

# **Information & Communication Technology**

Advanced GCE **A2 7838**

Advanced Subsidiary GCE **AS 3838**

## **Mark Schemes for the Units**

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**June 2006**

**3838/7838/MS/R/06**

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**Advanced Subsidiary GCE Information and Communication Technology (3838)**

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**Mark Scheme 2512**  
**June 2006**

- 1 (a) **Describe, using examples, the difference between information and knowledge.**  
 Example must be relevant to cinema  
 Max 2 for examples, max 2 for difference.  
 Information – facts (and figures) / information = data +( [context] + [structure]) +  
 meaning/processed (1)  
 e.g. 2,000 people saw a particular film (1)  
 Knowledge – applied information / conclusion/based on rules/probabilities/interpreted (1)  
 e.g. How popular a film is / When to open the film (1) [4]
- (b) **Give one example of a direct source of data and one example of an indirect source of data that the cinema could use.**  
 One from:  
 Direct e.g.:(NOT just questionnaires)  
 Questionnaires of people visiting cinema (1)  
 Count number of people visiting cinema (1)  
 One from:  
 Indirect e.g.:  
 Sales figures from other cinemas (1)  
 Sales figures for films (1)  
 Purchased(1) [2]
- (c) **Identify suitable data types for the following fields:**  
 One mark per data type:  
 Certificate rating  
 Text/Alphanumeric/string/character (1)  
 Number of performances  
 Integer (1) **NOT** numeric/number/whole number  
 Price of ticket  
 Currency / Real (1) [3]
- (d) **Describe three advantages of coding the data.**  
 One for identify to a max 3, up to two additional marks for description:  
 Less data entry (1) faster data entry (1)  
 Shortens data (1) less storage space required (1) faster processing (1)  
 Degree of security (1) encoded so cannot be understood by casual glance (1)  
 Validation (1) ensure reasonable data entry (1) [6]

## 2 (a) For each one, give its purpose.

One per item:

RAM:

- Holds working data (1)
- Temporary store (1)
- Open files (1)/Graphics memory (1)
- Holds O/S (1)
- Holds part of application software being used (1)

ALU:

- Performs mathematics (1)
- Performs comparisons (1)
- Holds results of processing (1)
- Manipulate/processes data (1)

Control Unit:

- Manages execution of instruction (1)
- Fetches each instruction (1) in sequence (1)
- Decodes it (1)
- Synchronises it (1)

[3]

## (b) Apart from a keyboard and mouse, identify three other input devices the cinema staff may use when selling tickets.

Any three from:

- Bar code reader /scanner (1)
- Numeric keypad (1)
- Chip reader (1)
- Touch Screen (1)
- OMR (1)
- Magnetic stripe reader (1)
- named data entry device for disabled person

[3]

## (c) Describe the difference between backup and archiving of data.

Two from:

- Backup makes copy of the data / immediately available (1)
- Archive removes data to different location / off line (1)

[2]

## (d) Identify one storage device which can archive 30GB of data.

One from:

- Magnetic tape (1)
- External/removable hard drive (1)
- Blu-Ray (1)

[1]

## 3 (a) Describe two characteristics of a multi-user operating system.

Four from:

- More than one user (1) at the same time (1)
- Time slice (1) allocated to each user (1)
- More than one terminal (1)

[4]

## (b) Describe three characteristics of a WIMP user interface.

One for identify, 2<sup>nd</sup> for describe.

- Windows (1) contained area (1)
- Icons (1) small images/shortcuts /open programs(1)
- Mouse/Pointer (1) direct manipulation (1)/arrow to move and click/select (1)
- Menus/Pull down Menus (1) series of options (1)

[6]

- 4 (a) **Describe two benefits of using variable length records.**  
Any four from:  
No truncation of data (1) all data entered is stored (1)  
Can add extra fields not originally planned (1)  
No wasted disk space (1) no space at end of record (1)  
**NOT** less disk space [4]
- (b) **Describe one benefit of using a relational database.**  
Any two from:  
Links between tables (1) can create queries/reports (1)  
Relational integrity (1) data updates across tables (1)  
No data duplication (1) faster searching (1)/ faster data entry (1)  
Can change structure (1) add tables (1) [2]
- (c) **Identify one other type of database structure the cinema could use**  
Any one from:  
Flat file (1)  
Hierarchical/tree (1) [1]
- (d) **Identify three different access levels that could be applied to the database.**  
Any three from:  
Read write (1)  
Append (1)  
Update/Edit/Amend(1)  
Delete (1)  
Create (1)  
Full (1)  
No access (1) [3]
- 5 (a) **Give two reasons why a test plan is required.**  
Any two from:  
So you know what to test (1)  
So you know what has been tested (1)  
To be repeatable (1)  
To ensure all avenues are covered and none forgotten (1)  
To document the data used (1)  
To list the start point of any testing (1)  
To list expected results (1) [2]
- (b) **Give two reasons why the database must be tested**  
Any two from:  
To know that it works (1)  
So the customer is satisfied (1)  
To get paid (1) [2]

- 6 (a) (i) **Draw and label a bus topology.**  
Must be drawing, no marks for description.  
Max 1 for correct unlabeled drawing  
Data flow both ways (1)  
Diagram of topology (1)  
Labeled: terminators / computers / printers / server (1) [3]
- (ii) **Draw and label a ring topology.**  
Must be drawing, no marks for description.  
Max 1 for unlabeled drawing  
Data flow one way (1)  
Diagram of topology (must be closed ring) (1)  
Labeled: computers / printers / server (1) [3]
- (b) **Describe two items of hardware required to network standalone computers.**  
One for identify, 2nd for description physical or functional  
NIC/Wireless NIC (1) to allow computer to communicate (1)  
Hub/Switch/Router / concentrator (1) connect cables together (1) (allow wireless)  
Cable (1) connect machine to hub/switch/router (1)  
Server (1) control logon/printing/internet access/email/applications/backup (1) [4]
- (c) (i) **What is the purpose of the User ID?**  
One from:  
To identify the user (1)  
To allow access to resources – printers/files/software (1)  
To make individual user members of groups (1)  
To allow the user to be monitored/actions logged (1) [1]
- (ii) **What is the purpose of the password?**  
One from:  
To verify the user (1)  
To protect the work (1)  
To prevent unauthorised access/hacking(1) [1]

