OCR
RECOGNISING ACHIEVEMENT

GCE

Information & Communication Technology

Advanced GCE **A2 7838**

Advanced Subsidiary GCE **AS 3838**

Mark Scheme for the Components

January 2008

3838/7838/MS/R/08J

Oxford Cambridge and RSA Examinations

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All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the Report on the Examination.

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RECOGNISING ACHIEVEMENT

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Advanced GCE Information and Communication Technology (7838)

Advanced Subsidiary GCE Information and Communication Technology (3838)

MARK SCHEMES ON THE UNITS

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
Below Threshold Performance		**0**
Threshold performance	Candidates spell, punctuate and use the rules of grammar with reasonable accuracy; they use a limited range of specialist terms appropriately.	**1**
Intermediate performance	Candidates spell, punctuate and use the rules of grammar with considerable accuracy; they use a good range of specialist terms with facility.	**2–3**
High performance	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.

General advice to Assistant Examiners on the procedures to be used

1 The schedule of dates for the marking of this paper is of paramount importance. It is vital that you meet these requirments. If you experience problems then you must contact your Team Leader without delay.

2 Please ensure that you use the final version of the Mark Scheme which will be available at the end of the Examiner's Standardisation meeting. You are advised to destroy all draft versions.

3 An element of professional judgement is required in the marking of any written paper, and candidates may not use the exact words which appear in the detailed sheets which follow. If the science is correct and also answers the question then the mark(s) should normally be credited. If you are in doubt about the validity of any answer then contact your Team Leader for guidance.

4 Mark in red. A tick (✓) should be used, at the appropriate point, for each answer judged worthy of credit.

5 Strike through all blank spaces and/or pages in order to give a clear indication that the whole of the script has been considered.

6 The mark total for each question should normally be ringed at the bottom right hand side.

7 In cases where candidates give multiple answers, mark the first answer(s) up to the total number required. In specific cases where this simple rule cannot be applied, the exact procedure to be used will be given in detail at the Examiners' Standardisation meeting.

8 Some questions may have a 'Level of Response' mark scheme. Details of these are given in Appendices attached to this Mark Scheme.

9 Abbreviations, annotations and conventions used in the detailed Mark Scheme:

/ = alternative and acceptable answers for the same marking point
NOT = answers which are not worthy of credit
___ = (underlining) key words which **must** be used to gain credit

10 Abbreviations to be used when marking:

^ = omission mark
bod = benefit of the doubt
nbod = not benefit of the doubt
je = just enough to get the mark
tv = working towards credit, but not awarded the mark, too vague
con = contradiction (cases where candidates contradict themselves in the same response)
NAQ Not answered the question
MTP Miss the point
NE Not enough
r = repetition
( ) = words around text indicate that what is written is irrelevant and has been ignored

Mark Scheme 2512 ICT Information, Systems and Communications

1 (a) Identify <u>three</u> other different sources where BPC could get information from to improve its business.

Three from, 1 mark each, eg:
- internet (1)
- people on street (1)
- interviews (1)
- questionnaires (1) **[3]**

(b) Describe <u>two</u> disadvantages of coding the data.

Two from, 2 marks each:
- precision of data coarsened (1) eg light blue coded as blue/cannot get back to original (1)
- difficult to code value judgements (1) eg “was the service good?” to be coded as a judgement of 1-4 (1)
- comparisons of coding difficult (1) as value judgements made by different people (1)
- if the user does not know the codes (1) they cannot use them(1)
- limited number of codes (1) if codes are made up of a range of letters and numbers they can end up running out of codes (1)
- difficult to trace errors (1) have to decode first (1) **[4]**

(c) Identify and describe <u>three</u> different validation methods.

Two marks per method, 1 for identification, 2nd for description/example, three from:
- range (1) upper and/or lower limits (1)
- type (1) matches to data type (1)
- length (1) maximum length allowable (1)
- existence/lookup (1) must exist in separate list (1)
- presence (1) must be entered (1)
- format/picture/input mask (1) matches location of numbers and letter (1)
- check digit/hashing (1) calculated and compared to ensure correct digits entered (1)

[6]

(d) The quality of the data collected by BPC can affect the information produced. The age of the data source is one factor than can affect the quality of the information produced.

Identify <u>four</u> other factors.

Four from:
- accuracy/correctness (1)
- relevance (1)
- completeness (1)
- presentation (1)
- level of detail/volume (1) **[4]**

2 (a) Identify <u>two</u> tasks that RAM can be used for

Two from e.g:
- holding open files (1)
- holding running programs (1)
- holding OS in use (1)
- holding screen display (1)
- clipboard (1) **[2]**

(b) (i) Identify a device that could be used to input a paper photograph to a computer system.

One from:
- scanner (1)
- digital camera (1)
- video camera (1) **[1]**

(ii) Identify a device that could be used to edit a photograph that is stored on a computer system.

One from eg:
- mouse
- keyboard
- concept keyboard
- graphics tablet
- touch screen
- head pointer
- eye typer
- foot mouse **[1]**

3 (a) Identify a suitable storage medium that could be used to store the 120GB of data that is backed up every week.

One from:
- external/ removable/ portable hard disk (1)
- [magnetic] tape (1) **[1]**

(b) The system used for backing up and restoring data needs to be tested on a regular basis.
Explain why it is important that testing takes place.

