UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Advanced Subsidiary Level and GCE Advanced Level

MARK SCHEME for the October/November 2011 question paper for the guidance of teachers

9713 APPLIED ICT

9713/33 Paper 3 (Written B), maximum raw mark 80

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UNIVERSITY of CAMBRIDGE
International Examinations

1 (a) Any **three** points from:
Fewer complaints from customers about queuing times
More customers due to faster system
Fewer staff required at turnstiles (to admit visitors)
Advanced planning possible from trend in purchasing
Reduced printing costs as zoo will be printing fewer tickets themselves
Zoo will have some advance notice of prospective visitor numbers
Customers buying tickets in advance would have to use the website and therefore see any advertising which generates revenue for the zoo
Customers buying tickets in advance would have to use the website and will be able to leave feedback for the zoo
The zoo can attract more customers by using a website [3]

(b) Any **three** from:

(i) Easy to read screen such as suitable font, suitable font size, appropriate background colour, appropriate spacing (at least **two** features)
Use of multi-choice questions
Drop down list with alternative animal features
Radio buttons with two possibilities/ or yes no questions
Example of question such as 'does the animal have 4 legs'
Buttons to either quit or start again [3]

(ii) The probability of the animal being certain species
Suggested possible animals species
Pictures of possible animals (so user can select correct animal)
Sounds of the possible animals (so user can select correct animal)
Location on map of animals in zoo
Buttons to either quit or start again [2]

(c) Any **six** points from (max 4 problems or 4 solutions):
Any 4 problems from:

Hackers attempting to access files and copy visitor credit card /personal details
Unauthorised alterations to web site/customer details
Security of data when customer details transferred/stored
Uploading of virus to site
Uploading of spyware
Spammer obtaining zoo's email addresses and sending spam
Denial of Service attack

Any 4 appropriate solutions from:

Firewall to control access by computers
Description of appropriate authentication technique
Use of encryption of data when being transferred or stored/use of secure website/https/SSL
Use of digital certification to verify website
Use of up to date anti-virus application
Use of anti-spyware software
use of spam filtering software
Install a firewall, and configure it to restrict traffic coming into and leaving your computer [6]

2 (a) Any **five** points from:
Rendering can be altered to view object by polygon rendering, scan line, wire frame, ray tracing/shading effects
Zoom used for detail/over view
Can view from different angles
3D representation generated from 2D drawings/to view representation of final product
Materials required can be stored for use by CAM
Costs calculated/stored for analysis
Walk through/virtual prototype to show product/product interiors/alternative views
Use of library of elements to choose from plus example of elements e.g. windows
Accurate dimensions (enabling glass to be ordered before frames built)
Designs can be worked on by several designers simultaneously
Can be used to create (virtual) prototype to allow changes to dimensions/shape to see effect on e.g. performance [5]

(b) Any **four** of the following:
Uses critical path method/Gantt/PERT charts finding optimum time to be spent on individual stages/find end date
Critical path specifies the order in which tasks must be completed
PERT charts specifies the order in which tasks are completed
Gantt charts help to show progress of individual tasks
Event chain diagrams for visualising multiple events
Software helps identify progress made in each task
Software helps with daily and weekly planning
Identifying progress/lack of progress helps with planning future tasks/Milestones identified such as building walls
Some tasks can be done in parallel such as developing software and installing hardware, installing network cabling
Other tasks must be done in sequence such as installing hardware, installing software, testing network
Number of workers/cost of each stage identified- to monitor cost/organise work force
Use of alarms if stage is late and warning zoo director/ project manager [4]

(c) One mark for up to **four** sensor descriptions including use:
Light sensor to measure lighting level
Sound sensor to detect animal in distress/noisy
Movement sensor to detect animal awake/ visitor
Temperature sensor to ensure animal kept in correct temperature range/ fire detector
Humidity sensor (to measure moisture/humidity) to ensure correct moisture levels for animals
pH sensor to monitor the water acidity for animals
Gas sensor such as CO_2 sensor to ensure (safe) air supply [4]

3 **(a)** Any **two** points from:
Use of multi-choice questions
Answered on OMR sheet/ on screen /shade in lozenges/boxes on sheet
Candidate types in single word/short phrases
Use of barcodes to identify candidates answer paper [2]

