

# **OCR ADVANCED SUBSIDIARY GCE COMPUTING (3820)**

## **OCR ADVANCED GCE COMPUTING (7820)**

### **Specimen Question Papers and Mark Schemes**

These specimen assessment materials are designed to accompany the OCR Advanced Subsidiary GCE and Advanced GCE specifications in Computing for teaching from September 2000.

Centres are permitted to copy material from this booklet for their own internal use.

The GCE awarding bodies have prepared new specifications to incorporate the range of features required by new GCE and subject criteria. The specimen assessment material accompanying the new specifications is provided to give centres a reasonable idea of the general shape and character of the planned question papers in advance of the first operational examination.

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**Advanced Subsidiary GCE**

**COMPUTING**

**INTRODUCTORY COMPUTER SYSTEMS, COMMUNICATIONS AND SOFTWARE** **2506**

Candidates answer on the separate answer paper provided.

Additional materials:

One 8-page answer booklet.

**TIME** 1 hour 30 minutes

**INSTRUCTIONS TO CANDIDATES**

Write your name, Centre number and candidate number in the spaces provided on the answer booklet.

Answer **all** questions.

**INFORMATION FOR CANDIDATES**

You will be assessed on your clarity of expression, the structure and presentation of your ideas and your grammar, punctuation and spelling in your answers to questions.

There are 4 marks for Quality of Written Communication

This question paper consists of 4 printed pages.

Answer **all** questions.

**1** A friend, who wishes to buy a computer for home use, knows little about computer hardware and has asked for some help. Write a brief report outlining the main differences between a floppy disk drive, a hard disk drive and a CD-ROM drive. You should make particular reference to their relative capacities and state a typical use for each kind of drive.

- (a) Floppy disk drive [3]
- (b) Hard disk drive [3]
- (c) CD-ROM drive [3]

**2** (a) State what is meant by *simplex*, *duplex* and *half duplex* in the context of data transmission, and give an example of the use of each. [6]

(b) Explain the meaning of the term protocol and explain why protocols are necessary for data transmission. [2]

**3** Consider the following 8 bit binary integer which is in twos complement form.

0	1	1	1	1	0	1	0
---	---	---	---	---	---	---	---

(a) State the decimal equivalent of this binary integer. [1]

(b) Show how this binary integer would be represented in hexadecimal. [1]

(c) (i) Show the result obtained when this binary integer is added to itself.

(ii) State its decimal equivalent and explain the result. [3]

**4** A software developer retains the source code for a particular application and provides the application's user with the object code.

(a) Explain the difference between *source code* and *object code*. [2]

(b) State **two** reasons why the application's user is provided only with the object code. [2]

- 5** With the aid of a suitable example, describe one type of error which will be detected during
- (a) program compilation [2]
  - (b) program execution [2]
- 6** With the aid of an example in each case, briefly describe each of the following programming constructs:
- (a) sequence [3]
  - (b) selection [3]
  - (c) repetition [3]
- 7** A number of stand-alone computers are to be connected together to form a network. Identify two hardware components and two software components that are required to be added to the stand-alone computers, explaining why each is necessary.
- (a) hardware components [4]
  - (b) software components [4]
- 8** Explain the meaning of the following terms in the context of a computer system:
- (a) Explain the purpose of a multi-tasking operating system. [1]
  - (b) Describe how buffers and interrupts can be used to allow multi-tasking when a job is sent from a computer to a printer. [5]

- 9** A sales department in a large corporation makes approximately 20000 amendments to its data files each day. Backups are carried out daily while archiving is carried out on a yearly basis.

State the purpose of these **two** procedures, and outline the main steps involved in each procedure.

(a) *backups* [3]

(b) *archiving* [3]

- 10** A teacher wishes to keep records of the marks obtained by pupils throughout the year. At the end of the year each pupil is supplied with a report that contains personal details of the pupil, the percentage mark obtained by the pupil and a comment written by the teacher. Explain the role of a

(a) word processor

(b) spreadsheet

(c) database

in the production of the reports. [6]

- 11** The file referred to in Question 10 is organised as an indexed sequential file.

(a) Identify the field most suitable for use as the key field. Justify your choice. [2]

(b) Describe **two** different ways in which the records in an indexed sequential file may be accessed. [4]

(c) Briefly describe **one** other way of organising a datafile. [2]

- 12** (a) Give one example of an application for which it would be sensible to use a batch processing operating system. [1]

(b) Describe two characteristics of your chosen application which make a batch processing system a sensible choice. [4]

- 13** The leader of a pre-school playgroup would like to buy a computer. The computer will be used to teach the young children to count and also to assist the leader with administration tasks.

The interface between the user and the computer is likely to be very different for the two types of user. Describe a suitable type of screen interface, and state a sensible method of input, for each user, giving reasons for your answers. **[8]**

**[Quality of Written Communication: 4]**

**Oxford Cambridge and RSA Examinations**



**Advanced Subsidiary GCE**

**COMPUTING**

**INTRODUCTORY COMPUTER SYSTEMS, COMMUNICATIONS  
AND SOFTWARE**

**2506**

**Mark Scheme**



## General

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- 3 Candidates should be regarded as achieving the highest level of response which accurately describes their answer.
- 4 The mark scheme includes an indication of the possible content that candidates might use in their answers. It should though be stressed that where content is provided in this way, it is indicative of the likely answers to be forthcoming and is therefore neither exhaustive nor complete.
- 5 In assessing quantitative answers the ‘own figure rule’ should apply i.e. a candidate must be given credit for logical calculations which, though numerically wrong, are consistent with an earlier error.
- 6 The Quality of Written Communication is to be explicitly assessed on answers to questions identified in the paper rubric. In this context, it refers to:
  - (a) the selection and use of form and style of writing appropriate to purpose and complex subject matter;
  - (b) the organisation of relevant information clearly and coherently, using specialist vocabulary when appropriate;
  - (c) legibility of text, accuracy of spelling, punctuation and grammar so that meaning is clear.

Marks will be allocated according to the following criteria:

- 3–4 Very good form and style of language, appropriately used with complex subject matter. Writing is legible with spelling, punctuation and grammar accurate and meaning clear. Ideas well organised and expression clear and coherent using specialist language.
- 1–2 In general, the layout expresses a comprehensible picture although it is not difficult to see ways in which the language could be improved. The spelling, punctuation and grammar are accurate, and the language is not difficult to understand.
- 0 Is to be awarded if the candidate fails to achieve 1.

The Quality of Written Communication mark must be added once the primary marking has been completed. The Quality of Written Communication mark should be clearly shown on the candidate’s script, together with the primary mark and overall script total.

**Question 1**

<b>Device</b>	<b>Description</b>	<b>Capacity</b>	<b>Use</b>
Floppy drive	Removable flexible magnetic disk [1]	Small (eg 1.44 Mb) [1]	Backup data [1] Software copies [1] [Max 1]
Hard drive	Fixed/sealed magnetic disk [1]	Very large (eg 30 Gb) [1]	Working data [1] Software [1] [Max 1]
CD-ROM drive	Removable laser-read disk [1]	Medium (eg 1 Gb) [1]	Backup data [1] Software copies [1] Multimedia material [1] [Max 1]

Max 3 x 3

**[9 marks]**

**Question 2**

(a) Terms refer to communication between two devices along a communications channel.

