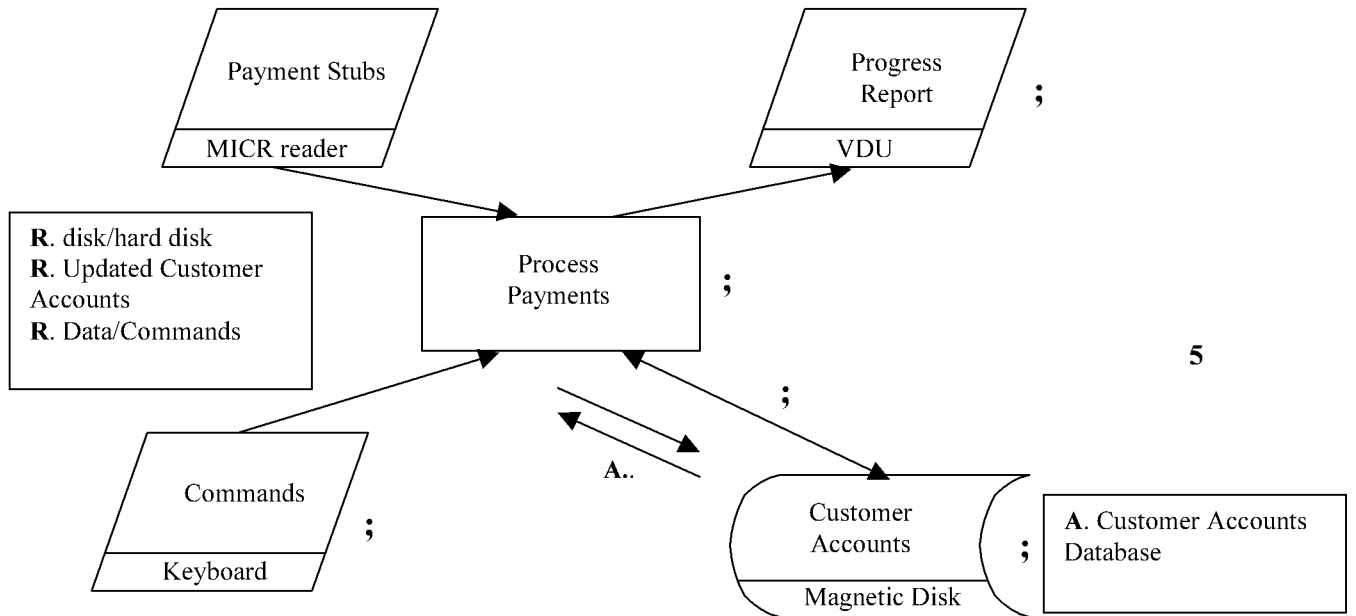
1 Any two @ one mark each  
 Interview;  
 Observation;  
 Survey/Questionnaire;  
 Examination of paperwork;  
**Total 2**

2 (a) Method: key-to-disk// explanation, e.g. keyed in and stored on disk;  
**R.** keyed in and stored in database **1**  
  
 Justification: not suitable for direct data entry because large volume//often  
 written badly//proposal form needs some interpretation; **1**  
  
 OR  
  
 OCR//explanation; **R.** Just scanning or use a scanner  
 OMR//explanation;  
**R.** MICR **R.** Voice recognition **1**  
  
 Justification: Reduced human intervention//possibly fewer errors//faster to enter  
 data(**R.** Quicker/faster on their own )//can cope with large volume; **1**  
  
**max 2**

(b) **R.** validation or validation of data **R.** plenty of space on forms  
 Verification/Double entry//visual inspections/spot checks//validation check on fields  
 (A. example that relates to fields)//  
 form design(use of boxes)//batching//control totals//batch totals//  
 hash totals; **R.** Default values  
 A. Require data to be written in block capitals/capital letters/uppercase letters **1**  
  
**Total 3**

Relate to fields of the entry of individual items

3 (a)



(b) System flowchart;  
 A. System Flow diagram  
 R System Diagram

1

(c) Magnetic Ink Character (Recognition);  
 A. Characters encoded/written using/in magnetic ink  
 A. Magnetic Ink Character Reader  
 R. Magnetic ink R. MICR