- 7 Compare the use of fax and email for sending sales figures to head office.**  
Must be comparison. Max 2 for individual points. Comparison can be something both can do.  
Examples:  
Fax is not secure as can be sent to office , email can be encrypted and sent to individual(2)  
Fax cannot be edited, email attachments can be edited (2)  
Fax cannot have attachments, email can have attachments (2)  
Fax is sent to a location, email can be picked up anywhere (2)  
Fax gives a delivery receipt, email gives a deliver receipt but can be cancelled(2)  
Both can be sent to more than one person at the same time(2)  
Fax and email can both be sent in colour(2)  
Quality of fax can be poor, quality of document is not affected by email(2) [6]
- 8 Identify the three crimes identified by the Computer Misuse Act (1990)**  
Unauthorised **access** to computer material (1)  
Unauthorised access with **intent to commit** or facilitate commission of further offences (1)  
Unauthorised **modification(changing, editing, deleting)** of computer material (1)  
**NOT** copyright [3]
- 9 (a) Identify three safety issues related to working with ICT.**  
Must be safety issues NOT health  
Examples include:  
Trailing wires (1)  
Electrocution (1)  
Overloading plugs (1)  
Unstable surfaces (1)  
No liquids near computer(1) [3]
- (b) For each health risk below, give an appropriate different solution.**  
One mark per solution, must be different. E.g.  
Ulnar Neuritis  
wrist rest (1) 5 minute break every hour (1) chair of adjustable height (1) correct height of desk  
Deep Vein Thrombosis  
chair of adjustable height (1) foot rest (1) 5 minute break every hour (1) exercise legs (1) flight socks (1)  
Eyesight Defects  
filter on monitor (1) monitor not facing sun (1) eye tests (1) plenty of fluids (1) correctly adjusted/flicker-free monitor (1) refocus on distant objects (1) appropriate lighting(1) [3]
- 10 Describe two measures that could be introduced to prevent software theft.**  
Any four from or 1for identify, 2<sup>nd</sup> for description. Examples:  
No drives to remove files (1) cannot take programs from network (1)  
Limited access rights/password protected (1) cannot get to program files (1)  
Physical security (1) no access to media/licenses (1)  
Log access (1) can see who has accessed areas (1)  
Do not allow attachments with email (1) cannot send software home (1)  
"Stamp" software with machine ID (1) can only be used on that machine (1)  
Security guards/security cameras/check bags (1) cannot physically remove software (1)  
Disciplinary/legal action (1) make example of employees as threat (1) [4]

**11 Discuss the impact that ICT has had on cinemas.**

Seven marks for discussion. 1 mark for conclusion but no more than 7 in total can be awarded:

0-2	<b>Identification Only</b> Identification of 1 point only (1) Identification of 2 points or more (2)
3-4	<b>Advantages Only OR Disadvantages Only</b> 1 advantage (3) 2 or more advantages (4)  1 disadvantage (3) 2 or more disadvantages (4)
5-7	<b>Advantages AND Disadvantages</b> Advantages of 1 and disadvantages of 1 (5) Advantages of 2 and disadvantages of 2 (6)  Advantages of 3 and disadvantages of 2 (7) Advantages of 2 and disadvantages of 3 (7)

Code	Marks
<b>I</b>	1
<b>II</b>	2
<b>P</b>	3
<b>N</b>	3
<b>PP</b>	4
<b>NN</b>	4
<b>PN</b>	5
<b>PPNN</b>	6
<b>PPPNN</b>	7
<b>PPNNN</b>	7

C applied anywhere to a max 7

**Identification:**

A relevant point that relates to the question and involves ICT. It is not expanded upon or implications given.

**Advantage/Disadvantage:**

The point is applied to the situation and the advantages or disadvantages are expanded upon.

Codes to use are:

- I - identification,
- P – advantage (positive )
- N – disadvantage (negative,)
- C – conclusion (1)

Points to cover may include:

Booking tickets over the Internet  
Special effects used in the films  
Sound system in the cinema  
Design of cinemas for acoustic effects  
Management access to information – best selling films etc

Advantages (expanded) to include:

Can make changes immediately a problem is known reducing its impact to the organisation.

Can see how a change they have made is impacting on the organisation and whether it is benefiting it or needs to be changed.

Hearing impaired can get the full effects – special sound systems, signed just for them so increasing audience – inclusion of all people

Booking tickets over the Internet – people can make sure they see the film they want – not have to get to the cinema and find it is sold out and waste a journey

Special effects can make the film more realistic given the context – will not see the strings and sets move – get more engrossed in the film without being distracted.

Disadvantages (expanded) to include:

Too much information too soon may not allow any changes to embed themselves. The organisation may require instant success and not let changes work through initial problems.

Too much technology may have an adverse effect on enjoyment – interactive seats for example, having to wear specialist equipment (glasses) may detract

Over reliance on equipment – if it breaks down cannot show the film, need trained experts to run the systems – increase in wages

High definition has required new equipment – increase costs for the cinema, need to introduce it to compete, put up prices

QOWC [4]

**Mark Scheme 2514  
June 2006**

### The Awarding of Marks for Written Communication

Marks are awarded for the use of accurate spelling, punctuation and grammar according to the following criteria.

		Marks
<b>Below Threshold Performance</b>		0
<b>Threshold performance</b>	Candidates spell, punctuate and use the rules of grammar with reasonable accuracy; they use a limited range of specialist terms appropriately.	1
<b>Intermediate performance</b>	Candidates spell, punctuate and use the rules of grammar with considerable accuracy; they use a good range of specialist terms with facility.	2–3
<b>High performance</b>	Candidates spell, punctuate and use the rules of grammar with almost faultless accuracy, deploying a range of grammatical constructions; they use a wide range of specialist terms adeptly and with precision.	4

The marks will be awarded on an impression basis and will reflect the candidate's performance in the paper as a whole.