- Simplex** = communication in one direction only [1]  
eg teletext [1]
- Duplex** = **Simultaneous** communication in **both directions** [1]  
eg telephone [1]
- Half Duplex** = communication in **both directions** but only in **one direction at a time** [1]  
eg printer-computer [1]

**[6 marks]**

(b) A protocol is a **set of rules** [1] which dictate the **format** of messages [1]

Protocols are needed so that both stations can understand one another. [1]

**[2 marks max]**

### Question 3

- (a)  $122_{10}$  [1]
- (b)  $7A_{16}$  [1]
- (c) (i)  $11110100_2$  [1]  
(ii) -12 [1]  
Answer is negative because of carry into MSB [1]

### Question 4

- (a) Source code is the original version of the program (in a high level language)  
Object code is the binary/executable version of the program [2 marks]  
*(1 mark for source code, 1 mark for object code)*
- (b) The object code is the version which can be executed directly. [1]  
The source code version would require a translator. [1]  
The object code version cannot be easily altered by the user. [1]  
[2 marks max]  
*(1 mark for each of two acceptable reasons)*

### Question 5

- (a) eg The program (or statement) breaks the rules of the language [1]  
eg. for without next [1]  
[2 marks]  
*(1 mark for each point)*
- (b) The program attempts an impossible operation [1]  
eg. Division by zero [1]  
[2 marks]  
*(1 mark for each point)*

### Question 6

- (a) Two or more statements [1]  
executed in the order written [1]

a := b

c := d

print a, c

correct example

[1]

[3 marks]

- (b) One of two or more sets of statements will be executed [1]  
Depending upon a condition [1]

If mark < 40

then writein ('fail')

else writein ('pass');

correct example

[1]

[3 marks]

- (c) A number of statements will be executed a number of times [1] until a condition is met/while a condition is true. [1]

while reply <> 'N' do

begin

end

correct example [1]

[3]

### Question 7

- (a) Hardware: Network/comms card [1] to handle data transmission [1]  
Cable [1] to provide data transmission medium [1] [4]

- (b) Software: Comms SW [1] – to handle data transmission [1]  
management SW [1] – to manage users/files [1] [4]

### Question 8

- (a) To allow more than one job to appear to be run at the same time. [1]
- (b) Buffer is temporary store [1]  
Filled by the computer and used to provide data for the printer [1]  
Allowing the computer to carry on with other tasks [1]  
Printer sends interrupt when buffer is empty [1]  
Requesting the computer to refill the buffer [1]  
Computer suspends current task and refills the buffer [1]  
Cycle is repeated until print jobs are finished [1]

(1 mark per point to maximum 5)

### Question 9

#### Backups

Purpose – to make a second copy of the data which will be used if anything goes wrong with the working copy. [1]

Steps all data is copied to another external storage medium, e.g. magnetic tape, tape streamer. [1]

The copy is stored in a safe place. [1]

[3 marks]

#### Archiving

Purpose – to remove data, which is no longer needed, from the current data files. [1]

Steps – suitable data is identified (e.g. invoice data relating to the previous financial year) [1],  
deleted from the current data files and written to an archive file [1].

[3 marks]

### Question 10

- (a) word processing - produce comments and reports [1]  
- accepting data from spreadsheet [1]  
- and from database [1]
- (b) spreadsheet - record marks [1]  
- calculate percentages [1]
- (c) database - keep details of pupils, e.g. name, class [1]

[6 marks]

### Question 11

- (a) Pupil id [1]  
It is unique to each pupil [1] [2]
- (b) Serially [1] through all records [1]  
  
Index is searched for block holding record [1] then block is searched for the record [1] [4]
- (c) e.g. Calculating the address of the record [1]  
by performing a transformation on the key field [1] [2]

### Question 12

- (a) eg payroll/billing systems [1]
- (b) Large quantities of data [1] to be processed in a similar way [1]  
Information is collected before the run [1] thus requiring no human intervention [1]  
Large amounts of down time on system/over night [1] allowing for uninterrupted use/efficient use of slack time [1] [4]

*(Give marks in pairs, maximum 4)*

### Question 13

Child:

Graphical [1]

Use of colours/animation/large digits [1]

Need for simple input [1]

Rewards for correct answers [1]

*(Give maximum 2 for above)*

eg. touch screen [1]

Immediate/natural action to point/ease of use [1]

Leader:

Text based [1]

Material sorted for presentation [1]

Choices of different facilities available [1]

WIMP element in interface [1]

*(Give maximum 2 for above)*

e.g. Keyboard and mouse [1]

to allow input of text data and commands to different parts of the screen [1]

**[8 marks]**

**[Quality of Written Communication : 4]**

**[Total : 12]**

**Unit 2506**

Section	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13
<b>1.1</b>	3									6			
<b>1.2</b>								1				5	6
<b>1.3</b>				4	4	9							
<b>1.4</b>			5								8		
<b>1.5</b>	6							5	6				2
<b>1.6</b>		8					8						

Total

A01	9	8	1	2	2	6	8	6	6	3	8	5	5	69
A02			4	2	2	3				3			3	17

86	
4	QOWC
90	



## Oxford Cambridge and RSA Examinations

### Advanced Subsidiary GCE

### **COMPUTING** COMPUTER SYSTEMS DEVELOPMENT AND PRACTICAL APPLICATIONS

**2508**

### Specimen Paper

Candidates answer on the separate answer paper provided.

Additional materials:

One 8-page answer booklet.

**TIME** 1 hour 30 minutes

#### **INSTRUCTIONS TO CANDIDATES**

Write your name, Centre number and candidate number in the spaces provided on the answer booklet.

Answer **all** questions.

#### **INFORMATION FOR CANDIDATES**

You will be assessed on your clarity of expression, the structure and presentation of your ideas and your grammar, punctuation and spelling in your answers to questions.

There are 4 marks for Quality of Written Communication

This question paper consists of 4 printed pages.

Answer **all** questions.

Tifpeek Ltd operates sports and leisure clubs in a number of towns and cities throughout the country. Each provides a wide range of fitness, sporting and health facilities for its members. Members can use and book the facilities of their own club or of any other Tifpeek clubs. Membership is renewed annually. Each club also provides its members with a wide range of catering and shopping facilities.

**1** Tifpeek's accountants, in their annual report, advise that the company's accounts be computerised. There are a number of accounts packages available 'off the shelf'. The management of Tifpeek have to decide between using an off the shelf accounts package and a tailor made piece of software.

**(a)** Explain clearly the differences between *off the shelf* software and *tailor made* software. **[4]**

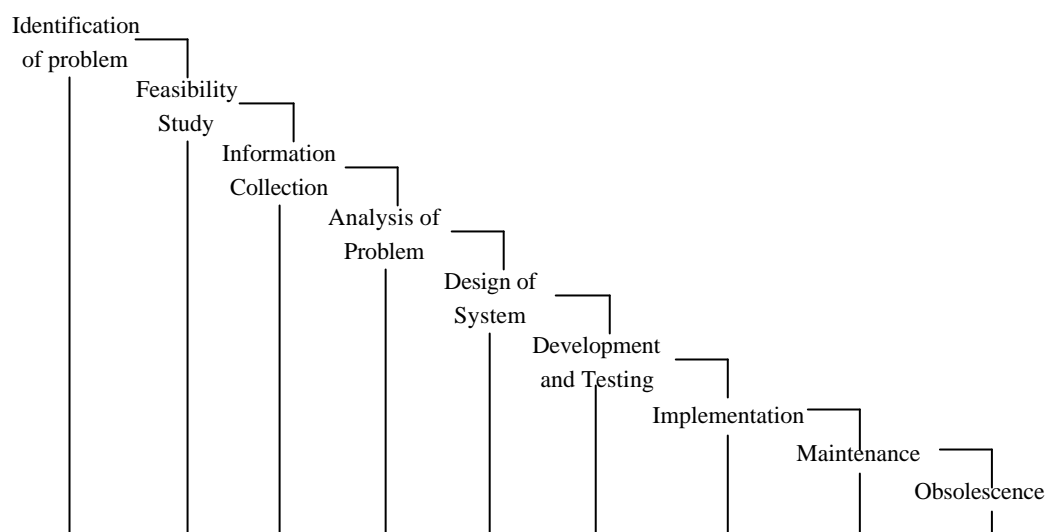
**(b)** Describe three advantages of using:

(i) off the shelf software,

(ii) Tailor made software. **[6]**

**2** Membership and renewals at each club are handled manually but Tifpeek are unhappy with many aspects of this system. They have engaged a computer consultant to examine one of their clubs and to develop a computerised membership system.

