MARK SCHEME for the October/November 2010 question paper

for the guidance of teachers

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 must be read in conjunction with the question papers and the report on the examination.

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CIE is publishing the mark schemes for the October/November 2010 question papers for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.

1 **(a)** **Four** from:
Cameras to inspect/check work
Welding guns to weld parts of the car body together
Grippers to pick up/ hold parts (and place them somewhere else)
Vacuum/suction cups to pick up parts
Screwdrivers to place/screw in and tighten screws
Spanners to place and tighten nuts
Riveters to place and tighten rivets
Spray guns/sprayer to paint the car body
Polishers/finishers to produce a shiny finish (after painting)
Sanders to prepare body for painting   [4]

(b) **Four** from:
The programmer could write a program remotely
The programmer controls the robot physically/manually
The programmer guides the arm through each step by physically holding the arm
The programmer has sensors attached to his/her arm
The sensors allow data to be transmitted back to the computer
    or
    the programmer uses a remote control.
    the programmer guides the arm through each step by using a remote control.
The computer stores the sequence of movements…
…as a program in its memory.
The robot arm is therefore able to repeat the actions every time (a new unit comes down the assembly line).   [4]

(c) **Six** from:
Advantages
A robot arm has greater accuracy/fewer errors than a human
There are lower running costs/no need to pay wages/lower utility costs
Work/work rate is of a consistent standard
The whole process can be continuous/24 hours a day 7 days a week…
…without having to stop at shift changeovers
It is a safer/less dangerous environment for humans
Greater productivity

Disadvantages
Setup and maintenance <u>costs</u>
Is unable to cope with unusual circumstances
Staff need to be retrained leading to higher costs…
…and loss of workers for a period of time

must have at least one advantage and one disadvantage amongst their six points to gain full marks   [6]

2 (a) Product advertising – 1 mark
Two from:
Advertising a specific product
Advertising one item such as a specific model of a car
Not the whole range of cars the company sells/not the company itself.
Target audience is identified…
… and an advertising campaign that will appeal to that type of audience is created.
Media is decided upon...
...such as newspaper advertising, magazine advertising, television advertising, poster advertising, internet advertising   [3]

(b) **Four** from:
Graphics tablet to input drawings/designs
Scanner to scan (hard copy) images/text
Microphone to create voice overs/ input engine sounds
Video camera to create/input videos for including in website
Video digitiser to input videos (from an external source)
Digital camera to take photographs/upload photographs
Example of midi instruments to input background music/theme tunes   [4]

(c) **Six** from:
Pop-up advertising is little windows suddenly appears in front of the web page/tend to appear when a link is clicked/opened
A pop-up instantly grabs the attention of the consumer
Discontented consumer may avoid that organisation in future
Many computer users now have pop-up blocking software
Many users just close the pop up without reading it/ignore it
Can use pop-unders
Small windows which are placed underneath the web page being accessed
Don't appear to users until they close a window
They are not removed by pop-up blocking
Consumer regards pop-unders as less of a hindrance than pop-ups/pop ups are considered to be a hindrance/distraction/annoyance
Pop-ups and pop-unders can both be linked to the organisation's own website
Can use banners
Can't be closed unless website is closed
Sometimes banner still remains even when website closed   [6]

3   **Six** from:
    Separate sheets can be used to store information about different classes
    Store test marks, exam marks, predicted grades, targets and attendance records (at least two must be mentioned for a mark)
    Scores can be plotted in graphs
    Used to chart progress
    Grades/percentages can be calculated from raw scores
    Statistics/averages/totals can be calculated
        percentage attendance/number of days attended/number of days absent
        difference between target grades and actual performance can be used
    Conditional formatting/extra column used to show progress/underachievement/ overachievement
        Cells formatted red for low achieving students/symbol placed in extra column
        Cells formatted green for high/normal achieving students/different symbol placed in extra column
    Statistics can be used for comparison/results of all students can be compared
    Data can be filtered to list best/worst performing students
    Reports can be created
    Reports can be sent to head/parents/students using email/internet   [6]

4   **(a)** **Six** from (max four for either):
    Use of data flow diagrams…
    …(graphical method of) recording the inputs, outputs and processing
    DFD consists of terminators, processes, flow arrows and stores (at least two must be mentioned for a mark)
    Somebody/somewhere outside the system is a terminator
    Process box contains the processing for that part of the system
    Data output from the system is called a store
    Data flow is represented by arrows
    Different levels 0,1,2
    Systems flowchart…
    …shows inputs, processing and outputs (only if not used in DFD description)
    Generally a method of designing a systems solution
    Not found very often in the analysis stage
    Storage represented by a storage medium in a computerised system
    Outputs is represented by an output box
    Data flow represented by arrows
    Inputs represented by input medium symbol   [6]

(b) Eight from:
Length check for student number...
...must be only 10 characters, (no more, no less)
Range check on student number/test scores
Student number must be between 1 000 000 000 and 9 999 999 999
Scores must be between 0 and 100
Type check on student number/test scores…
...must be digits only
Check digit for student numbers...
...each separate digit is mathematically manipulated to produce a final check digit
Format/picture check on student number...
...all **10** characters are numeric
(six maximum for descriptions)