Rule of  thumb

- 0 Award only in rare circumstances e.g. no written work or minimal, which is not in sentences and is spelt incorrectly, without use of appropriate technical terms.
- 1 Questions answered using statements or single words only.
- 2 Candidates use some sentences and some technical words. Some errors in grammar and spelling.
- 3 Candidates use sentences correctly, with few errors in grammar. Some technical words used appropriately and with limited spelling errors.
- 4 Almost perfect use of grammar, technical vocabulary and spelling.

The 'norm' will probably be 3 marks. However, do not be afraid to award 4 marks if appropriate.

- 1 (a) Give two advantages of purchasing off-the-shelf software rather than custom written.

2 x 1 mark

- Software has already been tested (1)
- Can select different manufacturers (1)
- Purchase price is a one-off (1)
- Very little time delay in implementing the software (1)
- Support readily available (1)
- Training courses available (1)

[2]

- (b) Identify four other ways the company can make use of this relational database.

4 x 1 mark

- Search/query (1)
- Sort (1)
- Mail Shot (1)
- Convert specified data (1)
- Print labels (1)
- Link tables (1)
- Forms (1)

[4]

- (c) i State the primary key in the PRODUCT Entity

- Product\_code (1)

[1]

Must follow as given above

- ii State one foreign key in ORDER Entity

- Cust\_ID or Product\_Code (1)

Must follow as given above

[1]

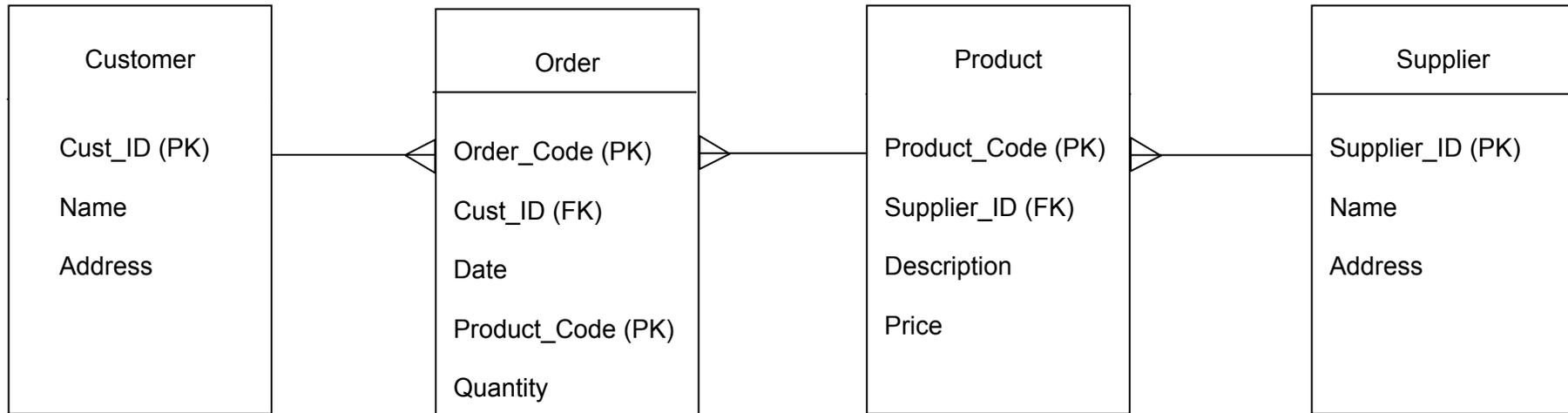
- iii See diagram over page

[11]

1 (c) iii

		Total Marks
Correct Attributes in format given	1-2 entities	1
	3-4 entities	2
Primary Keys defined (PK)	1-2	1
	3-4	2
Foreign Keys defined (FK)	1 mark each	Up to 3
Relationships defined	1 mark each	Up to 3
Consistent/correct layout/notation		1

MAX 11 marks



1 (c) iv Identify two characteristics of data in first normal form (1<sup>st</sup> NF)

2 x1 mark

- Repeating data (1)
- Non-Atomic (1)

[2]

2 (a) i Describe the following features of a word processing package:

**Max 2 per feature**

**Word Wrap**

- Enables text to be wrapped around graphics (1)
- Various choices (1) for example tight (1)
- Text can be positioned under or over text (1)
- Can be used to highlight objects in a document (1)
- Continues words onto next line (1)
- Also known as soft return (1)

**Templates**

- Layouts of documents (1) can be pre-defined and created (1)
- Ensures constant layout (1) on all documents of a specified type (1)

[4]

ii Describe the following features of a DTP package

**Max 2 per feature**

**Rotate**

- Enables objects to have their orientation changed (1) for example upside down (1)
- Can be done automatically through DTP package (1) or by a specified number of degrees (1)
- Objects can be grouped (1) for example text and a graphic (1) rotated together (1)

**Layering**

- Two or more objects (1) are placed on top of each other (1)
- Can be grouped (1) so the layered object can be moved as one (1)
- Different types of transparency/opaqueness (1) enables different shading of total layers (1)
- Send to back (1)

[4]

- 2 (b) **Explain the benefits of using a DTP package rather than a word processing package to develop a flyer.**

**1 for identity, 1 for further explanation**

**For example:**

- Offer more flexibility (1) enables objects to be manipulated (1) eg flip/rotate (1)
- Text frames (1) text automatically flows from one area on a page to another (1)
- Ability to layer objects (1) enables graphics to appear behind text (1)
- Workspace area around page on screen (1) objects can be placed here during creation of flyer (1)
- Layout guides (1)
- Switchboard (1)

**[6]**

- 2 (c) **Describe, giving an example, how the following features can assist in the production of the flyers using the desktop publishing package**

**Up to 2 per description, 1 for example**

**Macros**

- Can be used to format the flyer (1)
- In a consistent style (1)
- Can be programmed (1) to do common tasks (1)
- Reusable (1)

**Example**

- Eg print the flyer

**Layout Guides:**

- Create a grid to repeat the layout on each page of the flyer (1)
- Ensures consistency of layout (1)
- Multiply/single text frames can be used (1)
- Objects can be 'snapped' (1) to layout guides (1) ensures professional layout (1)

**Example**

- Layout guides can be developed and saved for each DTP publication (1) re-usable (1)

**[6]**

- 3 (b) Describe how the following features could be used in the presentation.

Max 2 per feature.