Two from:
- to know the process has worked/check the system is working correctly (1)
- to have confidence in the process (1)
- so that errors can be tracked down (1) **[2]**

4 Describe how the lack of standardisation could affect BPC.

Any **four** from, eg:
- cannot transfer data (1)
- need common format (1)
- technical support/ helpline difficult (1)
- normal support cannot be used (1)
- parts in stock to replace will not work (1)
- savings on bulk buy not an option (1)
- transfer of staff will require new skills (1)
- existing knowledge of software will not be any good (1)
- cost of replacement components to standardise (1) **[4]**

5 (a) Describe <u>two</u> differences between a batch processing system and an interactive system.

Any **four** from at least 1 from each side for full marks:
- Batch
  - Data not up to date (1)
  - Delayed processing (1)
  - Fixed time (1)
  - Data collected beforehand (1)
  - Done when resources not being used (1)
  - Can be left without intervention (1)

- Batch jobs submitted all at once (1)

- Interactive
  - immediate (1)
  - data up to date (1)
  - requires response from operator to continue (1) **[4]**

(b) Describe the purpose of linkers and loaders.

Four from, must be at least 1 from each:

- Linkers
  - links modules (1) into a single program (1) and converted into an executable program (1)

- Loaders
  - takes the program from backing store (1) and places it in main store (1) ready for execution (1)
  - bootstrap loader (1) loads a small piece of itself from disk when computer started (1)
  - linking loader (1) combine linkers with loaders (1)
  - relocating loaders (1) can load the program anywhere in the memory (1) **[4]**

(c) Identify two characteristics of a CLI

Two from:

- less memory overheads (1)
- commands typed (1)
- limited command set (1)
- commands have switches (1)
- prompts (1) **[2]**

6 (a) Describe the following terms associated with relational databases.

(i) Two from:

- Field:
  - holds single item of data (1)
  - part of a record (1)
  - can have its own data type (1)
  - can be primary key/foreign key
  - can be validated on it own (1) **[2]**

(ii) Two from:

- Duplicate Data:
  - data stored more than once (1)
  - in the same table (1)
  - or in different tables (1) **[2]**

(b) Give <u>two</u> advantages to BPC of using fixed length records.

Two from:
- storage requirements can be calculated (1)
- saves memory (1)
- easier to program and deal with (1)
- reports can be structured and fixed (1)
- faster searching (1)
- can aid validation (1) **[2]**

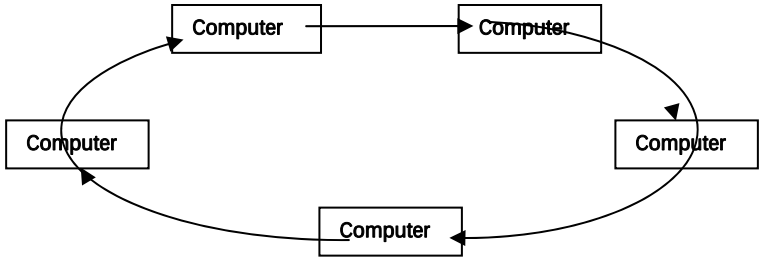
(c) (i) For each type of access, give an example to show how it would be used in the new database.

One for each, examples must be related to customers:
- Sequential
  - sending letters to all customers (1)
- Indexed Sequential:
  - sending letters to customers who live in a certain town (1)
- Random:
  - access a single customer account (1) **[3]**

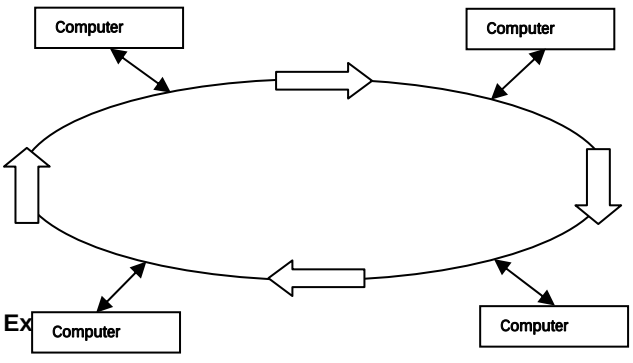
(ii) Identify <u>one</u> difference between serial and sequential access to data.

One from:
- sequential is sorted (1)
- serial is transaction order (1) **[1]**

7 (a) Draw and label a ring network topology.
Wrong diagram: No marks



Data flow one way



Direction of flow of data: one way round ring,
two way to computers

One from:

- 1 for diagram of ring (minimum two computers) (1)

One from:

- 1 for labelled data flow – one way only (1)
- 1 for labelled component – cable/repeater/computer (1) **[2]**

(b) Describe <u>three</u> advantages, to the network manager, of networking the computers together.

Six from:

- updating any virus protection (1) all systems/files up to date (1)
- making backups (1) all files can be backed up (1)
- installing/updating software (1) can be done from a central install point (1)
- monitoring of use (1) allows network manager to what all users are doing(1)
- faster technical support (1)
- greater security (1) all patches on computers (1) **[6]**

(c) Describe <u>two</u> items of hardware needed to connect the local area network (LAN) to the internet.