**(a)** In a memo to the directors of Tifpeek, the computer consultant frequently refers to the 'system life cycle' of the proposed membership system. Briefly describe **six** main stages of the system life cycle, described in Fig. 1. **[12]**



**Fig 1.**

- 3** Previously, members paid by cash or cheque for any facilities used and for any purchases made. Tifpeek have recently installed a new system in each club that eliminates daily cash transactions. This system involves each member using a swipe card in special terminals placed at reception desks and at points of sale in the shops and restaurants. Members now settle their accounts on a monthly basis by cheque or credit card.
- (a) Describe how the swipe card system collects and processes data relating to members' expenditure. **[6]**
- (b) Give **two** advantages to Tifpeek and **two** advantages to the club members of this new system. **[4]**
- (c) The system provides a number of daily, weekly, and monthly reports which assist Tifpeek management in the day-to-day running of the clubs and in forward planning. One of these reports identifies the monthly utilisation and income generated for each facility within each club for each of the last six months.  
Draw a diagram showing in detail a possible layout of this report. **[5]**
- 4** Tifpeek decide to install a computer terminal in the exercise room, one of the functions of which will be to run a program called FITMON. Members input data about their weight, physical activities, and heart rate, in response to questions from the software. Details of their responses are then stored for future use.
- (a) Describe a suitable hardware interface for use by the members, giving reasons for your answers. **[4]**
- (b) Explain how the system can identify each member; in order to keep their records separate. **[2]**
- (c) Describe two features of the interface software which will be important in such a system. **[4]**
- 5** Tifpeek Ltd want to evaluate FITMON.
- (a) Identify **two** methods they could use to help them evaluate FITMON. **[2]**
- (b) State how Tifpeek could identify evaluation criteria. **[1]**

- 6 Tifpeek store large amounts of data about their members, including financial, personal and health details. Such personal information is protected by the Data Protection Act.  
Describe **four** features of the Data Protection Act which might allay the fears of any members who are worried about their data being misused. [8]

**The remaining questions do not refer to Tifpeek Ltd.**

- 7 The Bank of Kedlam looks after the accounts of individuals, and of companies. For individuals it offers the usual range of facilities: current accounts, deposit accounts, credit cards, cash (cheque guarantee) cards etc. In each country of operation it has branches in every major town and city.  
The bank holds a record for each current account customer on-line at the bank's main computing centre. Some of the fields held in the record are: account number (unique identifier); customer name; address; credit balance; credit rating; and a field for each transaction made to the account in the current financial year.  
When data is entered onto the bank's computer system it is subjected to the processes of *verification* and *validation*.
- (a) Define the terms *verification* and *validation*. [2]
- (b) With reference to the record described above, explain how  
(i) verification,  
(ii) validation  
of the data can be carried out. [6]
- (c) Discuss the precautions that should be taken to ensure that the data remain private and confidential. [6]
- (d) The Bank of Kedlam is going to introduce on-line banking for its customers so that they can check their accounts, make transactions etc., all from the comfort of their own home.  
Discuss the social effects this will have on Kedlam's customers. [6]
- 8 (a) Explain why the bank holds customer account information on-line. [2]
- (b) Customers are sent statements of their account once a month. The computer system produces these statements using a batch processing operating system. Describe **three** characteristics of this application which will make batch processing a suitable system to use. [6]

**[Quality of Written Communication: 4]**



**Oxford Cambridge and RSA Examinations**

**Advanced Subsidiary GCE**

**COMPUTING**

**COMPUTER SYSTEMS DEVELOPMENT AND PRACTICAL  
APPLICATIONS**

**2508**

**Mark Scheme**

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- 1 (a) Off the shelf software is a general [1] package which can be adapted to suit.  
[1] In this example it would probably be a spreadsheet. [1]

Tailor made software is specially written for the task or organisation. [1]  
No adaptation should be necessary. [1]

[4 marks max]

(b) **Off the shelf**

Tried and tested. [1]

Immediate availability. [1]

Existing users can be contacted and asked their opinion. [1]

The system can be seen in operation. [1]

Relatively cheap [1]

Training in its use might be widely available. [1]

[3 marks max]

**Tailor made**

Specially designed system that should do exactly what is required. [1]

Minimal changes to current operating procedures should be possible. [1]

Future user-specific modifications should be possible. [1]

Minimum training necessary. [1]

[3marks max]

2 **IDENTIFICATION OF PROBLEM**

Problem must be defined accurately...[1]

Must meet agreed criteria...[1]

or client will be dissatisfied with solution [1]

**FEASIBILITY STUDY**

Initial survey carried out...[1]

to decide whether full scale analysis and design should be considered...[1]

based on cost/technical problems [1]

**INFORMATION COLLECTION**

Carried out by:

Interviews/Questionnaires to establish views of users [1]

Observation of current practices [1]

Following data through the system [1]

## **ANALYSIS**

To study the information collected to produce a thorough analysis of present systems [1]

To split problem up and represent (diagrammatically) [1]

To specify User/Hardware/ Software requirements [1]

## **DESIGN**

Specification of output [1]

Specification of data structures [1]

Specification of input [1]

## **DEVELOPMENT AND TESTING**

Production of code [1]

Tailoring of established software [1]

Production of test results to ensure working system [1]

## **IMPLEMENTATION**

Placing system in working environment [1]

Production of data files [1]

Training of staff [1]

## **MAINTENANCE**

Solve problems caused by bugs in the system [1]

Modifications due to changing requirements [1]

Continued training of staff [1]

## **OBSOLESCENCE**

Review of effectiveness [1]

Upgrades to the system [1]

Need for compatibility with old/new software [1]

*(1 per point, Max 6 x 2)*

**[12 marks max]**

- 3 (a)** When a member makes a purchase the swipe card is read. [1]  
The swipe card identifies the member. [1]  
The amount of the sale is keyed in or scanned. [1]  
These two pieces of information and other details such as time and date [1]  
Are transmitted to a central location. [1]



- And used to update the member's account. [1]
- Once a month each member is sent an account. [1]
- A member makes a payment [1]
- which is credited to the member's account. [1]

*[1 per point, Max 6]*

**[6 marks max]**

**(b) Advantages to Tifpeek**

- More accurate system – direct data entry avoids many types of error. [1]
- No need to handle cash or cheques for each transaction. [1]
- Possible to impose and monitor credit levels. [1]

**[2 marks max]**

**Advantages to Members**

- No need to carry cash or cheques. [1]
- Single monthly payment covers all expenditures. [1]
- Detailed monthly statement possible to settle disputes. [1]

**[2 marks max]**

**[4 marks max]**

**(c) Title of report.**

- Date of report. [1]
- For each club.
- Club identification. [1]
- For each facility within the club.
- Facility identification. [1]
- Utilisation. [1]
- % usage. [1]
- income. [1]