**Animation effects (max 2)**

- Can be used to control the way that text/graphics appear on a slide (1)
- Effect can be manual (1) when the presenter performs an action (1)
- Effects can be automatic (1) timings set up (1)
- Can be used to emphasise important points (1)
- Adds interest to the presentations (1)

**Slide transition (max 2)**

- Used to move slide to slide (1)
- Can be the same effect through the presentation (1)
- Different effects can be used (1) to emphasise different sections of the presentations (1)
- Can be used in conjunction with sound (1)

**Video (max 2)**

- Company video can be shown (1)
- Can be set up to play automatically on a slide (1)
- Can be started manually (1) by presenter on a mouse click (1)
- Can be used to show a process (1)
- Can be better to show a video than try to explain a process in words (1)

**Sound (max 2)**

- Can be used to emphasise a point (1)
- Can be an effect from the software (1) or a sound file from another source (1)
- Company advertising jingle can be inserted (1)
- Can be placed automatically on a slide (1)
- Can be started manually (1) by presenter on a mouse click (1)

**[8]**

- 4 (a) **Explain the differences between formulae and functions as used in a spreadsheet giving an example of each.**

**Up to 4 marks for differences**

- Function is built-in (1) special type of formula (1)
- Formula is typed (1) directly into formula bar (1)
- Can nest functions (1) unable to nest formula (1)
- Functions are used to simplify complicated maths (1) formula are simple calculations (1)
- A function can contain a formula (1) a formula cannot contain a function (1)

**MAX 1 mark per example:**

**For example:**

- **Function:** =SUM() (1)
- **Formula:** =(c1\*d3) (1)

**[6]**

- (b) **Describe, giving examples, how form controls can be used to enter data into a spreadsheet.**

**6 x 1 marks:**

- Use of buttons/drop-down lists (1) used to make data entry simple (1)
- Validation controls (1) only valid entries can be used (1)
- Formulas (1) ensure that invoice totals are correct
- Data from other worksheets/work books (1) can be imported into invoice (1)

**[6]**

- (c) **State the most suitable type of chart that can be used to show:**

**1 mark for each correct answer:**

**the most popular type of pet food**

- Pie/bar/ pictogram (1)

**the profit of the company for the last 12 months**

- Bar/line (1)

**the predicted sale figures for the private customers and the independent shops**

- Line (1)

**[3]**

- 5 Describe the characteristics of a self-paced teaching package which would make it suitable for this task.**

**Up to 8 marks**

**For example:**

- Positive approach (1) gives learner confidence (1)
- Path of learning (1) can be set by responses to previous questions (1)
- Can be used at any place (1) convenient to learner (1)
- Can return to topics (1) to reinforce concepts not fully understood (1)
- Quick feed back available (1) when tests are completed (1)
- Can use multimedia (1) to enhance learning experience (1)
- Can be used 24/7 at a time (1) convenient to learner (1)
- Provides automatic reporting facility (1)
- Package will remember where you ended (1) and start at that point (1)

**TOTAL**

**[8]**

**86**

**Quality of written communication**

**4**



**Mark Scheme 2515**  
**June 2006**

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- 3 Candidates use sentences correctly, with few errors in grammar. Some technical words used appropriately and with limited spelling errors.
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The 'norm' will probably be 3 marks. However, do not be afraid to award 4 marks if appropriate.

1 Describe **four** facilities available on a modern telephone system.

**e.g.**

Abbreviated dialling (Speed dialling/hot keys) (1) frequently called numbers (1) can be obtained by pressing only 1 or 2 digits (1)

Repeat last call (redial) (1) single digit pressed after getting an engaged tone (1) /automatically tries the number again (1)

Ring back (1) caller will be alerted when phone number becomes free (1)

Call divert (1) incoming calls can be diverted (to another number) (1)

Call waiting (1) incoming calls are acknowledged and asked to wait (1) when the called number is engaged (1)

Call barring (1) incoming/outgoing calls can be barred (1)

Reminder calls (1) automatic call by the exchange (1) /at a requested time (1)

Remote access (1) to some facilities (1) /by the phone subscriber (1)

Call switching (1) e.g. to acknowledge another call (1)

Withholding number (1) to protect the identity of the caller (1)

Voice activated dialling (1) caller speaks number to the phone (1)

Caller identification (1) if dialled number is stored on recipient's phone (1)/ the recipient can see who is calling before answering (1)

Log of calls made/received/missed (1) over a period of time (1)

Automatic voicemail (1) will record a message if phone not answered (1)

Multi – way calls (1) e.g. a conference call (1)

Use of a loud speaker (1) so others can hear the conversation (1)

Accepting text messages (1) from a mobile phone (1)

Different ring tones (1) for different people (1)

Can send/receive e-mail/text (1) with the use of an lcd screen (1)

Any 4 facilities described (4x2)

**[8]**

**Do not accept facilities specific to mobile or internet phones  
Do not accept references to video phones.**

2 Find-A-Home is a national chain of estate agents with offices spread throughout the country. The estate agents operate local area networks (LANs) in their local branch offices, and a wide area network (WAN) to enable branches to communicate. All workstations also have Internet access.

(a) Describe the facilities of the Internet which would be useful to the estate agency.

**e.g.**

Houses for sale could be advertised on a website (1)

which would reach a wider audience (1)

Potential buyers could search for suitable properties (1)

without visiting a branch office (1)

People (who are moving from a distance away) (1)

can search at a time convenient to them (1)

E-mail buyers/sellers/solicitors (1) to keep informed of progress (1)

Ability to note number of hits (to website) (1) would enable the

company to respond appropriately (1)

Accept other valid points, **which must relate to the estate agency**

Any 2 facilities described (2x2)

**[4]**

**Not** e-mail between branches etc

Beware generic responses

(b) The company is considering using wireless networks in the branch offices.

(i) Describe wireless communication in LANs.

No cables (1)

Uses radio waves/ microwaves/infrared/bluetooth (1) (for data transmission)

If systems are close together communication can be direct (1)

Otherwise, antenna may be required (1)

Machine needs to be wireless enabled (1)

Any 2 points

**[2]**

(ii) Describe **two** advantages and **one** disadvantage of wireless communication for the branches of Find-A-Home.