Two from, 1st for identify, 2nd for description – allow physical or functional:
- cables/phone line (1) to carry data (1)
- hub/switch (1) to centralise connections from computers (1)
- router/modem (1) to translate/forward signal (1) **[4]**

8 Identify <u>three</u> rules that users must follow when choosing their password.

Three from:
- Minimum length (1)
- Cannot reuse old password (1)
- Not dictionary word (1)
- Not personal(1)
- Case sensitive/ lower and uppercase(1)
- Contain text and numbers/symbols (1) **[3]**

9 Describe <u>two</u> facilities of video conferencing that would be useful to BPC when communicating with its shops.

Two from, 1 for identify and 2nd for description, eg:
- sound and picture (1) see and hear staff (1)
- record conversation (1) for playback to verify requests (1)
- multiple contacts (1) say same to many people at the same time (1) **[4]**

10 Describe the health risks she might be concerned about because she works with computers.

Two from, 1 for identify, 2nd for description (allow expansion of problem or cause not solution):
- DVT (1) blood clots (1)/from sitting in same place for long periods of time (1)
- RSI (1) inflammation of joints/long periods of typing (1)
- Carpal Tunnel Syndrome (1) compression of median nerve (1)/long periods of typing (1)
- Ulnar Neuritis (1) compression of ulnar nerve (1)
- Eyesight defects (1) from flickering screen (1)/dry/strained eye (1)
- Fatigue/headache/migraine (1) muscle aches (1) **[4]**

11 Identify <u>two</u> aspects of the ECA and for each, state how it could affect BPC.

1 for identify, 1 for affect:
Register of approved cryptography suppliers (1) know who to go to (1)
Recognises digital signatures (1) allow contracts to be sent via email (1) **[4]**

12 Discuss the impact of the introduction of ICT systems into BPC.

High 8-11	The candidate is able to discuss clearly the impacts and consequences. Candidates will show a detailed level of understanding and be able to explain in detail both the impacts and consequences of more than one position. Logical arguments are produced to demonstrate a clear understanding of the question. Ideas will be expressed clearly and fluently using specific knowledge to support and inform the discussion. There may be a reasoned conclusion. Subject specific terminology will be used accurately and appropriately.
Medium 4-7	The candidate is able to explain superficially the impact(s) and consequence(s). Candidates will show a limited understanding and be able to explain at least one impact and one consequence of a given position, however explanations may lack specific detail and/or concentrate on either an impact or consequence with a limited explanation of the other. The explanation, though informed, may stray from the point but specific knowledge will be evident. Some subject specific terminology will be used.
Low 1-3	The candidate is able to describe superficially the impact or consequences. The information may be poorly expressed and may be in the form of a list of points. Subject specific terminology may be limited or missing.

Examples might include:
Unemployment, reskilling, change in management, new departments set up, disruption as equipment is installed.

[11]

QWC [4]

Mark Scheme 2514 Practical Applications of ICT

Question	Answer	Mark
1 (a)	**Describe bitmap graphics.** **Any four from:** Made up of pixels (1) The colour of each pixel is individually defined (1) Each pixel is defined by the position on the grid (1) and its colour (1) Pixelate on enlargement (1) Are produced when image is taken from digital camera/scanner (1) Can be known as raster graphics (1) Have many different file types (1) eg BMP/GIF/JPEG/TIF (1) DNA: responses relating to file size OR compression,	4
(b)	**Explain why the logo should be included on the presentation.** **Any four from:** Use of corporate style/image (1) instantly recognisable as from driving school (1) Recognition by clients (1) identifies as original (1) Has been designed/paid for (1) will be used (1) If example provided **must** be related to the driving school (1) A response of Professional OR consistent MUST be justified to award marks	4
(c)	**Describe how the use of a master slide template can aid the production of the presentation.** **Any four from:** Shows the theme to be used (1) defines background colour/any special effects (1) The position of graphics on each slide (1) eg company logo (1) Positioning of any standard information (1) eg date/slide number/footer/ header text (1) known as placeholders (1) Controls font size/type/colour (1) known as master text (1) If a change is made on the master slide (1) all existing and new slides are automatically updated (1) A team can work on the development (1) using the master slide the presentation will be consistent (1)	4

(d) **(i)**	**Explain how the following features could be used in the presentation, giving an example for each.** **Max 2 per feature, 1 for example** **Sound** Can be used to emphasise a point/attract interest/attract attention (1) Can be an effect from the software (1) or a sound file from another source (1) Can be placed automatically on a slide (1) Can be started manually (1) by presenter on a mouse click (1) – only allow if not given in (ii) **Example MUST relate to driving school** eg Sound bites from interviews/Company advertising jingle can be inserted (1)	**3**
(ii)	**Video** Can be set up to play automatically on a slide (1) Can be started manually (1) by presenter on a mouse click (1) – only allow if not given in (i) Can be used for demonstration (1) Can be better to show a video than try to explain a driving skill in words (1) **Example MUST relate to driving school** eg Video of driving skills taught, interviews with customers, company advert	**3**
(e)	**Describe how a user could navigate the presentation using buttons.** **Any 3 from:** Enables user interaction with presentation (1) User selects the slides they want to see (1) Can be used to select order slides are shown (1) Can be used to jump to required sections of presentation (1) Can use a touch screen/pointing device (1) **Any example given MUST relate to driving school/courses** eg to jump to course required/motorway skills, off road, defensive driving (1)	**3**

Question		Answer	Mark
2	(a)	**Describe two advantages and one disadvantage of style sheets.** **Max 2 per description** **Advantages: any 2 from** All company documents have a consistent house style (1) instantly recognisable (1) Different people can work on different parts of a document (1) all parts of the document will look the same (1) A style sheet, defines parameters (1) such as page size, margins/fonts (1) no room for error when creating documents (1) The same style sheet can be used for different documents (1) no time wasted in creation of documents (1) **Disadvantages: any 1 from** All documents look the same (1) no room for adaptation to suit the needs of the users/target audience (1) Style sheet must be created and paid for (1) style may not be appropriate to needs of the driving school (1)	**6**
	(b)	**Describe the following features of word-processing.**	
	(i)	**Word wrap** **2 from:** Enables text to be wrapped around graphics (1) Various choices (1) for example tight (1) Text can be positioned under or over images (1) Can be used to highlight objects in a document (1) Continues words onto next line (1) Also known as soft return (1)	**2**
	(ii)	**Paragraph styles** **2 from:** Are pre-defined (1) Can use house style/corporate image (1) Defines features of text (1) eg alignment/indentations/line spacing/fonts/ bullets (1) Format **must** be justified to be awarded a mark.	**2**
	(iii)	**Wizards** **2 from:** Assists the user to produce a document (1) Offers a series of options/questions/step-by-step (1) Based on answers to questions the document is completed (1) Options offered are limited (1)	**2**

