

CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Advanced Subsidiary Level and GCE Advanced Level

MARK SCHEME for the October/November 2012 series

9713 APPLIED ICT

9713/13

Paper 1 (Written A), maximum raw mark 80

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the October/November 2012 series for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level components and some Ordinary Level components.

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1 (a) *Batch process control*

Two from:

- Used in food mixing process
- Amounts of raw materials are combined together
- Mixed for a certain length of time
- Amount of each ingredient is controlled by computer
- Length of time for each stage controlled by computer
- Temperature controlled by computer

[2]

Continuous process control

Two from:

- Used in storing process
- Used in processes which appear to be unending
- Temperature has to be maintained continuously

[2]

Discrete process control

Two from:

- Used in Food packing process
- Like an on/off or stop/start process
- The computer control involved in putting mixture into cartons is discrete
- A carton is packed, the next carton comes along, the robot packs it exactly the same

[2]

(b) **Six** from:

- Receives data from sensors
- PLC is a type of computer/microprocessor used for a single purpose
- Has analogue and digital inputs
- PLC stores preset value of temperature
- Logic statements are used to compare the temperature with a pre-set value
- It switches the compressor on or off depending on the results of the comparison
- Rarely any input to it from the user once it has been programmed
- It is used in this process as the pre-set value is constant
- PID...
 - ...calculates the difference between the input value and the pre-set value
 - It causes the PLC to make proportional changes to the temperature...
 - ...by switching the compressor on for short periods of time
 - If the temperature is higher than the required temperature it calculates the difference
 - PLC switches compressor on for a short time and checks the difference again
 - If there is still a difference, PLC switches the compressor on very briefly
 - This is repeated until the required temperature is reached

[6]

2 (a) **Two** from:

- Wages so far this year
- Income tax so far this year
- Employer insurance contribution so far this year
- Employee insurance contribution so far this year
- Pay date
- Pension contributions so far this year

[2]

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(b) Three from:

Name
 Contact details i.e. phone/address
 Holiday entitlement
 Rate of pay
 Tax code
 Job title
 Employee number/id number/payroll number/works number
 Social security/national insurance number
 Department worked in
 Date employed
 Bank details
 Payment method
 Date of birth

[3]**(c) Three from:**

Deletion of a record such as a worker leaving employment
 Change/amendment to a record such as a worker changing address/job title/phone
 Addition of a record such as when a new employee starts with the company

[3]**3 (a) Two from:**

Can keep a closer watch on work progress
 Employees will tend to be on task – not distracted by home entertainment
 Data is more secure as it doesn't leave the office
 Don't have to subsidise home workers equipment
 Easier to arrange team meetings/make contact with all employees (about any changes to task requirements)

[2]**(b) Four from:**

Have greater personal contact with colleagues
 Can discuss ideas with colleagues
 Can see the manager daily...
 ...have greater chance to impress manager giving better job prospects
 Home based telework is inappropriate for some people
 Many homes are not well equipped for home working
 Easier to concentrate on work as there are fewer distractions

[4]**4 Systems - Three from:**

A detailed overview of the whole system
 What is expected of the system/purpose of the system
 Data Flow Diagrams/systems flowcharts
 The results of systems analysis
 What is expected of the system/purpose of the system
 Test plan and test results
 Overall design decisions...
 ...the choice of hardware and software
 ...file, input and output structures
 Systems flowcharts

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Program - Three from:

Description of the software/purpose of the software

What the software does and its features

Program listing

A complete copy of the code used

Annotation explaining what each module of code does

Reasons for choosing those pieces of existing software that were used instead of the programmer having to write code

Input and output data formats

Program flowcharts/algorithms

Program listing – a complete copy of the code used

Annotation explaining what each module of code does

Notes that will help any future programmer to make modifications to the system

[6]

5 (a) **Four** from:

Reporter types up/edits their story using word-processing software/DTP

Reporter types up/edits their story using laptop

Takes photographs using a digital camera/phone

Import images from digital camera/phone

Edit images using picture editing software

Connect laptop to Internet using mobile phone/WiFi hotspot/dongle

Email story to editor's office

Email photos separately using phone/laptop

[4]

(b) **Two** from

Page in digital form/fax form

is sent up to a satellite

Transmitted by the satellite to the various printing plants simultaneously

or

Two from:

The image of the printed page is burned onto light-sensitive film

The film of the page is placed in a large fax machine

The image faxed to the print plant

[2]

6 (a) **Four** from:

An easy-to-remember domain name

A secure method of accepting payments

Descriptions/pricing/photos of goods

Username and passwords to make the system secure

Customers are able to contact shop directly via e-mail

Allows customers to make use of their orders stored in a database

Allows customers to see their order and maintain their own accounts

A shopping basket to hold goods you are going to buy

Prospective customers should be able to use a temporary shopping basket

Returning customers can have a permanent shopping basket

Searches and advanced searches can be carried out easily

Customers can move easily to the checkout/navigate from category to category easily

Orders can be tracked

Wish lists which enable users to store the goods they might want to buy in the future

'People who bought A also bought B' recommendations

[4]

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(b) Four from:

Increased unemployment for checkout operators/sales people
 Increased unemployment for security staff
 Increased unemployment for staff who organise stock control
 Increased employment for technical staff/programmers
 Increased employment for van drivers
 Increased employment for call centre operators

[4]**7 (a) Five** from:

Consists of a number of separate tables
 For example a sales records table and a customer records table
 Tables are linked to each other...
 ...using a primary/key field
 Key field could be the customer ID
 Key field is part of the other table(s)
 Data from one table combined with data from other table(s) when producing reports
 Can select different fields from each table for output
 SQL is used for queries and producing reports

[5]**Three** from:

data is not repeated...
 ...so less storage capacity needed
 If data was duplicated hackers would have easier access to data
 Easier to expand the database
 Data only needs to be amended once
 Easier to produce reports **with cross-tabular data rather than separate files**

[3]**8 (a) Three** matched pairs from:

Range check on credit limit
 Credit limit for new customers \leq \$2000 and \geq \$500

Type/character check on credit card number
 Only digits are accepted

Length check on credit card number
 No more than or less than 16 characters

Check digit on credit card number
 Extra digit calculated from digits in credit card number and appended to number

Length check on Customer ID
 No more than or less than 7 characters

Picture/format check on Customer ID
 Must be one letter followed by 6 digits

[6]

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- (b) Use of normal/live data such as a number between 500 and 2000
 This data should be accepted by the system
 If it isn't the validation rule needs to be amended to ensure the acceptable value is ≥ 500 and ≤ 2000 [3]

Use of abnormal data such as 2001 or "two thousand"
 This data should be rejected by the system
 Amend rule to ensure that it uses 500 to 2000/amend rule to ensure it checks it is numeric/amend rule to make sure $<$ hasn't been used instead of $>$ and vice versa [3]

Use extreme data such as 500 or 2000
 This data should be accepted by the system
 If it isn't amend rule so it is \leq and not just $<$ / check it is \geq not just $>$ [3]

- 9 Service advertising [1]
Two from:
 Advertising of services rather than goods
 Used in insurance, government, tourism, banking, education
 College courses constitute education [2]

10 **Four** matched pairs from:

Scores can be plotted in graphs
 Used to chart progress/results of students can be compared/results of classes can be compared

Grades/percentages can be calculated from raw scores
 Difference between target grades and actual performance can be calculated/number of students achieving a particular grade can be calculated

Averages can be calculated (for each student)
 Individual scores can be compared to class/year average

Scores can be searched/sorted
 To list best/worst performing students/students achieving a particular mark range/grade so that these students can be set suitable targets

Statistics can be calculated/maximum/minimum mark can be found
 The highest/lowest mark can be used to identify best/worst performing student [8]