*In order to obtain each mark, the items must be positioned sensibly*

**[5 marks max]**

- 4 (a) **INPUT:** e.g. touch sensitive screen/Simple key pad attached to screen because limited number of responses to each question/ Simple to use device, not affected by the physical location. [1]

**OUTPUT:** e.g. Screen/Speaker to ask questions/Printer to produce hard copy if requested by user.

Screen supplements possible input/ Speaker for those who cannot read small print without glasses (gym)/ Members may require permanent record. [1]

[4]

- (b) Either: Input of membership number and [1]  
PIN via [1]  
Key pad [1]

OR: Use of swipe card [1]  
and PIN [1]  
Via card reader and key pad [1]

[2 marks max]

- (c) Simple navigation [1]  
through a tree structure [1]  
Bright, colourful screens with high contrast with text [1]  
To ensure clarity for users [1]  
Automatic clear and return to root [1]  
In case member fails to finish input [1]  
Consistent screen layout [1]  
So that members become used to system quickly [1]

[1 per point, Max 4] [4]

- 5 (a) Usage statistics built into software. [1]  
Questionnaire to members using the system [1]  
Observing who uses it, for how long etc [1]

[2 marks max]

- (b) Criteria references in design specification [1]  
Use criteria selected from list of requirements specified from feasibility study/analysis [1]

Accept either requirements specification or design specification. [1 mark max]

- 6 Members allowed to see their data [1]  
 in order that they can check the validity of their data held [1]  
 Access to information is limited to some employees of Tifpeek [1]  
 So that members are aware that access to their data is not general [1]  
 Data must be uptodate and accurate [1]  
 Members can rely on the data being valid [1]  
 Data is only held for as long as it is needed [1]  
 Members know that redundant data information/information when they leave, will  
 be destroyed [1]  
*(1 per point, Max 8)* [8]
- 7 (a) Verification. Checks that data entered is the same as it appears on the source document. [1]  
 Validation. Checks that the data are feasible/sensible [1]  
 [2]
- (b) (i) Verification:  
 Data entered twice [1]  
 By different means/people [1]  
 System compares two sets of data [1]  
 Reports any disparities [1]  
 [3 marks max]
- (ii) Validation:  
 e.g. Account number – format check  
 Name/Address – existence check  
 Credit balance – range check  
 [3 marks max]
- (c) Access to building only given to authorised personnel. [1]  
 Keys, card keys, identification cards etc. [1]  
 Archived data kept in a secure place [1]  
 Restricted use of computer system [1]  
 User ID's and password [1]  
 Sensitive data further protected by password [1]  
 Transmitted data either on dedicated fibre optic cable [1] or transmitted in code [1]  
 [6 marks max]

- (d) No need to go to bank so lack of relationships between bank staff and customer [1]
  - 24 hour banking facilities [1]
  - Reduced time travelling to bank [1]
  - Reduced costs of travel [1]
  - Disabled customers benefit [1]
  - Shift workers benefit [1]
  - Special notices/offer could be easily missed [1]
  - Many details of account will be at their fingertips, e.g checking standing orders/direct debits, dates, changes – all without special forms/ requests [1]
  - Generally reduced paperwork because everything done on screen/on line [1]
  - Any other reasonable social effect
- (1 per point, Max of 6)* [6 marks max]

- 8 (a)**
- Immediate check on state of account if customer wants to withdraw money [1]
  - Ability of members of staff at branches/over the phone to answer customer queries [1]
  - Check on identity if customer loses card/cheque book [1]
- [2 marks max]**

- (b)**
- Large volumes of data [1]
  - Taking advantage of off peak time. [1]
  - Similar processing for all data [1]
  - Means that no human intervention necessary [1]
  - All accounts need to be processed [1]
  - Can be extracted easily from storage [1]
  - Heavily peripheral dependant [1]
  - Run at time peripherals not normally needed [1]
- [1 per point, Max 6]* [6]

**[Quality of Written Communication : 4]**

**Unit 2508: Assessment Grid - Computer Systems, Development and Practical Applications**

	<b>Q1</b>	<b>Q2</b>	<b>Q3</b>	<b>Q4</b>	<b>Q5</b>	<b>Q6</b>	<b>Q7</b>	<b>Q8</b>	<b>Totals</b>
<b>3.1</b>		12			3				<b>15</b>
<b>3.2</b>	10								<b>10</b>
<b>3.3</b>			11	2			8		<b>21</b>
<b>3.4</b>				8					<b>8</b>
<b>3.5</b>								8	<b>8</b>
<b>3.6</b>			4			8	12		<b>24</b>
<b>AO1</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>6</b>	<b>3</b>	<b>8</b>	<b>16</b>	<b>6</b>	<b>69</b>
<b>AO2</b>		<b>2</b>	<b>5</b>	<b>4</b>			<b>4</b>	<b>2</b>	<b>17</b>
									86
<b>Quality of Written Communication</b>									4
<b>Total</b>									<b>90</b>

## Advanced GCE

### COMPUTING

SYSTEMS SOFTWARE MECHANISMS, MACHINE  
ARCHITECTURE, DATABASE THEORY AND PROGRAMMING  
PARADIGMS

**2509**

### Specimen Paper

Candidates answer on the separate answer paper provided.

Additional materials:

One 8-page answer booklet.

**TIME** 1 hour 30 minutes

### INSTRUCTIONS TO CANDIDATES

Write your name, Centre number and candidate number in the spaces provided on the answer booklet.

Write all your answers on the separate answer paper provided.

If you use more than one sheet of paper, fasten the sheets together.

Answer **all** questions.

### INFORMATION FOR CANDIDATES

The number of marks is given in brackets [ ] at the end of each question or part question.

You will be awarded marks for the quality of written communication where an answer requires a piece of extended writing.

In this paper you are expected to show your knowledge and understanding of different aspects of Computing and the connections between them.

Answer **all** questions.

- 1 (a) Briefly explain the difference between the use of a compiler and an interpreter in the translation of a high-level language program into executable form. [4]
- (b) Suggest in what circumstances it would be appropriate to use:
- (i) a compiler rather than an interpreter; [2]
  - (ii) an interpreter rather than a compiler. [2]
- (c) Explain how a stack can be used to control calls to procedures. [4]

- 2 An A level computing student attempts to computerise a school bookshop as her project work. For part of the project the student has written a program, in a high level language, which accepts a barcode as input. It then searches a file for the correct barcode and finds from the record the price of the item, which is then displayed.

When the student tests the program she is puzzled to find that although she stored in the computer file the price of £4.99 for a book, when the price is displayed it appears as £4.990001.