	(c) (i)	**Describe a header** **Any 2 from:** Are used at the top of a document (1) Can be changed to be individual to each letter (1) Header can be different on different pages (1) Can appear on every page (1) Example of use (1)	**2**
	(ii)	**Describe a footer** **Any 2 from:** Are used at the bottom of the page (1) Usually contains the page number/date/file name (1) Can be different on each page (1) Can appear on every page (1) Example of use (1)	**2**
	(iii)	**Describe footnotes** **Any 2 from:** A note commenting on a word/phrase or point in text (1) printed at the bottom of the page (1) A reference number (1) is used to reference the explanation (1)	**2**

Question		Answer	Mark
3	(a)	**Describe three advantages of normalisation.** **Any 3 from: Max 2 per advantage** Removes redundancy (1) **final** tables will have little redundant data Database is flexible (1) if requirements of user change the database can be adapted (1) Increases integrity (1) data only needs to be entered/altered once (1) Increases consistency (1) duplicated data removed (1) Easier maintenance (1) updates will affect all instances/processes (1) Allows for data separation (1) which is easier to combine at a later date than to decompile / easier to set up different user views (1) data is atomic (1) Creating a database that behaves predictably/other database designers can understand the database (1) as it conforms to the well-tested rules of normalisation (1) Greater efficiency of use (1) improves the **speed** of data entry (1)	**6**
	(b) **(i)**	**Describe the following queries giving an example of when the driving school could use them** **Cross-tab** **Max 2 per description, Max 1 per example** Calculate a sum, average, count, or other type of total for data (1) Grouped by two types of information (1) One down the left side of datasheet and another across the top (1) Report summarises data (1) Presents summaries in a compact row/column format (1) Calculate and restructure (1) data for easier analysis (1) **Example: MUST relate to Driving school** eg number of people doing each course each month	**3**
	(ii)	**Parameter** **Max 2 per description, Max 1 per example** Type of select query (1) Query results only displayed if a field matches a given value (1) value defined by user (1) Can be saved/hard-coded (1) Can be dynamic (1) ask user for values required (1) Example: **MUST relate to Driving school** eg to select all customers who have completed a motorway skills course	**3**

	(c)	**Explain two design considerations that could be considered during the design of the tailored report** **Any two from:** How is the information to be presented (1st) text/numbers/graphs (1) Suitable headings (1st) to inform users of purpose/content of report (1) House style (1st) consistent use of eg font type/size (1) Spacing (1st) information needs to be easily read and understood (1)	**4**

Question		Answer	Mark
4	(a)	**Describe each of the following word fields.**	
	(i)	**FILL-IN** **Any two from:** Prompts user for information (1) useful when variable information not available from data source (1) has the same outcome as ASK word field (1) Allow 1 mark for example relating to driving school	**2**
	(ii)	**IF…THEN…ELSE** **Any two from:** Used to set conditions (1) to limit records printed (1) Allow 1 mark for example relating to driving school	**2**
	(b)	**Personalised envelopes are to be produced.** **Describe how merge fields could be used during this process.** **Any 2 from:** Template for envelope is produced (1) using merge fields taken from data source (1) Envelopes printed for all selected records (1) automatically (1)	**2**
	(c)	**Explain how graphic libraries could be used to produce this map.** **Any 4 from: eg** Library of standard map symbols (1) recognisable/industry standard symbols (1) Relevant features defined by symbols (1) can be placed on map (1) Map can be produced to appropriate scale (1) symbols can be resized with no loss of quality (1) If can't find suitable image in one library (1) can look in another (1)	**4**

Question	Answer	Mark
5 (a) (i)	Identify and describe two other features of spreadsheet modelling software. 1 for identify, 1 for description: **2 from:** Formulas (1st mark) a mathematical expression in a cell that is automatically calculated (1) usually input by the user (1) Rules (1st mark) set of procedures that must be followed (1) may be a validation rule (1) Functions (1st mark) a pre-defined formula that can be entered into a cell to carry out a specific calculation (1) can be used if a formula is too complex/long (1) built-into the spreadsheet (1) DNA Charts and graphs	**4**
(ii)	**Any two, eg** Entry fee (1) Maximum number of entrants/competitors (1) Prize money available (1) Cost of catering (1) Number of staff needed (1)	**2**
(b) (i)	**Define a macro.** A sequence of instructions (1) That are defined as a single element (1) Can be called to initiate the predefined procedure (1)	**2**
(ii)	**Identify three examples of the use of a macro in a spreadsheet.** **Any 3 from: eg** Moving to different parts of the spreadsheet (1) Running a calculation (1) Printing a workbook/sheet/graph (1) Producing a graph (1)	**3**
(c) (i)	**The number of people completing the defensive driving course for each month over a one-year period.** Bar/histogram (1)	**1**
(ii)	**The number of males and females completing each of the three different courses.** Radar/comparative (stacked) barchart (1)	**1**

Question	Answer	Mark
6	**Describe how an on-line booking system could be used.** **Any 8 from: eg** Customer can select course required (1) Select the date and time (1) Check availability (1) Check price (1) Can change options (1) Make a payment (1) with secure payment facilities (1) System stores details (1) Data can be used by company (1) eg mail shots based on bookings (1) Email notification of other courses based on bookings (1)	**8**
	TOTAL	**86**
	Quality of written communication	**4**

Mark Scheme 2515 Communications Technology and its Application

1 (a) One mark for point, one for expansion, one for improvement e.g.

