CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Advanced Subsidiary Level and GCE Advanced Level

MARK SCHEME for the May/June 2013 series

9713 APPLIED INFORMATION AND COMMUNICATION TECHNOLOGY

9713/11 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 May/June 2013 series for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level components and some Ordinary Level components.

1 (a) **Six** from:

Discrete process control
Three from:
Specific tasks are performed (by the robotic arm)
It is an on/off or stop/start process
Fitting the wheels on a car is an example/wheels are fitted by robots
Robots stop
Next car comes along and the process is repeated

Continuous process control
Three from:
Used in processes which appear to be unending
An example is the maintaining of temperature
Within a confined area
Keeping the temperature at a comfortable level for workers and robots **[6]**

(b) **Six** from:

It's a proportional–integral–derivative algorithm
Used when preset value is a constant
PLC stores preset value of temperature
Temperature is input from sensors
A set of logic statements is used
PID causes the PLC to make proportional changes to the temperature …
… by switching the compressor on for short periods of time
PLC/PID is used to compare temperature with a pre-set value
PID calculates difference between the input value and the preset value
If below, PLC switches heating element on/switches off compressor for a short time
If above, PLC switches heating element off/switches on compressor for a short time
PLC/PID checks the difference again
If still below, PLC switches heating element on for a short time
If still above, PLC switches off compressor for a short time
Until preset value is reached **[6]**

2 (a) **Two** from:

Grippers
Vacuum/suction cups **[2]**

(b) **Three** from:

Spray guns/sprayer to paint the car body
Polishers/finishers to produce a shiny finish (after painting)
Sanders to prepare body for painting
Cameras to inspect/check work **[6]**

(c) **Four** from:

(The programmer) controls the robot by physically guiding the arm through each step
The programmer has sensors attached to his/her arm
The sensors transmit data to the computer
The computer stores the sequence of movements …
… as a program in its memory **[4]**

(d) **Four** from:

Initial purchase of robots
Initial cost of installation
Initial redundancy payments
Maintenance costs
Initial cost of paying programmers
Cost of re-training **[4]**

(e) **Two** from:

It is a safer/less dangerous/less hazardous environment for humans
The work areas are cleaner
Jobs are less boring
Don't have to lift heavy weights **[2]**

3 **(a)** **Three** from:

Observation
Benefit –enables the systems analyst to see the process as a whole
Drawback – explanation of the 'Hawthorne effect'

Interviews
Benefit – Interviewer can move away from their 'script' and ask a more in-depth question if a particular response is given/can interpret body language

Drawback – **One** from:
Users have to be available at the time the systems analyst wants to interview them/may not have the time/can take a long time to interview all the users
Interviewees might try and provide answers which they think the interviewer wants to hear

Questionnaires
Benefit – **One** from:
Answers tend to be, on the whole, more accurate
Everyone can complete the questionnaire at the same time instead of one after the other (as with interviews)/can complete it at their leisure
Drawback – it is very difficult to ask further questions based on the response to another question/ can be anonymous and so may not be taken seriously by user

Examining documents
Benefit – helps to identify the inputs and outputs of the system/volume of data can be determined/processing can be deduced
Drawback – can take a long time to collate documents **[9]**

(b) **Two** from:

Data flow diagrams
Using (**two** from:) terminators, processes, flow arrows and stores
Represents inputs, outputs and processing

Two from:

System flowcharts
Using particular input, output, storage and processing symbols
Represents inputs, outputs and processing
(only if not used for DFDs) **[4]**

(c) **One** factor for each item from:

Specifying the required hardware
The volume of data determines the choice of hardware
The order that data will be output affects the choice of storage devices

Designing data collection forms/screen layouts
The user requirements influences the format
The output required from system influences the design
File structures affect the design

Designing validation routines
The form of input affects these
The file structure affects these

Designing the required file structure
The data structures/programming depend on the types of processing
The file structure depends on the input and output structures **[4]**

4 **(a)** **Two** from:

A field which contains unique data/no value occurs more than once/is the primary key in one table/is the foreign key in the other table **[1]**

In this example the ISBN **[1]**

(b) **Three** from:

Relationships will be designed using the key field
Between the two tables/separate tables
The bookshop data table and the books data table
Key field will be used as a foreign key in the linked table **[3]**

(c) **Three** from:

Data is not repeated
Less storage capacity needed
Easier to expand
Data only needs to be amended once
Easier to produce reports with cross-tabular data rather than separate files
Data integrity is maintained
(If data was duplicated) hackers would have easier access to data **[3]**

5 **(a)** **Two** from:

Sort code
Account number
Date of birth
Examples of memorable data
Full name
Post code **[2]**

(b) **Three** from:

Phone tapper/Hacker can only get hold of three characters in one go
Phone tapper/Hacker might need to know the whole password to get into account
Phone tapper/Hacker would need to intercept password several times to get into account
Will probably be different three characters asked for at next log in **[3]**

(c) **Three** from:

It asks the caller to select from a menu
It asks the caller to enter information using a keypad
It asks the caller to enter information by answering yes/no/saying words
It translates key presses through the tones produced by the phone
It detects spoken words using speech recognition
Upon receiving data it gives the balance of the account
Call can be directed to an operator **[3]**

(d) **Two** from:

Can take a long time to navigate through the menus/may be in a queue if you want to speak with an operator
The menus might provide too many/too few options
Too much information may be provided at the beginning of the call
Voice prompts might be hard to understand
IVR may not understand your accent/voice **[2]**

6 (a) Three from:

(Save costs as) don't have to rent so many high street premises
Employ fewer staff therefore less paid in staff wages
Save costs of printing/sending statements
Lower running costs, fewer branches so less electricity, heating and lighting
Less likelihood of the bank being robbed
Less money is spent on security staff **[3]**

(b) Two from:

High redundancy payments
Cost of buying equipment
Cost of installing system/paying systems analyst/programmers/web designers (to set up web site)
Some staff will need to retrain (which is costly) **[2]**

(c) Four from

There is no queuing in online banking
Can bank at any time of day or night
Can bank anywhere in the world <u>providing you have Internet access</u>
Can ask for a loan over the Internet without being embarrassed
Interest rates on savings accounts tend to be higher
Doesn't have to worry about whether the mail will get bill payments to companies on time
There is less likelihood of robbery/no likelihood of violence **[4]**

7 (a) Three from:

Insurance
Government
Tourism
Education
Social services **[3]**

(b) Three from:

Has range of multimedia - sound, video/animation, unlike posters/flyers
Other features e.g. slide transition effects, special text effects, image transition, unlike flyers/posters
Always on while mall is open/the user cannot switch it off – web site can be closed at any point/flyers can be thrown away
Flyers can target your audience better than slide show **[3]**