Explain what has happened and describe two methods that the student might use to overcome the problem. [4]

- 3 The following expresses family relationships using the declarative paradigm.

mary	childof	fred
mary	childof	anne
john	childof	fred
john	childof	anne
frank	childof	mary
edna	childof	john

X grandchildof Z if  
X childof Y and  
Y childof Z

(a) Show how instantiation is used to satisfy the goal

X childof fred. [2]

(b) Show how instantiation and backtracking are used to satisfy the goal

W grandchildof fred. [4]

4 Fig.1 shows three classes called VEHICLE, CAR and LORRY.

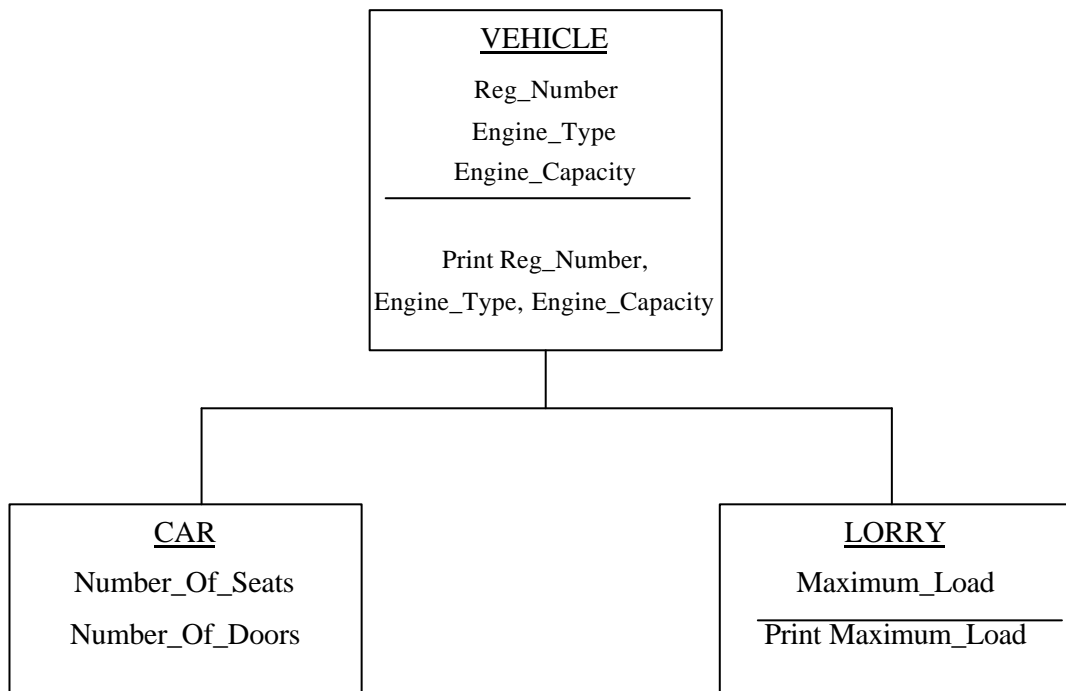


Fig. 1

(a) Using this example, explain the meaning of

(i) *derived classes*;

(ii) *inheritance*.

[4]

(b) Using the VEHICLE class, explain the meaning of *encapsulation*.

[2]



5 An integer is defined using Backus-Naur Form (BNF) as

$\langle \text{INTEGER} \rangle ::= \langle \text{DIGIT} \rangle | \langle \text{INTEGER} \rangle \langle \text{DIGIT} \rangle$

$\langle \text{DIGIT} \rangle ::= 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9$

This creates a problem because, for example, 00 is defined as an integer.

(a) By using

$\langle \text{NON-ZERO DIGIT} \rangle ::= 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9$

rewrite the rules so that an integer cannot start with a zero (0).

[2]

(b) Show in outline how changes could be made to your rules to give

(i)  $\langle \text{SIGNED INTEGER} \rangle$ ,

(ii)  $\langle \text{MIXED NUMBER} \rangle$  which has an integer followed by a decimal point followed by further digits.

[4]

6 (a) Explain how two PCs, running the same operating system, can start up with different configurations.

[2]

(b) Explain why, when loading a new applications package onto the hard disk of a PC, files may become fragmented.

[2]

(c) Explain how the operating system can load a file that is fragmented on a disk.

[5]

(d) A PC user has created a number of very large files which are to be printed. Explain how a print spooler is used to handle these jobs while the user continues to use the PC for other tasks.

[6]

7 (a) Using an add instruction, explain the fetch-execute cycle. You should refer to the

(i) program counter,

(ii) memory address register,

(iii) memory data register,

(iv) current instruction register.

[6]

(b) An algorithm for adding together two arrays is

```
FOR i = 1 TO n DO
    c[i] = a[i] + b[i]
NEXT i
```

- (i) Explain the difference between using a single processor and parallel processors to implement this algorithm.
- (ii) Explain a difficulty with implementing the following algorithm using parallel processors.

```
sum = 0
FOR i = 1 TO n DO
    c[i] = a[i] + b[i]
    sum = sum + c[i]
NEXT I
```

[3]

8 The owner of a flower shop uses a relational database to store information about orders placed by customers, and the types of flower in stock.

- (a) One entity is defined as CUSTOMERS. List four attributes which you identify as belonging to this entity. [4]
- (b) Another entity is identified as the orders placed by customers (ORDERS). Explain the relationship between the entities CUSTOMERS and ORDERS. [2]
- (c) A third entity is flowers, defined as the types of flowers in stock. Draw an entity relationship diagram for the three entities in this database. [3]
- (d) Design a table in third normal form, called CUST, to hold the details of customers and explain why it is in third normal form. [2]
- (e) When a customer orders flowers, an order form has to be completed. The order form is shown in Fig. 2.

<b>CUSTOMER ORDER</b>	
<b>Order Number:</b>	<b>Date: / /</b>
<b>Customer Number:</b>	
<b>QUANTITY</b>	<b>FLOWER ID</b>

**Fig. 2**

- (i) Create a table, called ORDER, which contains all the attributes shown on the order form. Explain why it is not normalised.
- (ii) Starting with the ORDER table, create a set of tables in third normal form.
- (iii) Explain how the tables can be used to create a list of customers who bought roses on 23/12/99.

[7]

- 9 A table is used to store the barcodes of a number of items available in a shop. The table also stores pointers to the location of the data about each item. The barcodes are stored in the table in numerical order, smallest first.

Give outline algorithms in whatever form you consider appropriate, to

- (a) search the table for a specific barcode using a binary search; [6]
- (b) insert a new entry in the table when a new product is offered by the shop. [4]

[Quality of Written Communication : 4]

**Oxford Cambridge and RSA Examinations**



**Advanced Level GCE**

**COMPUTING**

SYSTEMS SOFTWARE MECHANISMS, MACHINE  
ARCHITECTURE, DATABASE THEORY AND PROGRAMMING  
PARADIGMS

**2509**

**Mark Scheme**

## General

- 1 The paper is to be assessed and marked to Advanced GCE Standard.
- 2 Marking should be positive; marks should not be subtracted for errors or inaccuracies. Where appropriate, the benefit of any doubt should be given to the candidate.
- 3 Candidates should be regarded as achieving the highest level of response which accurately describes their answer.
- 4 The mark scheme includes an indication of the possible content that candidates might use in their answers. It should though be stressed that where content is provided in this way, it is indicative of the likely answers to be forthcoming and is therefore neither exhaustive nor complete.
- 5 In assessing quantitative answers the 'own figure rule' should apply i.e. a candidate must be given credit for logical calculations which, though numerically wrong, are consistent with an earlier error.
- 6 The Quality of Written Communication is to be explicitly assessed on answers to questions identified in the paper rubric. In this context, it refers to:
  - (a) the selection and use of form and style of writing appropriate to purpose and complex subject matter;
  - (b) the organisation of relevant information clearly and coherently, using specialist vocabulary when appropriate;
  - (c) legibility of text, accuracy of spelling, punctuation and grammar so that meaning is clear.

Marks will be allocated according to the following criteria:

- 3–4 Very good form and style of language, appropriately used with complex subject matter. Writing is legible with spelling, punctuation and grammar accurate and meaning clear. Ideas well organised and expression clear and coherent using specialist language.
- 1–2 In general, the layout expresses a comprehensible picture although it is not difficult to see ways in which the language could be improved. The spelling, punctuation and grammar are accurate, and the language is not difficult to understand.
- 0 Is to be awarded if the candidate fails to achieve 1.

The Quality of Written Communication mark must be added once the primary marking has been completed. The Quality of Written Communication mark should be clearly shown on the candidate's script, together with the primary mark and overall script total.