- imprecision (1) can't locate cars position precisely/example (1) technology enabling finer detail/triangulation through more satellites (1)
- blindspots (1) can lose signal (1) repeaters in tunnels (1)
- lack of detail on maps/resolution (1) not aware of new roads (1) greater memory on device/update the database (1)
- inflexibility (1) lack of options for entering destinations (1) improvements in software/interface = more options (1)

For full marks, all elements must be present to Max 6 **[Max 6]**

(b) Any 6:

Stage 1: Phone to mast

- mobile phone registered on network when switched on (1)
- identified by phone number/SIM/IMEI (1)
- phone transmits request for traffic information/phone sends traffic information number (do not allow examples or brand names) (1)
- signal from phone detected by one or more aerial/transceiver masts (1)
- if more than one mast, system determines location of device/which cell device is in by looking for mast receiving strongest signal (1)

Stage 2: Mast to database

- system associates request with given (cell) location (1)
- latest traffic report for that cell/location looked up on system (1)
- request sent from mast to system via public telephone network (1)

Stage 3: Database to mast

- traffic report sent from system to cellular network (1)
- system rechecks that phone is within that cell (1)

Stage 4: Mast to phone

- system associated request to particular device/phone (1)
- report relayed onto phone (1)

At least one from each section for full marks. **[Max 6]**

2 (a) (i) **Two** advantages, one mark for point, one for expansion e.g.
- Predefined choices (1) less time needed to search (1)
- No need to think about what enquiry is (1) select from list (1)
- Can use touchscreens/keystrokes (1) no need for keypads (1) **[Max 4]**

(ii) **One** disadvantage, one mark for point, one for expansion e.g.
- lack of flexibility (1) restricted to pre-determined option (1)
- sub-menu structure may not be as customer perceives choices (1) imposes structure of which options are grouped together (1) **[Max 2]**

(b) (i) Use of first language to enter enquiries (1) rather than codified data (1) sometimes spoken (1) **[Max 2]**

(ii) **Two** advantages, one mark for point, one for expansion e.g.
- greater flexibility (1) can explain question in own terms (1)
- greater choice (1) no need to use pre determined set of words (1)
- greater precision (1) nuances of meaning possible (1)
- greater range of questions (1) not reliant on previously asked questions (1) **[Max 4]**

(iii) **One** disadvantage, one mark for point, one for expansion e.g.
- response time greater (1) more processing needed/human intervention needed to interpret questions (1)
- lack of guidance (1) user has free choice (1)
- ambiguity of meaning (1) natural language is imprecise (1) **[Max 2]**

3 (a) (i) e.g.

- how to connect (1)
- how to adjust volume/picture size/quality (1)
- how to have inscreen image of self (1)
- how to zoom (1)
- how to save session (1)
- how to focus (1) **[Max 2]**

(ii) One mark for point, one for expansion e.g.

- Different pattern of meetings (1) less/more ad hoc meetings (1)
- Less travelling required (1) giving more time for other things (1)
- Bringing together colleagues who may not work together usually (1) allowing remote workers equal access to meetings/decisions (1) **[Max 4]**

(b) Three from;

- Observation (1)
- Interviews/questionnaires (1)
- Examining documentation (1)
- Watch how the system is used (1)
- Monitor money saved (1)
- Monitor pattern of use (frequency/who by) (1)
- Audit/connection logs (1)
- Equipment booking logs (1)
- Monitor changes in patterns of travelling (1)
- Monitor changes in patterns of meetings (1)
- Staff feedback (1)
- Record and playback (1) **[Max 3]**

(c) Max two from;

- privacy of conversation (1)
- greater clarity of sound/less distortion/background noise (1)
- less disturbance from/to colleagues (1) **[Max 2]**

(d) One mark for point, one for expansion e.g.

- net speed of data transmission (1) high bandwidth/optical cables more transparent (1)
- low loss (1) no need for repeaters (1)
- lightweight (1) low volume/size/thickness (1)
- difficult to intercept (1) have to break cable (1)
- lack of problems due to electrical interference (1) cables can be run through electrical conduit (1) **[Max 4]**

(e) One advantage, one mark for point, one for expansion max 2 marks e.g.

- less invasive (1) no need to build in cables/can connect buildings that couldn't otherwise be cabled (1)
- not susceptible to damage (e.g. rats) (1) no physical link (1)

One disadvantage, one mark for point, one for expansion max 2 marks e.g.

- susceptible to fog/obstruction etc. (1) needs clear line of sight (1)
- pointing stability problems (1) building sway, winds, accidental damage to transmitter/receiver (1)
- optical interference problems (1) background light/fringing/scattering/absorption (1) **[Max 4]**

(f) Connect together two LANs/ segments (1) **[Max 1]**

(g) Allow connection of devices (1) to a network/LAN (1) distributes data (1) between network segments (1) **[Max 2]**

4 (a) One mark for point, one for expansion e.g.

- to enable devices to communicate together (1) through shared protocols (1)
- to allow devices to be guaranteed as reliable (1) through consistent protocols (1)
- to allow purchasers to know the device will work (1) with existing system (1)
- increase choice in marketplace (1) different manufacturers can produce devices (1)

[Max 4]

(b) One mark for point, one for expansion e.g.