1

**Total 7**

- 4 (a) (i) Old system and new system operate alongside each other/in parallel until new system proved; (require time limited trial) **1**

Be careful that you are not giving mark for a pilot

- (ii) Parts of old system gradually replaced in stages by new system; **1**

- (b) Information/Data/Files may have to be converted/copied/reformatted/modified so that compatible with new system;  
Users/operators will have to be trained so that they can use the new system//Staff needed/hired to maintain new system;  
Old data archived;  
Make full backup before changing to new system;  
Hardware replaced/upgraded;  
System software replaced/upgraded; **2**

- (c) NB Emphasis is on changes not performance  
Is it possible/How easy is it/How long will it take to correct an error in software;  
Is it possible /How easy is it/How long will it take to change parameters in system, e.g. VAT rate;  
Is it possible /How easy is it/How long will it take to change system to cope with more users;  
Is it possible /How easy is it/How long will it take to change system to cope with more terminals/workstations;  
Is it possible /How easy is it/How long will it take to change system to cater for more software licences;  
Is it possible /How easy is it/How long will it take to change system to work with different hardware;  
Is it possible /How easy is it/How long will it take to update/upgrade system;  
How extensive is support documentation;  
What is skill level of support staff;  
What is availability of support staff;  
Can operators/users configure system/change settings;  
How long will support be available for;  
Is source code available;  
A. One reference only to documentation;  
R. How easy is it to add new features/expand system; **3**  
R. What is standing of developers;

**Total** **7**

- 5 (a) Any two ways at one each  
 Barcode;  
 OCR;  
 MICR;  
 Magnetic stripe;  
 Smart card/Microchip/Memory chip;  
**R. Computer chip R. Chip R. OMR**

2

(b) **Either**

Biometric method used locally:

One mark for what is stored on ID card – one of fingerprint, retina pattern, iris pattern, ear pattern, palm print (NB not DNA), vein pattern, (electronic) stored facial image (but not visible photograph of person) ;

One mark for capturing the biometric information and comparing with what is on card.

Expectation is of a system that stores this information on card in a way that is hard to tamper with

**Or**

Biometric method involving checking remote central database:

One mark for capturing specified biometric information - one of fingerprint, retina pattern, iris pattern, ear pattern, palm print (NB not DNA), vein pattern, facial image;

One mark for comparing with stored biometric information held in central database;

**Or**

One mark for entering pin number;

One mark for comparing entered pin number with stored pin number on remote database or stored on card;

**Or**

Photograph on card scanned//Camera captures image of person//PersonID scanned in//PersonID typed in;

Image compared with image stored on remote database;

**R. Remote database stores whether card has been lost/stolen – card will have to be re-issued with same name, address, PersonID**

**A. Remote database stores whether card lost/stolen; – card will have to be re-issued with new PersonID;**

2 or nothing

2

**Total**

4

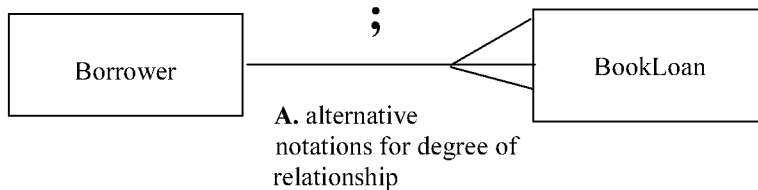
- |   |     |   |          |
|---|-----|---|----------|
| 6 | (a) | Medium: Magnetic hard disk<br>A. Hard Disk  | 1        |
|   |     | Justification: Random access device;<br>Sufficiently high data transfer rate;<br>Sufficiently high storage capacity;<br>R. Magnetic disk is fast enough   | 1        |
|   | (b) | (i)   |          |
|   |     | Processing is faster; A. System runs faster<br>Loading on main processor can be reduced;<br>CODEC has its own processor;<br>R. Faster on its own;<br>A. Faster with justification   | 1        |
|   |     | (ii)  |          |
|   |     | Movie needs to be <u>compressed</u> to fit storage capacity of DVD-R;   | 1        |
|   | (c) | Backing up (data stored on magnetic disk drive);<br>Archiving (data);<br>R. Storing video once editing complete   | 1        |
|   |     | <b>Total</b>  | <b>5</b> |
|   |     |   |          |
| 7 | (a) | LAN;<br>Justification:<br>Computers in health centre are in close proximity to each other/geographically close/in same building/on same site;<br>R. Computers <b>within health centre</b> on its own  | 2        |
|   | (b) | <b>NB each way must be different. Each way must be a benefit and not just a statement of fact.</b>  |          |
|   |     | (i)   |          |
|   |     | <u>Easier/save time</u> booking an appointment//easier to check for a free appointment slot;<br>Can be treated anywhere when away from “home”/moving to a new surgery<br><u>safely</u> / <u>without having to give</u> medical history or needs of patient addressed <u>more quickly</u> because medical records accessible remotely and immediately; (R. Can view medical records more quickly on its own and in the context of own GP’s surgery where paper medical records available. Viewing more quickly is OK if candidate describes context of moving to a new surgery and before medical records handed over to new surgery)<br>Needs of patient can be serviced <u>more quickly</u> because results of hospital tests available to patient’s doctor more quickly via network;<br>Needs of patient can be serviced <u>more quickly</u> because doctor can check electronically on availability of hospital beds/surgeons/consultants; |          |