Check digit would not be suitable for test scores as scores are not long enough
Length check would not be suitable as scores not long enough
Range check/Type check might not be suitable for student number as it will probably be stored as text
Both checks for test scores is the best recommendation.
Common error in student number would be transposing digits so check digit would trap this
None of the other checks would trap transposition errors
Common error is omission of digit which would be trapped by length check
Format/picture check on test score would be unsuitable...
...as scores could be single digit, two digits or even three digits   [8]

(c) Five from:
A set of test data is selected…..
……including normal, abnormal and extreme data
Data will be accepted or rejected by system
It is expected that abnormal data will be rejected
......such as (suitable example of abnormal data must be given)
It is expected that normal data will be accepted...
......such as (suitable example of normal data must be given)
It is expected that extreme data will be accepted...
......such as (suitable example of extreme data must be given)
Expected results and actual results are recorded
Actual and expected results are compared
If validation rules don't trap errors then will need to be amended
Comments on comparison are recorded/comments are made as to whether system needs to be changed or otherwise
Live data could be used
Comparison between actual results and previous system results   [5]

5 (a) (i) Three from:
  3 marks for 5 or more items
  2 marks for 4 or more items
  1 mark for 3 items
  0 marks for less than 3 items

  Name
  Contact details i.e.phone/address
  Tax history
  National Insurance history
  Pay so far this year
  Holiday entitlement
  Pension contributions
  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]

  (ii) 1 mark for worker's number **and** hours worked   [1]

  (b) Five (including examples) from:
    Information about all employees of the company
    Information about employees in a given department
    Information about the salaries of all employees
    Total salaries of all employees
    National Insurance contributions for all employees
    The total amount of National Insurance contributions paid to the tax authorities
    The income tax that each employee has paid
    The total amount of income tax paid to the tax authorities
    The amount of money paid to each bank that employees have an account with
    All the earnings and deductions of employees
    The earnings and deductions of each employee by department
    A summary of all the totals of the earnings/deductions of each department   [5]

(c) **Seven** from:

Phased implementation involves implementing one part of the system while rest of system remains unchanged/implementing system part by part

Temporary workers system could be introduced while old system for permanent workers is retained

Phased is cheaper than parallel running as you don't employ two complete sets of workers

With phased if there is a problem with the new system still have bulk of old system to fall back on unlike direct changeover

Training can be gradual in parallel running and phased implementation unlike direct changeover

Changes can be made if problems occur with phased and parallel unlike direct changeover

Phased is a slower method of implementation than direct changeover

Parallel running involves running the old system alongside the new system

If there is a problem with the new system still have the old system as a backup unlike phased implementation/direct changeover/pilot running

Parallel unlikely to be used because of expense of paying two sets of workers

Pilot running involves running new system in one branch of the organisation whilst old system still operates in other branches

Pilot is unsuitable for this situation as there is only one department being computerised

Direct changeover – involves replacing the old system with the new system all in one go

Direct is cheaper than parallel running as you don't have to employ two sets of workers

Direct is a quicker method as there is no delay waiting for bugs to be fixed unlike other methods/benefits of the new system become apparent immediately unlike other methods

With direct changeover, if there is a problem you don't have any of the old system to fall back on unlike other methods

One mark is available for a detailed reason for a suitable recommendation   [7]

6 (a) **Five** from:
A laptop/PDA to access information about properties/remotely using VPN
A laptop/PDA to organise appointments/run time management software
Mobile Phone/Laptop/PDA (with internet connection) to access internet/access or send emails
A laptop/PDA to store contact numbers
Database to store information about each property
Spreadsheet to calculate dimensions
Word processor to type up reports
A laptop/PDA to type up reports
Email software to send/receive instructions
Email software to send in reports
Mobile phone/laptop/PDA to send/receive instructions/keep in contact with the office/manager
Mobile phone/laptop/PDA with internet connection to send in reports
Mobile phone/laptop/PDA to contact customers
Laser measuring device to measure dimensions of rooms buildings
Video conferencing software to communicate with colleagues in the office
Webcam, headset/speakers and microphone to participate in a video conference
Web browser to access emails
Web browser to access details of a property
Remote access service software to access office computer remotely
Dongle to ensure security when using computer remotely
Digital camera to input photos of houses   [5]

(b) **Three** from:
Calendar function keeps a record of appointments and meeting times
Public calendar allows many workers in an office to have access to it over a network
Can see when he is free/ when others are free
Public calendar is separate to his own calendar
Advises of any meetings which are scheduled for the same time and date/avoids clashes
Setting the alarm for start of meeting   [3]

(c) **Four** from:
There is no need to spend money on transport going to and from the local branch
Saves time going to the bank/queuing
Can bank at any time of day or night
You can bank anywhere in the world providing you have internet access
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 their bill payments to companies on time.
There is less likelihood of robbery and no likelihood of violence   [4]