### Question 1

- (a) – Interpreter translates one line... [1]
- then allows it to be run before translation of next line [1]
- Compiler translates the whole program as a unit ... [1]
- and creates an executable program [1]

**[4 marks max]**

- (b) (i) – When program is to be run a number of times [1]
- When size of IAS is not important [1]
- When speed of execution of code is important [1]

**[2 marks max]**

- (ii) – When debugging a program [1]
- When the size of the object code will cause problems of storage [1]
- When a prototype is needed [1]

**[2 marks max]**

- (c) – Position from which procedure call is made is loaded onto stack [1]
- with values of any parameters passed by reference [1]
- Stack unwound by taking return addresses from top of stack [1]
- Reallocating values to variables [1]
- Problem of overload, particularly with recursion [1]

**[4 marks max]**

### Question 2

- Value not stored accurately as a binary fraction [1]
- When converted back to denary an error occurs [1]
- Force program to round off to 2 dec. places + e.g. [1]
- Store the price as an integer in pence and then convert to pounds + e.g. [1]

**[4 marks max]**

### Question 3

- (a) – X child of fred is compared to first line, fred matches [1]
- so X is replaced, instantiated, to mary and goal is satisfied [1]
- repeated so X is also instantiated to john [1]

**[2 marks max]**

- (b) – W grandchildof fred becomes W childof Y and Y childof fred [1]
- As in (a) Y becomes mary and new goal is W childof mary and mary childof fred [1]
- W is instantiated to frank [1]
- No more matches so backtrack to Y childof fred and find the other match Y is john [1]
- Repeat above to find edna [1]

[4 marks max]

#### Question 4

- (a) (i) – One class is derived from a parent class if it contains all the data and methods of the parent class plus some of its own data and or methods. [1]
- CAR and LORRY are derived from VEHICLE [1]
- (ii) – CAR inherits the data, eg, Reg\_Number, and method (Print) from VEHICLE [1]
- CAR can use these plus its own data [1]

[4 marks max]

- (b) – Data and methods are held together as a unit [1]
  - Only access to Reg\_Number etc is via the Print method in VEHICLE [1]
- [2]

#### Question 5

- (a) e.g.
    - <INTEGER> ::= <NON-ZERO DIGIT> | <NON-ZERO DIGIT> <DIGITS> [1]
    - <DIGITS> ::= <DIGIT> | <DIGIT> <DIGITS> [1]
- [2]

- (b) (i) – Definition of SIGN [1]
- Inclusion of SIGN in definition of INTEGER [1]

- (ii) e.g.
    - <MIXED NUMBER> ::= <INTEGER> . <DECIMAL> [1]
    - <DECIMAL> ::= <DIGIT> | <DIGIT> <DECIMAL> [1]
- [4]

## Question 6

- (a) – Place start-up commands [1]  
– in a boot file [1]  
– such as command.com in MS-DOS [1]  
**[2 marks max]**
- (b) – Initially all files are contiguous [1]  
– When files are deleted, gaps are created [1]  
– New files are loaded using these gaps [1]  
**[2 marks max]**
- (c) – Use the file allocation table (FAT) [1]  
– which records how files are stored in distinct clusters [1]  
– address of 1st cluster is in directory file [1]  
– FAT entry for 1st cluster contains address of 2nd cluster [1]  
– FAT entry for 2nd cluster contains address of 3rd cluster etc. [1]  
– Last entry contains end-of-file code [1]  
**[5 marks max]**
- (d) – spooler is a program [1]  
– that stores data ready for printing [1]  
– It uses a print queue to keep a list of the jobs to be printed [1]  
– It sends 1st batch of data to the printer [1]  
– relinquishes the processor [1]  
– interrupt from printer [1]  
– reactivates the spooler program [1]  
– and sequence is repeated [1]  
**[6 marks max]**



### Question 7

- (a) – copy contents of PC to MAR [1]
- fetch instruction and place it in MDR [1]
- copy instruction from MDR to CIR [1]
- Increment PC [1]
- Decode instruction [1]
- Copy operand to MAR [1]
- Copy data item (address in MAR) to MDR [1]
- Add item in MDR to accumulator [1]

[6 marks max]

- (b) (i) – single processor additions done one after the other [1]
- parallel processors all additions done at once/ each addition done by a different processor [1]

[2 marks max]

- (ii) –  $sum = sum + c[i]$  must wait until all additions completed [1]
- can be difficult to synchronise/effectively uses two loops [1]

[1 mark max]

[2 marks max]

### Question 8

- (a) e.g. Forename, Surname, [1] [Address 1, Address 2, county], [1] post code, [1] date of last order, [1] credit limit. [1] [4 marks max]

- (b) – One to many ... [1]
- because each order is placed by one customer, but each customer can be responsible for more than one order [1]

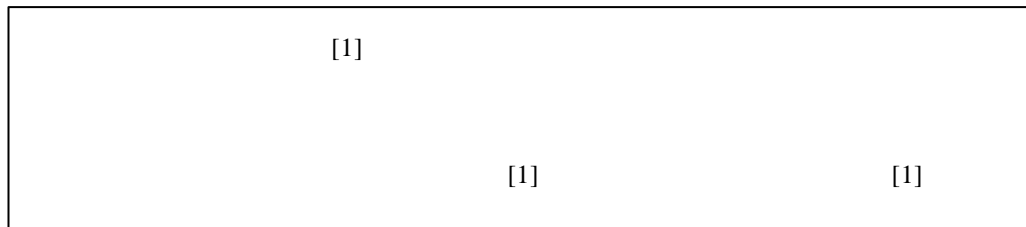


[2 marks max]

(c) Allow



or



[3]

(d) CUST(CustomerID, (four attributes from (a)))

All attributes depend on key and there are no non-key dependencies)

(1 mark for Key and 1 for explanation)

[2]

(e) (i) – ORDER(OrderNumber, CustomerNumber, Date, (Quantity), (FlowerID))

[1]

– Not normalised because of repeating groups

[1]

(ii) 1NF

ORDER(OrderNumber, CustomerNumber, Date, Quantity, FlowerID)

2NF

ORDER(OrderNumber, CustomerNumber, Date)

FLOWERORDER(OrderNumber, FlowerID, Quantity)

This is also 3NF

(1 mark per table, maximum:2)

(iii) – Create Flower table to find FlowerID from description

[1]

– Use FlowerID in FLOWERORDER to find OrderNumbers

[1]

– Use OrderNumbers and date in ORDER to find CustomerNumbers

[1]

– Use CUST table and CustomerNumbers to find details of customers

[1]

(1 mark per -, 3 marks max)

[7]

### Question 9

(a) e.g.

```
J=1=N/2  Assume N is number of items in table
REPEAT
J=J/2
INSPECT TABLE (1)
IF TABLE (1) = BARCODE THEN FOUND: END
ELSE IF TABLE (1) > BARCODE THEN 1 = 1 - J
                                ELSE 1 = 1 + J
UNTIL J = 1
REPORT BARCODE NOT FOUND
END
```

**Mark points:**

- Loop to continue searching smaller sections of table
  - sensible condition to end loop
  - Continual halving of number to inspect
  - Condition barcode found
  - Bisecting correct part of remaining table
  - Stated assumption of inspecting integer values
  - Error condition of barcode does not exist
- (1 per –, 6 marks max)

**[6]**

(b) e.g.

```
INSPECT TABLE(N)
REPEAT
IF TABLE(N)<NEW ENTRY THEN INSERT NEW ENTRY TABLE(N+1)
                                END
                                ELSE COPY TABLE(N) TO TABLE(N+1)
N=N-1
UNTIL N=0
INSERT NEW ENTRY AS TABLE(1)
```