Continued.....

- (i) Needs of patient can be serviced **more quickly** because patient's doctor can be informed more quickly via electronic means when patient discharged from hospital;  
Emergency admissions can be dealt with **more safely** because patient medical history instantly available to hospital;  
Hospital doctor can make diagnosis **more quickly** by having access to full medical history of patient;  
Patients can be **saved time** when collecting prescriptions if prescription sent electronically to pharmacist;  
**R. Can make diagnosis more quickly on its own** 1
- (ii) Fewer letters to open/file/post because communication electronic **saves time**;  
**Time consuming** letter writing and telephoning **avoided** because availability of hospital beds/ surgeons/ consultants can be checked on-line;  
**Time consuming** report(letter) writing can be **replaced** by automatic report(letter) generation and **despatch**;  
**Faster communication** is possible because messages sent and received by electronic mail travel through system **more quickly**;  
**Reduction in volume of stored paperwork (saves space)** because more of it will be held electronically;  
**Easier to identify** patterns of illness in health centre's patients because automatic processing possible;  
Routine tasks automated **freeing staff time**;  
**Saves GP's time** if medical expertise can be accessed electronically; 1
- (iii) It is **easier and less time-consuming** for a pharmacy to check a prescription because electronic access to the GP's record of the prescription is possible;  
Advanced notice of prescription can be issued **smoothing workload** of pharmacist/giving **more time** to prepare prescription/**more transactions** can be conducted;  
Pharmacist can generate **more business** by electronic authorisation of repeat prescriptions;  
Access to stock records of other pharmacies can **save pharmacist time** locating needed supplies; 1  
**R. Stock checking R. Less paperwork**
- (iv) Collection of statistics **made easier** because government can interrogate networked computers electronically;  
Statistics can be up-to-date leading to **more** accurate planning;  
Patterns of illness/health of nation **easier to assess/identify** because all the required data available electronically;  
Monitoring of resources **made easier** because data accessible electronically;  
**Faster communication** possible because messages can be sent and received by electronic mail through the system **quickly**; 1