- breaks down complex activity (1) into smaller ones, logical model (1)
- each layer has specific task (1) separates tasks into logical sets (1)
- each layer can only talk to adjacent ones (1) separates processes into discrete steps (1)
- layers operate independently (1) aids fault finding/error detection (1)
- application layer (1) supports end-user processes/authentication/data privacy (1)
- presentation/syntax layer (1) translates data between application/network
- session layer (1) manage connections (1)
- transport layer (1) completes data transfer/flow control (1)
- network layer (1) switching/routing/error handling (1)
- data link layer (1) encoding/decoding of data (1)
- physical layer (1) conveyance of data (1)

[Max 4]

(c) One mark for method, one for expansion e.g.

- verification (1) data sent twice and compared (1)
- CRC (1) algorithm applied to data at transmission and reception (1)
- checksums (1) data block generated by CRC or other methods
- parity check (1) 1 bit added (or not) to make total number even (1) if one digit is changed during transmission the error can be found (1) if two changed the error can not (1) burst error (1)
- hamming code (1) single bit error detection (1) uses multiple parity bit checking (1) combination parity bit checking at receiver detects error location and corrects it (1)
- a packet is checked after sending or upon receipt (1) using error control bits (1) /packet switching checks for errors (1)

[Max 4]

(d) Max two from;

- the translation of data/scrambling data (1) into an unintelligible form (1)
- securing data (1) by making it unreadable without a key (1)

[Max 2]

(e) Max two from;

- to verify the identity of the station sending the data (1)
- to allow the data received to be trusted (1) because it has been sent from a trusted source (1)

[Max 2]

5 One mark for point, one for expansion e.g.

- wide range of channels (1) giving local flavour (1) specialist programming (1)
- interactive TV (1) allowing viewer to select options (1) record and playback programmes / pause/rewind programmes (1)
- online gaming (1) allowing users to play against each other (1)
- broadband Internet (1) using high speed (1) cable modems (1)
- cable telephones (1) high voice quality (1) using VoIP (1) cheap calls (1)
- video services (1) including video on demand (1) high bandwidth (1) data compression (1)
- technical support (1) can give answers to FAQs (1)
- check/pay your bill (1) in real time (1)
- can book online (1)
- email (1)
- buy products (1)

Max four for single points **[Max 8]**

6 (a) One mark for point, one for expansion e.g.

- inflexible responses (1) non human contact (1)
- may need printed copy of recycling timetable (1) to ensure customer puts correct bins out (1)
- bandwidth (1) cost of access (1)
- reliance on technology (1) if server down, no information about recycling services (1)
- browser incompatibility (1) renders page unreadable (1)
- not available in community languages (1) disenfranchises minorities (1)
- some cannot access (1) digital divide (1) **[Max 4]**

(b) One mark for point, one for expansion e.g.

- cheaper devices (1) more readily purchasable (1)
- alternative means of access (1) eg TV/PDA/mobile phone
- online support (1) eg instant messaging, VoIP, callback (1)
- community broadband provided by council (1) reduces access costs (1)
- accessibility devices eg screen reader (1) access for special needs (1) **[Max 4]**

(c) One mark for point, one for expansion e.g.

- gathering feedback from residents (1) when new plans/ideas are up for consultation (1)
- payment (1) of eg council tax/rent (1)
- providing information on other council services (1) eg tourist information/what's on/energy saving schemes/fostering/ schools (1)
- providing downloads of documents (1) eg maps/planning applications (1)
- maintaining a database of/allowing information to be posted by/providing a search for information about (1) local clubs and societies (1)
- listing job vacancies (1) and providing online application forms (1)
- allowing residents to make complaints/contact council (1) via online forms (1)
- listing/contact form for local councillors (1) and providing search facility to find your councillor (1)
- providing information on availability of grants (1) and guidance/forms on how to apply (1) **[Max 6]**

Mark Scheme 2517 ICT Systems and System Management

1 A travel agency has a shop in a large town.

(a) Explain, using examples, why it is important to the agency that information is exchanged accurately.

eg
If the number of rooms in a hotel is under quoted [1] the agency may lose money by not letting all available rooms [1]
If the number of hours an employee worked was incorrectly recorded [1] that member of staff would be incorrectly paid [1]
If the prices quoted are incorrect [1] the firm could lose money to rival operators [1]
If the customer is told the wrong time of a flight [1] they will miss their plane [1] they may not use the agency again [1]
If the hotel room sold to the customer has been sold to another customer [1] the customer's holiday would be ruined [1]
Allow exchange of information between packages/machines

Max [4]

(b) Describe how the agency could use information in

(i) decision making
eg
Information received about flight times [1] will influence decisions on when holidays abroad can begin and end [1]
Information about prices of holidays [1] can influence special offers or promotions offered by the agency [1]
Poor performance of an airline over time [1] may mean the management take the decision not to use that airline again [1]

Max [2]

(ii) strategic planning
eg
Information about new flight routes/airports/hotels [1] can be used to plan next year's holidays/offers [1]
Information about competitors [1] can lead to a change in types of holidays sold by the agency [1]

Max [2]

(c) Describe <u>one</u> type of internal resource of the agency.

eg
Accommodation resources [1] such as the agency offices [1]
Human resources [1] such as the staff that work in the offices [1]
Technological resources [1] such as the computers used in the agency [1]

Max [2]

(d) The travel agency employees work with computers.