**Mark points:**

- *Begin inspection at value N not 1*
  - *Insert new entry when > entry inspected in table*
  - *Sensible attempt to copy values in table down the table to create space*
  - *Decrementing the value or some other means of inspecting successive entries in the table*
  - *Sensible method of dealing with new entry being first entry in the table.*
- (1 per –, 4 marks max)*

**[4]**

**UNIT 2509: Assessment Grid: Systems Software Mechanisms, Machine Architecture,  
Database Theory and Programming Paradigms**

<b>Q</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>TOTAL</b>
<b>5.4.1</b>						15				<b>0</b>
<b>5.4.2</b>	8									<b>8</b>
<b>5.4.3</b>							9			<b>0</b>
<b>5.4.4</b>	4	4							10	<b>18</b>
<b>5.4.5</b>			6	6	6					<b>18</b>
<b>5.4.6</b>								18		<b>18</b>
<b>A01</b>	<b>8</b>	<b>1</b>	<b>4</b>	<b>6</b>	<b>2</b>	<b>8</b>	<b>8</b>	<b>9</b>	<b>0</b>	<b>46</b>
<b>A02</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>0</b>	<b>4</b>	<b>7</b>	<b>1</b>	<b>9</b>	<b>10</b>	<b>40</b>
										86
<b>Quality of Written Communication</b>										4
<b>Total</b>										<b>90</b>

## Oxford Cambridge and RSA Examinations

### Advanced GCE

### COMPUTING INTEGRATED INFORMATION SYSTEMS

**2511**

### Specimen Paper

Candidates answer on the separate answer paper provided.

Additional materials:

One 8-page answer booklet.

**TIME** 1 hour 30 minutes

### INSTRUCTIONS TO CANDIDATES

Write your name, Centre number and candidate number in the spaces provided on the answer booklet.

Write all your answers on the separate answer paper provided.

If you use more than one sheet of paper, fasten the sheets together.

Answer **all** questions.

### INFORMATION FOR CANDIDATES

The number of marks is given in brackets [ ] at the end of each question or part question.

You will be awarded marks for the quality of written communication where an answer requires a piece of extended writing.

In this paper you are expected to show your knowledge and understanding of different aspects of Computing and the connections between them.

Answer **all** questions.

The Museum of the Late Twentieth Century (MOLT) has built up a collection of objects intended to help to serve as reminders to future generations of important matters in the last two decades of the second millennium. It has many mechanical, electronic and image-based materials including interactive video as well as more conventional films and music.

MOLT is still expanding its collection, and is moving to new premises. It is planning what facilities and information services it should make available to users of the museum, both visiting and remote.

- 1** MOLT decides to produce an on-line 'Guide to Exhibits', to be used within the Museum on terminals specifically chosen and configured for the task.
- (a) Describe and justify the hardware that would be required for this application. You should consider data storage, data communication and the user interface in your answer. **[8]**
  - (b) Describe **two** methods that can be used by visitors to the museum to find details about a particular subject, giving an advantage and a disadvantage of each. **[8]**
  - (c) Describe briefly the basic features of a data structure that would be suitable for storing the 'Guide'. **[4]**
- 2** MOLT is rapidly becoming world famous and realises that it will reach a wider audience if the Guide were available on the world wide web (Web).
- (a) Explain how MOLT could publish the guide on the Web, you should consider
    - (i) hardware
    - (ii) software
    - (iii) advertising the site's existence

in your answer. **[5]**
  - (b) (i) Explain **two** ways in which the facilities available at a remote site might be inferior to those available in the museum itself.
  - (ii) Explain the implications which such inferior facilities might have for the implementation of the guide on the Web. **[6]**

- 3** MOLT is anxious to ensure that its layout in its new premises meets the interests of its users. It decides to build a traffic flow simulation of the movement of visitors along the various routes between the exhibits. They have no previous in-house experience of simulation.
- (a) Explain how MOLT might use simulation in the process of prototyping its new layout. **[4]**
- (b) Discuss the different approaches which MOLT might use to produce the simulation and their relative advantages and disadvantages in this context. **[6]**
- (c) State what outputs you would expect the simulation to display and describe the ways in which the information might suitably be presented. **[5]**
- (d) Identify the main features of a testing strategy for the simulation. **[4]**
- 4** MOLT has to ensure that exhibits and ‘Guide’ terminals are securely protected against accidents or vandalism and to monitor activity when the museum is closed.  
Describe arrangements that MOLT might put in place to achieve this. **[5]**
- 5** MOLT sells copies of some of its popular exhibits in its shop or by mail order, or over the Internet through its web pages.
- (a) Explain two advantages and one disadvantage of offering items through the web site, rather than through a mail order catalogue. **[6]**
- (b) Explain the issues involved and the arrangements that would be needed to enable a purchaser to buy from a catalogue on the Internet. **[4]**



**6** MOLT continues to build its collection, and has a number of agents who are in contact with experts in universities, auction houses and other museums around the world, in order to acquire significant exhibits for its collection. Not only does MOLT need to receive detailed information about possible new exhibits from its agents, but it needs to be able to contact the agents with instructions about negotiations which are often highly confidential and require speedy decision making.

(a) Describe the facilities of electronic communication that might be used for this purpose and explain their use in this context. [5]

(b) It has been suggested that MOLT should provide each of its agents with a portable computer networking capability for this purpose.

Explain the hardware and software that would be needed for the system, relating your answer to sensible estimates of the size of the operation. [7]

(c) Describe briefly **four** factors that MOLT should taken into account in deciding whether to go ahead with this scheme. [4]

(d) Assuming that MOLT decides to go ahead with the scheme, describe briefly how MOLT would make use of project planning methods and the advantages that MOLT would derive from this. [5]

**[Quality of Written Communication : 4]**

**Oxford Cambridge and RSA Examinations**



**Advanced Level GCE**

**COMPUTING**  
**INTEGRATED INFORMATION SYSTEMS**

**2511**

**Mark Scheme**

## General

- 1 The paper is to be assessed and marked to Advanced GCE Standard.
- 2 Marking should be positive; marks should not be subtracted for errors or inaccuracies. Where appropriate, the benefit of any doubt should be given to the candidate.
- 3 Candidates should be regarded as achieving the highest level of response which accurately describes their answer.
- 4 The mark scheme includes an indication of the possible content that candidates might use in their answers. It should though be stressed that where content is provided in this way, it is indicative of the likely answers to be forthcoming and is therefore neither exhaustive nor complete.
- 5 In assessing quantitative answers the 'own figure rule' should apply i.e. a candidate must be given credit for logical calculations which, though numerically wrong, are consistent with an earlier error.
- 6 The Quality of Written Communication is to be explicitly assessed on answers to questions identified in the paper rubric. In this context, it refers to:
  - (a) the selection and use of form and style of writing appropriate to purpose and complex subject matter;
  - (b) the organisation of relevant information clearly and coherently, using specialist vocabulary when appropriate;
  - (c) legibility of text, accuracy of spelling, punctuation and grammar so that meaning is clear.

Marks will be allocated according to the following criteria:

- 3–4 Very good form and style of language, appropriately used with complex subject matter. Writing is legible with spelling, punctuation and grammar accurate and meaning clear. Ideas well organised and expression clear and coherent using specialist language
- 1–2 In general, the layout expresses a comprehensible picture although it is not difficult to see ways in which the language could be improved. The spelling, punctuation and grammar are accurate, and the language is not difficult to understand.
- 0 Is to be awarded if the candidate fails to achieve 1.