**Advantages**

**e.g.**

Easy to add extra stations (1) as no need for any cabling (1)

Signals can go through walls (1) so stations can be moved into other rooms (1)

Users with (wireless enabled) laptops (1) do not need to find a connection point (1)

Wireless assembly very simple (1) so less need for specialist IT support (1)

Health and safety implications (1) no wires to trip over (1) (or reverse)

**Disadvantages**

**e.g.**

Many devices receiving the same signal (1) can lead to a higher error rate (1)

Maintenance costs are high (1) because of the need to replace batteries (1)/ or equip with battery chargers/ rechargeable batteries (1)

Wireless communication is less secure (1)

and so not difficult to intercept (1)

Note to markers – accept the word ‘hack’

2 advantages and 1 disadvantage explained (3x2)

**[6]**

- (c) What is meant by the term communication protocol?

A set of rules (1) for the transmission of data (1)(between devices)

**CAO**

**[2]**

- (d) What is meant by the term layering?

Layering is the process of each successive layer building upon its predecessor (1).

Each layer is independent of other layers (1)

Each layer provides services/functionality to its successor (1)

Layering is separating the components into physical and logical (1)

Any 2 points

**[2]**

- (e) Describe the benefits of the Open Systems Interconnection (OSI) model.

Allows standardisation (1)

of any make of device and any operating system (1)

Allows devices/software of any make (1) to communicate (1)

Precise identification of errors (1) error report identifies cause of error /where error has occurred(1)

Easy to update (the protocol) (1) because only relevant layer(s) need to be updated (1)

Max 4 for any two benefits explained

**[4]**

- (f) Data is transferred electronically between branches.

- (i) Describe **two** methods that could be used to detect errors during data transmission.

Parity check (1)

1 bit (of each byte) is reserved as a parity bit (1)

e.g. if the system uses odd/even parity (1)

the number of bits in the byte must be odd/even (1)

if even/odd, then an error has occurred (1)

example of parity error (1)

Can be horizontal and vertical parity checking (1)

Cyclic redundancy check/ checksum (1)

used on blocks of data (1)

an agreed mathematical calculation is performed (1) on the data block and the result is appended to the block (1)

the same formula is applied at the receiving end (1)

if results differ then an error has occurred (1).

Hamming code (1)

is a more sophisticated error detection method (1)

and may sometimes detect **and** correct errors (1)\*

NOT hash totals or check digits

Any two methods described for 2x2

**[4]**

- (ii) Explain how data transmission errors may be corrected.

Most usual method is to retransmit the data (1)  
when requested to do so by the receiving device (1)  
either block by block/(stop and wait) (1)  
waiting after each block for ACK that no error has been detected (1)  
or NAK if an error has been detected (1)..  
in which case the block will be (repeatedly) re-sent (1)  
until an ACK is received (1)  
or transmission continues block by block (1)  
until an error is detected (1)  
this block is then re-transmitted (1)  
together with any blocks subsequently sent (1)  
known as Go-back method (1)

or selective repeat (1)  
blocks transmitted after the erroneous one (1)  
do not have to be re-transmitted (1)  
only the erroneous block is re-transmitted (1)

Hamming codes (1) can sometimes detect and correct errors (1)\*  
Any two methods described for 2x2  
\*award this point if it occurs in (i) or (ii)

Horizontal and vertical byte checking (1)  
can detect and correct single byte errors (1)/  
can detect and correct errors in a block (1)

[4]

3 Find-A-Home concentrates on buying and selling houses. Information about houses for sale is held on a database. The company has decided to use a distributed database.

(a) Describe **three** different approaches to database distribution that the company could use.

Partitioned between sites / offices (1)  
Database is split (1) such that each local office (1) holds data on houses in its own geographical area (1)

Partitioned horizontally/vertically (between sites/departments) (1)  
Particular groups of records/fields go to different sites/departments (1)

Database duplicated between sites (1)  
A full copy of the database is held at each local office (1)

One central database (1)  
Relevant/local indexes (1) are held at each branch (1)

1 mark for method and 1 for explanation. (3x2)

**[6]**

(b) Explain the security issues associated with distributed databases, and describe how the databases can be made more secure.

**Issues**

Risk of virus (1) – can spread from one database to others (1)  
Risk of hacking (1) because of multiple locations (1)  
How to control access to data (1) to ensure only those who need access (1)  
Risk of 'out of sync' data (1) when updating databases (1)  
Physical security (1)  
Management of backup (1)

**Security Measures**

User names/ passwords/access rights (1) at each location (1)  
Use of secure links (1) for updating database (1)  
Virus protection / anti-spyware (1) updated regularly (1) at each location (1)  
Firewall (software) (1)  
Access levels (1) with descriptions (1)  
Individual made responsible for security at each location (1)  
Auditing of database changes (1) transaction logs (1)  
Audit trail (1) to see who has accessed what data (1)  
Encryption of data (1)  
Any 8 points, max 6 per section.

**[8]**

**[Note]** Marks may be awarded where a candidate discusses data integrity  
Relevant points from the data protection acts may also be awarded credit

4 A cable TV company offers a number of programme channels to its customers.

(a) Explain the importance of bandwidth when transmitting TV programmes.

A low bandwidth implies slow transmission of data (1) or a small volume of data (1). TV programmes include speech and video so there is a high volume(1) of data which needs to be transmitted in real-time (1) especially with live coverage of events (1) so a high bandwidth is essential.

[4]

(b) Explain why the transmitted data may need to be encrypted.

To ensure that only the customers who have subscribed (1) to that particular channel can receive (1)

[2]

(c) Describe two other services which the cable TV company could offer to their customers.

**e.g.**

Video on demand (1)

Can select and run videos when convenient (1)

Interactive quiz shows / reality tv (1)

Participants can use the console to give answers/vote (1)

Direct shopping/booking (1)

by interacting with the appropriate channel(1)

E-mail (1) with description of use (1)

Access to the internet (1) but this access is a limited service only (1)

Interactive capability (1) e.g. choosing which of a sporting event to watch (1)

TV guide/organiser (1) automatically tune into pre-requested channels/alerts user that selected programme is about to start (1)

[4]

5 A small independent travel agency has a single office equipped with a number of standalone PCs.

(a) (i) Describe the characteristics a memory stick

Portable (1) storage device (1)  
uses USB port (1)  
fast read/write time(1)  
used to transfer (large amounts of) data from one system to another (1)  
when no direct transfer method is available (1)  
sensible attempt to quantify amount of storage (1) [2]

(ii) Explain how the travel agency might make use of memory sticks.