(i) Describe <u>two</u> health problems related to working with ICT.
(No marks for the solution to the health and safety problem. Must have the condition and an explanation for a mark)

eg
Repetitive strain injury can cause pains in the wrist/caused by typing too much without a rest [1]
Carpel tunnel syndrome where a nerve is pinched in the wrist/caused by adopting the wrong posture while working [1]
Ulnar neuritis where a nerve at the elbow is damaged/caused by excessive working with a mouse [1]
Deep vein thrombosis when blood clots form/caused by long periods of sitting at a computer [1]
Eye and eyesight defects may be caused by long periods at the screen [1]
Fatigue and stress from working in hot conditions staring at a screen [1]

Max [2]

(ii) Describe <u>two</u> safety problems related to working with ICT.

eg
Trailing wires could cause a person to trip/cause equipment to fall [1]
Risk of fire and electrocution if incorrect plugs/overloaded plugs/damaged wires are used [1]
Batteries catching fire [1]
Liquids should be kept out of the computer room to avoid electrocution or damage. [1]

Max [2]

(e) The travel agency uses an integrated office system.

Describe how the agency could use an integrated office system.

eg
A word processor [1] to write letters to customers [1]
A spreadsheet [1] to keep their accounts [1]
A database [1] to keep records of contact details/holidays booked [1]
An email package [1] to email prospective customers [1]
DTP package [1] for preparing advertising leaflets [1]
Files can be shared [1] across the different packages [1]

Max [4]

2 (a) Each of the computers in the travel agency is linked using network interface cards (NIC) to a computer which acts as a server.

(i) Describe the purpose of a NIC.

eg
To provide your computer with a physical connection to a network [1] thereby allowing communication with other devices [1]

Max [2]

(ii) Describe the purpose of the server.

eg
To provide a resource [1] that can be used by any authorised client station [1]
To hold software/databases [1] that can be accessed by any station on the network [1]

Max [2]

(b) Explain the benefits <u>and</u> drawbacks of using a star network topology.
Max 3 points if any benefits or drawbacks discussed.

Benefits
It is easy to add devices [1] as the network expands [1]
One network failure does not bring down the whole network [1]
The hub provides central management [1]
It is easier to find faults than with other network topologies [1]
Lower risk of data collision [1]
Drawbacks
Can be more expensive than other topologies [1] as it requires more cable [1]
Failure of the server can bring down the whole network [1]

Max [4]

(c) The travel agency would like to open up another shop in the town.

They need to plan this project carefully and they appoint a project manager.

(i) Identify <u>one</u> tool or technique available to the project manager.

Critical path analysis [1]
Project management software [1]
Gantt chart [1]
Allow spreadsheet

Max [1]

(ii) Explain the considerations that the project manager must give to the budget and deadlines when planning the project.

eg
Max 5 points for 'budget' or 'deadline'

Budget
Would need to be worked out before going ahead [1]
Decisions as to whether to borrow money [1]
Cost of employing staff/buying premises/installing software/hardware [1]

Deadlines
Need to be planned to ensure efficiency [1]
To make sure that each individual part of the project [1] was ready for the next part [1] (targets)
To award penalties/rewards to contractors [1]
The manager must be aware of the date the project is to be completed. [1]

Max [6]

(d) The agency wishes to have touch screens in the shops that can be used by the customers to choose flights and holidays.

Part of the project will be to design the user interface.

(i) Describe the contents of the design specification.
The purpose of the system [1]
The inputs [1]
The outputs/screens required [1]
Assumptions, limitations or constraints [1]
Processing requirements/queries [1]
The links between screens [1]
Data structures [1]
Colours/fonts/sizes/layout [1]
Validation rules [1]
Test plan [1]
Data flow diagram [1]

Max [4]

(ii) Explain the reasons for having an effective design for the human-computer interface.

eg

The user will perceive input from sight and sound [1]. The designer will have to take into account that the user has preconceived ideas [1] about for instance green for go and red for stop [1] if preconceived ideas are met confidence will increase [1]
The user will have a limited attention span [1]. To counteract this the designer should make the screen uncluttered [1] and have the salient points obvious [1]
The short term memory will be involved as the user moves from page to page [1]. The page layouts should remain consistent [1] this should increase the speed of learning [1]
The user will not be expected to use this screen often [1] and will not expect training [1]
Colour layout [1] should not be distracting [1]

Max [6]

(iii) Describe how the technique of prototpying would help in designing this interface.

A trial/dummy user interface can be created which is then tested by potential users [1] to incorporate the views of the user [1]
Prototyping allows users to test the interface [1] to allow changes before it is put into production [1]

Max [2]

(iv) Describe one process modelling technique and one data modelling technique.

eg
Max 2 points per description of each
An entity relationship model [1] allows a diagram of the relationship between data to be established [1]
State transition diagrams [1] help define every state of a system diagrammatically [1]
A flowchart [1] is the graphical representation of the operations involved in a process [1]
Dataflow diagrams [1] show how data moves through a system [1]

Max [4]

3 A new holiday booking system is to be created.

The project manager must decide whether to have a custom-written solution or use off-the-shelf software.

(a) (i) Describe custom-written software.
Software specially written for the travel agency [1]

Max [1]

(ii) Describe off-the-shelf software.
Software that already exists [1]

Max [1]

(b) Explain the benefits of using off-the-shelf software for the new holiday booking system.
The software should have most of the bugs removed [1] because it has been tested in the public domain for some time [1]
There are existing users/help groups/on-line help [1] as the software is used by many other travel agencies [1]
The staff may already be familiar with the software [1] so they will need the minimum/no training to use it [1]. There will be little or no decrease in the efficiency of operations immediately after installation [1]
It can be purchased/used immediately [1]
Existing users can be contacted and asked about performance/suitability [1]
Training is probably available through third parties [1]
It is relatively cheap to buy [1] as it is already written and the costs effectively shared by a large customer base [1]

Max [6]

(c) The project manager will be deciding on a method of installation for the new system.