The Quality of Written Communication mark must be added once the primary marking has been completed. The Quality of Written Communication mark should be clearly shown on the candidate's script, together with the primary mark and overall script total.

- 7 All answers are expected to be expressed in the context of MOLT; any answer which completely ignores the context can have at most half of the available marks.

- 8 For many questions, the candidate is free to give answers from a range of possible sensible options; these are expressed in the marking guidelines by the use of 'e.g.' in order not to restrict the candidate.
- 9 In the marking guidelines, 1 valid point within context justified and supported by evidence of understanding is considered to be worth 1 mark. In the case of some questions, the number of valid points indicated is greater than the number of marks for the question. This leads to a 'maximum mark' for the question, regardless of the number of points made by the candidate.

## Question 1

- (a) Server with file store [1], Some extension of simple file handling (e.g. different uses of CDROM and hard drive, or mention of paging)[1].

PCs/terminals with network cards/sound cards[1], reason why necessary [1].

Appropriate means of communication e.g. cabling [1] Sensible method explained e.g. twisted pair as opposed to simple serial bus [1].

Input. Sensible method with regard to situation e.g. touch screen. Explanation of reason for method, related to use.[1]

Output. Speakers/printers/screens [1], to provide sound, graphics and hard copy.

**[Max 4x2, 8]**

- (b) e.g. Use of tree/menu [1]

Top level choices leading to progressively more specialised lower levels [1]

D. Need to know something about the thing being searched for. [1]

A. Easily applied to touch screen interface. [1]

e.g. By keyword [1]

Type in keyword or select from list. [1]

D. Can be difficult to find relevant keyword. [1]

A. Leads directly to information. [1]

e.g. Through a related topic. [1]

Use hotkeys/hypertext to find the information. [1]

D. Somewhat down to luck that links exist. [1]

A. Natural search technique/leads to other information en route. [1]

e.g. Freetext search [1]

Searches for reference throughout text rather than in index [1]

D. Can be very time consuming/May give many spurious references [1]

A. Captures all references [1]

**[8 marks max]**

- (c) Multi-keyed database, [1] arranged as index sequential files [1] Use of secondary keys [1].  
Keys arranged in multiple tables [1]. Pointers within data areas providing hypertext links [1].

**[4 marks max]**

## Question 2

- (a) (i) The main machine housing the guide would have to become an Internet host [1]  
(ii) and run various Internet Protocols [1] hypertext would need to be written in a markup language such as HTML [1] and accept various internet protocols [1]  
(iii) links would have to be made from the system to other pages [1] Site's existence would have to be established with search engines [1] **[5 marks max]**
- (b) (i) e.g. you cannot assume that sound quality will cross the network/that sound will be available locally [2]; you cannot assume that bandwidth will be adequate/e.g. for video [2] **[4 marks max]**
- (ii) need for simplicity of design, simple logos, no movement or at option of user, video to use small area of the screen [2]. **[2marks max]**

## Question 3

- (a) e.g. MOLT would need to start with a model of the space and a crude initial design of the exhibits [1], use simulation to check out feasibility [1], use simulation results to suggest refinements [1] and proceed iteratively [1] check final design against actual experience when open to the public [1]. **[4 marks max]**
- (b) MOLT could: hire someone with expertise [1], would be under MOLT's control but slow; buy a package and learn how to use it [1], cheapest but least likely to result in what they want [1]; let a consultancy do it [1], most expensive probably least flexible but most professional result [1]. **[6 marks max]**
- (c) Output must always include values of parameters[1], and be presented in a way that is appropriate for its content [1] and for the audience [1]; will show changes over time clearly [1]; hence e.g. details of layout using CAD graphics[1], speed of flow or traffic density using colour bars on time line [1], bottlenecks or hazards using flashing video on screen [1], data on values of parameters in hard copy[1]. **[5 marks max]**
- (d) Give 1 mark for any sensible point: provided that the answer covers testing at extremes e.g. when full [1], with special circumstance users such as disability [1], Users as test cases [1] for user interface [1], in event of emergency [1]. **[4 marks max]**

#### Question 4

Exhibits and Guide terminals could be protected by security arrangements using strategically placed [1] sensors e.g. pressure pads on floor [1], UV beams [1], video cameras activated by movement or by time clocks [1], light sensors at night [1]; alarms both visual and audible [1] to alert security staff [1], cause appropriate exist / entrances to be automatically opened or locked [1]; all sensors networked to a central alarm [1].

[5 marks max]

#### Question 5

(a) Advantages:

Ability to use different media [1], shows off articles properly [1]

Alteration of catalogue on Web [1], can be done immediately [1]

Use of Web is high tec solution [1] which fits the image of the museum [1]

Disadvantages:

Restriction of possible customer base [1], not everyone has access to the Web. [1]

Extra hardware and software necessary [1], to provide multi media and secure payment. [1]

[6 marks max]

(b) Genuineness of orders [1] confidentiality of transmission of financial data [1], requiring e-mail with authentication [1] credit card numbers requiring encryption [1] address for delivery matches address for c.c. correspondence [1].

[4 marks max]

#### Question 6

(a) e.g. for an answer in terms of e-mail: Communication possible across different time zones using storage [1] and warning facilities [1]; detailed descriptions, spreadsheets, graphical images can be sent using attachments [1] messages from MOLT can be sent to all agents using address book [1], messages from agent can be copied to others [1], sender can be informed when message received [1] or if message cannot be delivered [1], messages include automatic identification, date and time [1]. Reasonable alternatives using voice mail should also be given equivalent credit.

[5 marks max]

(b) e.g. Agents would need portable with suitable screen, keyboard and pointer such as trackerball [1], with built-in modem or cellular phone link [1]; MOLT would need dial-in facilities [1]; both would need compatible communications software [1] and e-mail software with appropriate facilities [1]; agents would want standard office software with diary and address book [1]; if no sizing estimates provided [max 6]; any sensible sizing estimates [max 2].

[7 marks max]

(c) e.g. Technical feasibility and compatibility with MOLT's system [1], cost in terms of number of agents and extent of use [1], training requirements and acceptability [1], availability of communications links in relevant geographic areas [1], anticipated developments in relevant products [1], quantifiable benefits in terms of MOLT's reputation and users [1]. **[4 marks max]**

(d) MOLT uses techniques such as critical path analysis [1], including activities with durations, dependencies, links, resources [2], using standard software packages [1], enables MOLT to monitor progress [1], highlight activities behind schedule [1] **[5 marks max]**



## Unit 2511: Assessment Grid: Integrated Information Systems

Q	A01	A02	5.6.1		5.6.2		5.6.3		5.6.4		Synoptic with Units	Total
			Bullet	Mark	Bullet	Mark	Bullet	Mark	Bullet	Mark		
1A	3	4			2	3					1	7
1B	2	5			4	2					3	7
1C	3	12			2	1					1	6
	8	12										20
2A	3	2							12	4	4	5
2B	3	3			2	1					1	6
	6	5										11
3A	1	3					2	2			1&2	4
3B	3	3					3	4			1&2	6
3C	3	2					3	2			1&2&3	5
3D	2	2										4
	9	10										19
4	3	2					2	3			1&3	5
5A	2	4	3&5	4							1&2	6
5B	3	1							3	3	3	4
	5	5										10
6A	3	2		1					3	2	4&1	5
6B	3	4		2					1	3	1&2	7
6C	2	2			1	1			1	1	1&3	4
6D	2	3	3	1	5	2					3	5
	10	11										21
	41	45		8		10		11		13		86
<b>Quality of Written Communication</b>												86
<b>Total</b>												4
<b>Total</b>												<b>90</b>