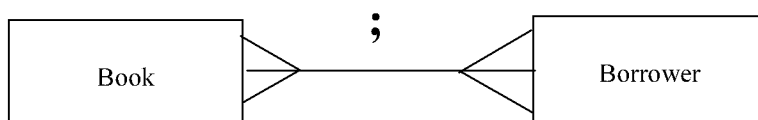
(c)	(i)	External/User (schema)//User/Local/External (view); <b>R.</b> Access rights/passwords	1
	(ii)	Lock is applied to datum//Run in exclusive mode//Timestamps applied to datum; Which prevents more than one user having write access/editing (record)/updating (record) at the same time//Until updated copy written back to database//to prevent one update overwriting another; <b>A.</b> File/database/data/copy where record could be used <b>R.</b> Queues updates	2
(d)		<b>NB Reasons must be different</b>	
	(i)	<b>NB</b> Need general statement as below not specific example <u>System/Requirements is/are poorly specified</u> ; <b>R.</b> Example <u>Hardware is inadequate</u> ; <b>R.</b> Example <u>Trained personnel not available</u> ; <b>R.</b> Example	1
	(ii)	Software errors/bugs; Design faulty/flawed; <b>R.</b> flaws on its own <b>A.</b> Software flaws System not tested adequately; System not adequately documented; Incompatible sub-systems; Incompatible operating systems; Incompatible file systems; Incompatible database systems; Incompatible protocols employed; Incompatible data coding systems; Lack of training for users/operators//operators not trained properly; Personnel issues: Staff resistance to using system; Difficulty recruiting staff with necessary skills; <b>R.</b> Power failures/cable faults/anything hardware related, e.g. server specification	1
	(iii)	Debugging time underestimated; <b>R.</b> Bugs in system Design flaws/faults; Potential problems not foreseen because existing system <u>not properly analysed</u> (need full statement); Poorly specified system//Customer changes specifications/requirements; Time taken to transfer/enter data into the new system underestimated; Skill shortage; Poorly managed project; Software components written from scratch rather than employing existing components; Underestimating the complexity of the task; <b>R.</b> Bad time planning <b>R.</b> Bad allocation of resources <b>R.</b> Funding argument <b>R.</b> Potential problems not foreseen.	1
		<b>Total</b>	<b>12</b>

8 (a) (i)



1

(ii)



I. other entities

1

(b) (i) `Select Book.Title` ; **A. Title**  
`From Book` ;  
`Where Book.ISBN = "1-57820-082-2";` **A. ISBN = "1-57820-082-2"**

Any extra attributes lose mark where extra attributes used

**R.** 1-57820-082-2 Need quotes

**A.** '1-57820-082-2'

**R.** TblBook – penalise once

**R.** Title.Book, wrong order

2

(ii)

Penalise  
 TblBook/TblBook  
 Copy once

Don't need Book in Select  
`Select Book.AuthorName, Book.ISBN` ;  
`From Book, BookCopy` ;  
`Where (Book.ISBN = BookCopy.ISBN)` ;  
`And (BookCopy.AccessionNumber = 1234)` ;

**A.** BookCopy.ISBN in  
 place of Book.ISBN

**A.** AccessionNumber in place of  
 BookCopy.AccessionNumber

**R.** quotes on 1234

Any extra attributes lose mark where extra attributes used

Brackets non-essential. May see conditions interchanged, this is OK

`Select Authorname, ISBN` ;  
`From Book` ;  
`Where ISBN = (Select ISBN From BookCopy` ;  
`Where AccessionNumber = 1234)` ;

**A.** In for =

4

(c) Mail-merge//Mail-merging

1

**Total** 9

9 (a) (i) Too much traffic//Congestion//slow to respond//too many (packet/frame) collisions; (Candidate may answer reduces traffic, etc. This is OK)  
**A. Performance degrades** 1