Describe <u>two</u> different installation methods.

<u>Phased installation</u> [1]
When part of a new system replaces part of the old system [1] while other tasks continue to use the old system [1]. The installation is spread over a period of time [1]
<u>Pilot installation</u> [1]
Is where the new system is only used in one/a few stores first [1] to be tested [1] before being fully implemented [1]
<u>Big bang/immediate/direct</u> [1]
The new system replaces the old system without any overlap [1]
<u>Parallel</u> [1]
The new system operates for a short period of time alongside the old system [1]

Max [4]

(d) The system will need to be reviewed.

Explain the role of a review.

eg
The system will need reviewing regularly [1] to ensure that it does not get out-of-date/become old fashioned [1]
Problems/errors can be reported [1]
Staff can be asked for their opinion on how well the system is performing [1] and how they think it could be improved. [1]
To check that the data is being processed efficiently [1] and that there is still sufficient storage space for the number of new customers/orders [1]
To check that the data-entry system is working efficiently and accurately [1]
To check whether any new legislation has been introduced which might affect the recording of data about the customers [1]

Max [4]

4 The successful travel agency is taken over by an international company with a head office abroad.

(a) Describe the impact of this external change on

(i) the travel agency staff

eg
The agency staff may fear redundancy [1]
They may worry that they would be relocated [1]
That their salaries/working conditions may be changed [1]
They might have to learn new skills/be retrained [1]
Different time zones mean staff have to work unsociable hours [1] **Max [2]**

(ii) the system the travel agency uses.

eg
The system may not be compatible with the new company's system [1]
There may be language problems [1]
Data may need to be converted/transferred/merged. [1] **Max [2]**

(b) Describe factors which the new company must consider when managing this change.

All points can be expanded for an extra mark
The change-over must involve staff and management [1]
The change to the new system must be developed within a time scale [1] and at a cost that allows for consultation, quality assurance and development [1]
Staff capabilities must be considered [1]
The staff may need training [1]
Extra staff may need to be employed (or staff redundancies) [1]
Staff views will need to be taken into account [1]
Changes in working practice might require increase in wages [1]
New systems need testing [1]
Staff need support to embrace the new systems [1]
Equipment may need to be installed [1]
Financial aspects discussed [1]
An experienced manager is needed to help the change [1]
Notification to customers [1] **Max [4]**

(c) Representatives are sent to inspect hotels.

They are able to keep in touch with their head office using a nomadic network.

Describe the characteristics of a nomadic network.

(Description by example is fine)
A nomadic network may consist of a portable computer [1] and a mobile telephone [1]
Local networks can be wireless based [1] with laptops fitted with transmitter receivers for contact with the central system [1]
Nomadic networks enable the representatives to gather up-to-date information [1] from the company's database wherever they are [1]
Details of holidays/services booked by the reps can be entered into one company system immediately [1] thus avoiding the possibility of double booking [1]
Max [4]

5 The company is thinking about offering virtual holidays where people never actually leave their homes but apparently "go on holiday" anyway.

Discuss hardware and software developments which would make these possible.

High 7-9	The candidate is able to discuss clearly the impacts **and** consequences. Candidates will show a detailed level of understanding and be able to explain in detail both the impacts **and** consequences of more than one position. Logical arguments are produced to demonstrate a clear understanding of the question. Ideas will be expressed clearly and fluently using specific knowledge to support and inform the discussion. There may be a reasoned conclusion based upon prior discussion. Subject specific terminology will be used appropriately and accurately.
Medium 4-6	The candidate is able to explain superficially the impacts **and** consequences. Candidates will show a limited understanding and be able to explain both the impact(s) **and** consequence(s) of a given position, however explanations may lack specific detail and/or concentrate on either impact(s) or consequence(s) with a limited explanation of the other. There may be a reasoned conclusion. Specific knowledge appropriate to the discussion will be evident. Subject specific terminology will be used accurately.
Low 1-3	The candidate is able to explain superficially an impact **or** a consequence. The information will be more than a list of points. Subject specific terminology may be limited but will be used. Ideas may be poorly explained or be logically disjointed.

Examples might include:
Sun beds in the home/at leisure centres
Virtual reality trips including suits, helmets, software
Photos of yourself digitally re-mastered to show you at various well known places around the world
Virtual reality trips into space including G-forces etc
Electronic postcards apparently sent from overseas destinations
Holographic images of the holiday area
Environmental controls in the home
Using GPS systems to model the area you are pretending to go to

Max [9]

QWC: 4

Total: 90

Grade Thresholds

Advanced GCE (Subject) (Aggregation Code(s))
January 2008 Examination Series

Unit Threshold Marks

Unit		Maximum Mark	a	b	c	d	e	u
2512	Raw	90	54	48	42	36	31	0
	UMS	90	72	63	54	45	36	0
2514	Raw	90	54	48	42	36	31	0
	UMS	90	72	63	54	45	36	0
2515	Raw	90	46	41	36	31	27	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	58	53	48	43	38	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
3838	300	240	210	180	150	120	0
7838	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
3838	12.3	34.6	53.7	76.5	96.9	100.00	163
7838	3.6	28.6	60.7	89.3	100.00	100.00	28

For a description of how UMS marks are calculated see;
http://www.ocr.org.uk/exam_system/understand_ums.html

Statistics are correct at the time of publication

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