**e.g.**  
To transfer data between PCs (1)  
To take data home (1)  
As back up (1) [2]

(b) The travel agency currently books holidays, for clients, by telephone.  
Explain the limitations of this current system.

**e.g.**  
Problems with time zones (1) with explanation (1)  
Using telephone can be slow (1)  
because booking agents may have to wait in queues (1)  
have to traverse (many layered) telephone menus (1)  
No immediate confirmation of what has been booked (1) [4]

A new manager is appointed who decides to implement a local area network (LAN) with Internet access.

- (c) Explain how the new system will improve the efficiency of the company.

**(Must be specific to a travel agency)**

**e.g.**

**Office network**

The same information is available to all staff (1)  
so clients can be helped by any member of the agency (1)

**More efficient** communication between staff (1)

because can use e-mail (1)

which is auditable (1)

no longer relies upon scribbled notes to colleagues (1)

which can be lost or overlooked (1)

**e.g.**

**Internet Access**

Agency can contact hotels/airlines on-line(1)

for immediate update of room/seat bookings (1)

Can have a website (1)

which could increase client base (1)

and allow clients to search for holidays at any time (1)

Client/Agency communication simpler (e-mail) (1)

Clients may be able to book on line (1)

Any 4 points

**[4]**

**(Candidates will not have split their answers into these to headings)**

- (d) Explain the advantages of using a form-based human computer interface (HCI) for booking holidays.

Clear to see where data needs to be entered (1)

essential fields can be enforced (1)

data validated on entry (1)

simple system to use (1)/little help needed (1)

little help needed (1)

information entered in same order as printed form(1)..

so easy to verify (1)

standard form for all bookings (1)

use of limited choice boxes/drop down menus (1)

Context sensitive help (1)

**[6]**

6 Describe the development of networking.

**e.g.**

In the beginning there was the standalone PC (1)

use of physical cable to link machines (1)

slow data transfer (1)..

of small amounts of data (1)..

over short distances (1)

peer to peer networks (1)

Use of telephone network (1)...

to send data (1)

which had to be converted from digital (1)

to analogue (1)

and reversed at the receiving end (1)

Introduction of high speed data lines (1)

e.g. ISDN, ADSL etc (1)

for e-mail and internet connections (1)

WAP (wireless application protocol) (1) e.g. mobile phones (1)

Satellite/microwave links (1)

wireless portable networks (1)

Advances in network topologies explained (1)

Advances in cabling explained (1)

**Max 8 for any 8 points**

**[8]**



**Mark Scheme 2517**  
**June 2006**

### The Awarding of Marks for Written Communication

Marks are awarded for the use of accurate spelling, punctuation and grammar according to the following criteria.

		Marks
<b>Below Threshold Performance</b>		0
<b>Threshold performance</b>	Candidates spell, punctuate and use the rules of grammar with reasonable accuracy; they use a limited range of specialist terms appropriately.	1
<b>Intermediate performance</b>	Candidates spell, punctuate and use the rules of grammar with considerable accuracy; they use a good range of specialist terms with facility.	2–3
<b>High performance</b>	Candidates spell, punctuate and use the rules of grammar with almost faultless accuracy, deploying a range of grammatical constructions; they use a wide range of specialist terms adeptly and with precision.	4

The marks will be awarded on an impression basis and will reflect the candidate's performance in the paper as a whole.

Rule of  thumb

- 0 Award only in rare circumstances e.g. no written work or minimal, which is not in sentences and is spelt incorrectly, without use of appropriate technical terms.
- 1 Questions answered using statements or single words only.
- 2 Candidates use some sentences and some technical words. Some errors in grammar and spelling.
- 3 Candidates use sentences correctly, with few errors in grammar. Some technical words used appropriately and with limited spelling errors.
- 4 Almost perfect use of grammar, technical vocabulary and spelling.

The 'norm' will probably be 3 marks. However, do not be afraid to award 4 marks if appropriate.

- 1 (a) **Customers, competitors and pressure groups may influence decisions made by the company. For each group describe how they can influence the company.**

**Must be three different groups for full marks.**

Customers can exert influence by:

e.g.

loyalty/shopping with rivals (1) causing price changes/special offers. (1)  
by adopting fashions (1) that force change to the goods sold. (1)

Competitors can exert influence by:

e.g.

undercutting prices (1) causing a fall in customers. (1)  
producing new products such as new exotic plants (1) thus attracting new customers. (1)  
better advertising (1) focussing attention on the stores. (1)

Pressure groups can exert influence by:

e.g.

dictating the kind of buildings erected (1) so as to blend with the surroundings (1)  
stifling expansion on conservation grounds (1) and forcing the stores to relocate (1)  
affecting sales (1) by actively opposing the sale of endangered plants. (1)  
refusing to buy(1) cloned/ genetically modified goods.(1)

**Total [6]**

- (b) **Information has to be exchanged between the stores and Head Office. Explain two reasons for ensuring that information is exchanged in an accurate and timely manner.**

**Must be two reasons for full marks.**

e.g.

If data is not up-to-date (1) too many hanging baskets might be ordered. (1)  
If data is not accurate (1) some plants might die before they are sold. (1)  
Some data exchange needs to be immediate (1) for instance checking on a customer's discount/past orders. (1)

**Total [4]**

- (c) **Describe the role of the stock control system in this company.**

e.g.

Keeps a record of the number of goods/plants in stock. (1)  
Helps the management to plan purchases for the future (1) by monitoring the sales. (1)  
(Automatic) reordering (1) is possible allowing a more efficient/profitable system. (1)  
Keeps a track of purchase dates of plants (1) to make sure they are sold when fresh. (1)  
Stock control system monitors level of stock. (1)  
Links to marketing system (1) to provide stock following advertising campaigns. (1)

**Total [3]**

- 2 (a) **The company has a website. Customers can search the site for the items they require.**

**Identify two different types of search the customer could use.**

Searching using indexes (1)  
 Searching using key words (1)  
 Simple search (1)  
 Complex search (1)  
 Parameter/criterion search (1)  
 Example of a search e.g. Using a search engine to search for tomatoes. (1)

**Total [2]**

- (b) **The company also sends out their catalogue on CD-ROM to customers if they request it.**

**Give one advantage and one disadvantage to the customers of using the CD-ROM instead of the website.**

Advantage of CD-ROM

e.g.