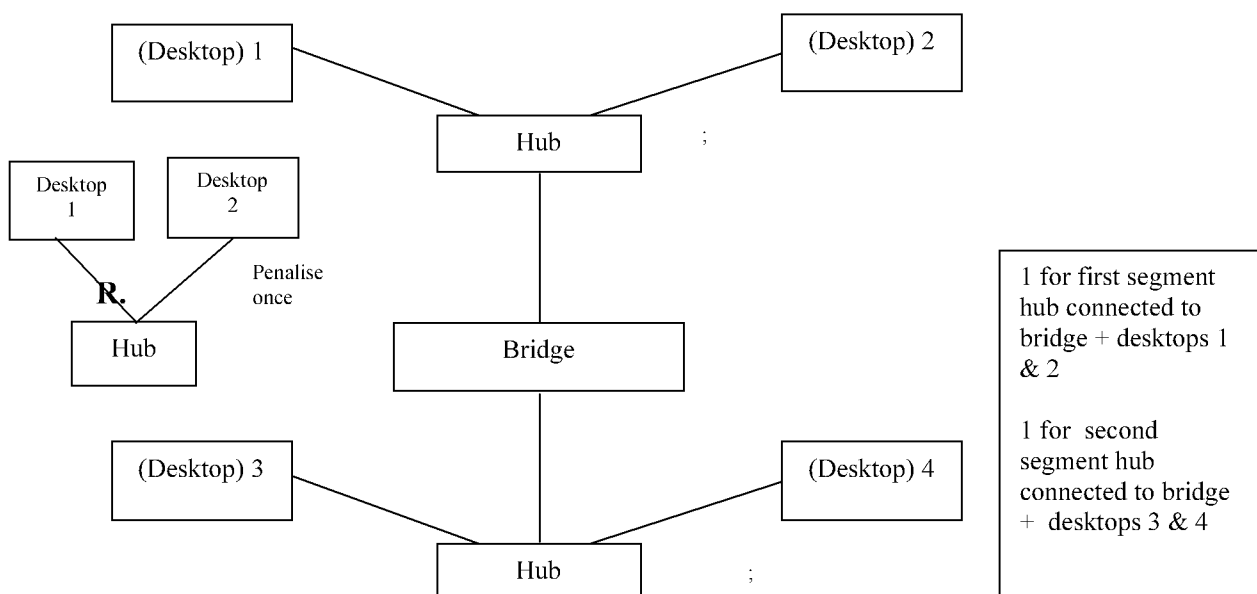
(ii) Bridge “learns” which desktop PCs connected to each port//bridge stores Ethernet addresses of desktop PCs connected to port A and port B;  
 Bridge blocks packets destined for a desktop PC on same segment from being passed to other segment// Bridge only passes packets destined for a desktop PC on other segment;

Packets between machines on same segment are ignored by bridge/blocked by bridge;

Packets between machines(using machine identifiers is OK, e.g. PC1) on different segments transferred by bridge;

**A. Messages for packets** 2

(iii)



Missing bridge correct hubs – penalise once  
 No hubs – scores zero

2

(iv) A user logged in at one peer computer is able to use resources on any other peer computer;  
 In a peer-to-peer network, there are no dedicated servers;  
 In a peer-to-peer network all computers are equal/have equal status;  
 Each computer functions as both a client and a server;  
 User at each computer acts as both a user and an administrator (determining what data, disk space and peripherals on their computer get shared on the network)//User at each controls what is shared with other computers;

**A** Network with no central control;

**R.** Each computer is directly connected to each other and so can send to each other without a server

**R.** All computers have same rights 1

- (b) (i) To provide access/interface to the Internet/World Wide Web (to individuals/organisations/businesses);  
To act as hosts for Web pages (that individuals/organisations/businesses wish to publish on the Internet);  
To provide electronic mail boxes;  
To provide services related to Internet access; 1
- (ii) Any two @ one each  
Greater bandwidth//higher speed connection//faster downloads;  
Less error prone//more reliable connection;  
Internet connection can be shared with a telephone call/voice call/fax/analogue modem connection;  
Streaming music at CD quality;  
Streaming video of a much better quality;  
Can use videoconferencing;  
Access to Application Service Providers web-based software;  
Remote storage of files feasible;  
Instant Flash animations;  
On-line 24/7 possible for flat fee//permanent connection for flat fee//on-line 24/7 un-metered access//don't get kicked off after two hours on un-metered access contract// No per minute access charges//no call charges//no connection charges;  
Internet –based telephony of good quality possible;  
VR/VRML/other 3-D standards/Virtual worlds appear instantly;  
(Line) always connected so no need to dial up to connect; 2
- (iii) A router is a device that receives datagrams or packets from one computer and uses the IP addresses that they contain to pass on these packets, correctly formatted, to another computer;  
Device which uses IP addresses to route packets; 1
- (iv) IP address: 213.208.10.146;  
R. address of port B 1  
Why: Router needs to have a presence on Internet so that it can be reached from anywhere//public address//must be unique over whole Internet//Must be visible on Internet//provides identity on Internet;  
R. Port B is the one that ISP can see 1
- (v) 192.168.1.1; 1
- (c) (i) 198.112.57.124:80  
A. Correct IP address and correct port no presented with a different syntax as long as IP address and port no identifiable 1
- (ii) Server listens on a well-known/publicly-known port for client requests;  
Server selects a separate unused port for each client request//new socket is spawned for each client//Each connection from a client made on a different port; 2
- Total 16**