Can be used off-line/without a computer connected to a network (1)  
 Display is quicker to appear (1)  
 Multimedia works more efficiently (1)

Disadvantage of CD-ROM

e.g.

Does not stay up-to-date for long (1)  
 Limited volume of information (1)  
 May be unusable due to damage (1)  
 The customer cannot place an order directly (1)

**Total [2]**

- (c) **The company decides to improve the website. Several factors will be taken into account when designing the interface. Apart from the use of colour identify two other factors that are an important design consideration.**

Layout (1)  
 Quantity of information on the screen (1)  
 Consistency (1)  
 Accessibility (1)  
 Meeting new regulations (1)  
 Matching the hardware involved (1)  
 Audience (1)  
 Purpose (1)  
 Compatibility with browsers (1)  
 Formatting/fonts/etc. (1)

**Total [2]**

- (d) Explain how perception, attention, memory and learning affect the design choices when designing an interface.

**Must be four factors for full marks.**

**Any point may be expanded for an extra mark.**

Perception

is input from sight and sound (1)

The user has preconceived ideas (1) such as green – go and red – stop. (1)

Certain sounds are perceived as happy or sad. (1)

User thinks they can/cannot use the system. (1)

Attention

will be maintained by the consistent use of colour/layout (1)

Each screen clearly labelled/salient points obvious (1)

Use of logical menus (1)

The user will have a limited attention span (1)

Use of flashing/inverse video/pop-up messages/sounds could be used to draw attention to something (1)

Memory

The screen should be uncluttered (1)

The customer will use the screens infrequently (1)

The short term memory will be involved (1)

Page layouts should remain consistent (1)

Links to pre-existing knowledge (1)

Learning

The user will not be trained to use this site often (1)

The use of the site must be intuitive (1)

On-screen help (1)

**Total [8]**

- (e) Describe the contents of the design specification for this new website.

Design specification will include:

Pages required (1)

The links between pages (1)

Data structures (1)

Colours/fonts/sizes (1)

Screen design (input/output) (1)

Validation rules (1)

Test plan (1)

Process/queries (1)

**Total [4]**

- 3 (a) The company has decided to place a point of sale terminal (checkout) at the exit of the greenhouse.

**Describe the features of this checkout mentioning any special features which might be necessary for the hardware to work in this environment.**

**Max 4 for general features**

The checkout will have a barcode reader/scanner/RFID (1)

Sound to confirm sale (1)

Keypad for entering items without barcodes (1)

Touch screen (1) as keyboard might get dirty (1)

Monitor/screen (1)

Card swipe device/chip and pin (1)

Printer for receipts (1)

Sensors to detect theft of goods (1)

Electronic scales (1)

Special features

e.g.

The hardware must function in the high humidity/temperatures (1)

Keypad must be easily cleaned because of the dirty environment (1)

Safety features as area might be damp (1)

**Total [6]**

- (b) **Before deciding on the new checkout system the management used a process modelling technique to help them.**

**Describe a process modelling technique that would be suitable in this case and give a reason why it is suitable.**

e.g.

A data flow diagram would be suitable (1)

It models the flow of data through the system using different shaped boxes (1)

It is suitable because the model describes the events and operations of the system (1)

**or**

Pseudo-code (1) This can describe the new system in a more detailed manner (1)

It is suitable because pseudo-code uses a mixture of English and computer code (1)

Other possibilities

State transition diagrams (1)

Flow diagrams (1)

**NOT** E-R diagrams, organisation charts

**Total [3]**

- (c) **Customers can send in orders to Head Office using an order form. This data is then keyed in to a computer at Head Office.**

**Describe a validation check that could be used for the quantity of an item and give a reason why it is useful for that purpose.**

e.g.

A range check (1), for example a number between 1 and 100 (1) would prevent the keying in of a ridiculous number (1)

A type check (1) would only allow numerical data to be input (1) this would avoid the problem of typing a letter o instead of a zero for instance (1)

A presence check (1) this would ensure that a number had to be entered in this field(1) because this is required by the system. (1)

**Total [3]**

**(d) Discuss how**

- **cognitive psychology**
- **artificial intelligence**
- **ergonomics**

**have contributed to the good design of the interfaces on the electronic notepads**

<b>P</b>	<b>1 mark</b>
<b>(P + P) or PE</b>	<b>2 marks</b>
<b>(P + PE) or PEE</b>	<b>3 marks</b>
<b>(PE + PE) or (P + PEE)</b>	<b>4 marks</b>
<b>(P + PE + PE) or (PE + PEE)</b>	<b>5 marks</b>
<b>(PE + PE + PE) or (PEE + PEE) or (P+PE+PEE)</b>	<b>6 marks</b>
<b>(P + PE + PE + PE) or (P + PEE + PEE)</b>	<b>7 marks</b>
<b>C</b>	<b>1 mark for a conclusion</b>

**In order for full marks the candidate must have mentioned all three of cognitive psychology, artificial intelligence and ergonomics. In addition 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.**

e.g.

Cognitive psychology is studying the way that people think (**P**) which will allow the most efficient design of the notepad. (**E**)

Artificial intelligence will allow the software to predict (**P**) what is being entered into the notepad (**E**) or deny/query conflicting entries such as two starters for one customer. (**E**)

Ergonomics will help to design the method of input to be as efficient (**P**) as possible by using a method most associated with normal working practice of a waiter. (**E**)

Design of the interface will be clear (**P**) so that mistakes can be avoided. (**E**)

It can be easily wiped clean. (**P**) It will show clearly in subdued lighting. (**P**)

Design of the software (**P**) will be efficient so that the system works quickly. (**E**)

It has been shown that electronic interfaces can be designed more effectively if the three above topics are taken into consideration. (**C**)

**Total [7]**

- 4 (a) Discuss the support which will be required for the staff, before, during and after the changes brought about by the new electronic notepad system.

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
(PE + PE + PE) or (PEE + PEE) or (P+PE+PEE)	6 marks
(P + PE + PE + PE) or (P + PEE + PEE)	7 marks
C	1 mark for a conclusion

In addition 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. e.g.

The company will involve the staff in discussions about the expected changes (P). This will make them more likely to accept the changes. (E)  
Sample menu pages may be tested. (P) The kitchen staff can walk alongside the waiters in tests. (E)

Training sessions can be given (P) which will ensure that the staff feel confident about the new system. (E)

Constant support from the company (P) should emphasise the benefits of the new system (E) and reassure the staff that their jobs are not in jeopardy. (E)

User guides/documentation (P)

Support from someone (P)

(Example) In conclusion if the changeover is managed carefully there should be no loss of confidence on behalf of the staff or the customers. (C)

**Total [7]**

- (b) Describe how reviews will feature during the life-time of this system.

The system will need reviewing regularly (1)

This will identify when it gets out-of-date/becomes old fashioned (1)

Problems can be reported (1)

The staff can be asked their opinion (1) on how well the system is performing (1)

**Total [3]**

- (c) Explain the need for different types of maintenance during the life time of this system.

Adaptive maintenance (1) will be needed if changes in working practices are identified in the review (1) or an increase in the number of customers/waiters (1) to adapt the system if new legislation concerning wireless signals/hygiene standards for instance is introduced (1)

Perfective maintenance (1) if new technology shows that the performance of the system could be improved. (1) Improving speed of searches (1)

Corrective maintenance (1) for fixing bugs. (1)

**Total [6]**

**5 (a) (i) Describe video conferencing.**

Video conferencing is the use of communications links (1) to conduct meetings between people who are geographically separated. (1) The links include voice and pictures. (1) Hardware such as a webcam/microphone are needed. (1) To see each other on screen (1) communicating in real time. (1)

**Total [2]****(ii) Describe the advantages to the company of using video conferencing.**

e.g.

In this case it will be possible to obtain the opinions of the managers without them having to travel. (1) This will be cheaper for the company than having to pay travelling expenses. (1)

The managers will spend less time away from the offices/stores (1) meaning that they can spend more time with the customers. (1)

There is less chance of bad decisions (1) owing to manager tiredness from travelling. (1)

The company has the potential to hold meetings more often (1) because no time is wasted in travelling between venues. (1)

New products and new initiatives are better explained using voice and pictures (1) than sending a memo. (1)

Record the conferences (1) for future reference. (1)

**Total [5]**

- (b) Discuss the impact of possible external changes on the systems and the staff of the company.

Discussion of factors (P) with expansion (E) can lead to all 7 marks scored. A conclusion (C) can obtain 1 mark.

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
(PE + PE + PE) or (PEE + PEE) or (P+PE+PEE)	6 marks
(P + PE + PE + PE) or (P + PEE + PEE)	7 marks
C	1 mark for a conclusion

e.g.

Economic changes (P) in hard times customers may not buy flowers or visit the restaurant. (E)

Currency changes (P) may affect the cost or availability of raw materials. (E)

Changes in individual spending patterns (P) may cost the jobs of some staff. (E)

Changes in what is a fashionable (P) event may affect sales of plants. (E)

To cope with new systems (P) the employee may have to retrain. (E)

External changes in technology (P) mean the systems may have to change. (E)

Changes in legislation (P) might mean changing the system for working practices. (E)

Diseases/health scares e.g. bird flu (P) means staff have to be vaccinated (E)

In conclusion many external factors affect the company which must be ever vigilant to these factors in order to stay in business and be competitive. (C)

**Total [7]**

- (c) Describe how developments in hardware and software may help to improve the running of the company in the future. You may consider the company as a whole, the greenhouses and the restaurant in your answer.

e.g.

Intelligent software monitors the greenhouses (1) adjusting the levels of heat, light etc automatically (1)

Intelligent materials could be used in the construction (1) such as glass that can darken itself in intense sunlight (1)

The website improves with, for example, pictures of plants in 3D/holographs (1) leading to more home deliveries from on-line ordering. (1)

The company installs sensors in the pot plants (1) which activate artificial voices demanding watering or feeding as required (1)

Iris scanners/voice/face recognition software recognises customers (1) as they arrive and flashes personalised messages on monitors as they move round the store (1)

Robotic devices tend to the weeding/watering of plants (1)

**Total [6]**

**TOTAL [86]**

**Advanced GCE ICT**  
**June 2006 Assessment Series**

**Unit Threshold Marks**

Unit		Maximum Mark	a	b	c	d	e	u
2512	Raw	90	62	55	48	41	34	0
	UMS	90	72	63	54	45	36	0
2513	Raw	120	100	90	80	70	60	0
	UMS	120	96	84	72	60	48	0
2514	Raw	90	60	54	48	42	36	0
	UMS	90	72	63	54	45	36	0
2515	Raw	90	53	47	41	35	30	0
	UMS	90	72	63	54	45	36	0
2516	Raw	120	98	87	76	65	54	0
	UMS	120	96	84	72	60	48	0
2517	Raw	90	57	51	45	39	33	0
	UMS	90	72	63	54	45	36	0

**Specification Aggregation Results**

Overall threshold marks in UMS (i.e. after conversion of raw marks to uniform marks)

	Maximum Mark	A	B	C	D	E	U
<b>3838</b>	300	240	210	180	150	120	0

	Maximum Mark	A	B	C	D	E	U
<b>7838</b>	600	480	420	360	300	240	0

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

	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>U</b>	<b>Total Number of Candidates</b>
<b>3838</b>	5.1	17.6	39.9	64.8	83.7	100.0	4561

	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>U</b>	<b>Total Number of Candidates</b>
<b>7838</b>	6.9	22.9	48.7	75.9	94.5	100.0	2734

7295 candidates aggregated this series

For a description of how UMS marks are calculated see;  
[www.ocr.org.uk/OCR/WebSite/docroot/understand/ums.jsp](http://www.ocr.org.uk/OCR/WebSite/docroot/understand/ums.jsp)

Statistics are correct at the time of publication





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