(b) Any **seven** points from:
No fees for examiners/ fewer staff required lowering costs
Reduced costs of administration
Fewer examiner meetings required therefore cheaper
Less likelihood of scripts going missing in transit
(Better customer relations due to) faster results service for candidates
Increased detailed statistics available
Initial hardware setup costs
Initial cost of software
Errors due to faulty mark readers
Errors due to inaccurate completion of OMR sheets
Answers not strictly worded as per mark scheme may not be given credit
Possible software errors
Loss of power can lead to no marking

Max 5 for all advantages or all disadvantages. [7]

4 **(a)** Any **four** points from:
PC used for office/home tasks v. supercomputer for complex number-crunching/calculations
Supercomputer typically used for (large scale) scientific or engineering work/ PC used for office processing
PC physically smaller than supercomputer
PC less expensive than a supercomputer
PCs are suited to generalised computing tasks v. supercomputers often customised
PCs usually constructed from cheaper components than a supercomputer
A supercomputer can do billions of calculations v. a PC does not
Supercomputer carries out more processes per second/ FLOPS
A supercomputer is permanently on v. a PC is usually not always on
Supercomputer has many more processors than a PC
Supercomputer has more RAM/memory compared to a PC
Supercomputer uses tailor made/customised operating system
Supercomputer can support more users at same time than a PC
Security monitoring requires processing power of supercomputer to handle volume of traffic-PC could not cope in the time frame [4]

(b) Any **five** points from:
Complex models created
Data provided by sensors such as air pressure, humidity, temperature, rainfall, wind speed
Data input into model
Calculations carried out/performed
Enormous number of calculations carried out
Weather reports input
Collected around the globe
Searches for a match in past conditions
Software makes prediction based on past data
Software observes patterns in current conditions and makes predictions
Selects most likely forecast
Creates output charts to screens
Uses plotters to print out charts/maps of pressures/wind speeds
Human forecaster confirms forecast [5]

5 **(a)** Any **four** points from:
Loudspeakers to generate sound of engines
Headphones for communications/hear instructions
Motors/hydraulic rams to generate movement/vibrations
Screens to project panoramic view
LEDs for information on buttons/switches to show status/warnings
TFT displays for aircraft status readout/in instrument panels
Alarm buzzers when state is dangerous [4]

(b) Any **four** points from:
Safer method of learning to fly
Scenarios can be repeated many times
Rare scenarios can be used in training
Dangerous scenarios can be simulated with no risk to the pilot
Reduces risk of accident causing costs for airline
Training costs to the airline can be lower
Airline can get printouts or pilot performance
Passenger reassurance of quality
May be a requirement of Aviation Authority
Can be scheduled more flexibly that aircraft
Passengers would not like to see a plane with engine failure/ out of public view [4]

(c) Any **four** from
Supervisor/pilot selects event
Software creates the required outputs using DAC
outputs to simulate e.g. sharp descent
e.g. change in engine note
alarm signal/ change in status display
Pilots reactions are recorded by system on hard disk for review
Pilot inputs data by e.g.
pushing on joystick/pedals/pressing control [4]

6 (a) Any **three** points from:
Wider customer base
Tickets can be booked at any time/from anywhere - better customer satisfaction
Reduced number of staff/reduced number of offices/no commission to agents for selling tickets so reduced costs
Faster processing of bookings/faster check in - better customer satisfaction
No double booking so better customer satisfaction
Advanced notice of customer requirements e.g. meals/seat allocations
Can operate outside normal business hours
Less risk of losing ticket
Faster check-in process [3]

(b) Any **two** points from:

(i) Inspects packets going in and out of system
Can be hardware or software
Restricts packets using IP addresses
Restricts packets using key word list [2]

(ii) Issued by a trusted organisation
allows server and client PC to trust each other/are who they say they are/allows secure transactions
Used in secure servers/use of https
Uses public key [2]

(iii) Changing confidential data such as customer credit card numbers into meaningless data
An encryption key is used to encode data
Key is used to decode data stream
The longer the key the more secure is the encoding [2]

(c) Any **five** from:
PCs carry out home/office task such as e.g. internet access, office tasks
PCs usually have smaller backing storage size e.g. smaller hard disks
PCs usually have slower/fewer processors than file servers
Fileservers store larger files e.g. databases than PCs
File servers store user data for access over a network
File servers reduce the need for users to have local backing storage in their own computer
File servers control network access rights
File servers allow access by multiple users/PCs at same time [5]

7 **(a)** Any **four** points from:
POS terminal scans item barcode as item sold
Barcode checked against field in database
Used to lookup stock level
Stock levels automatically reduced by number sold in software/database field
Stock level compared with re-order level
If stock level is equal to or less than reorder level
Automatic reorder sent to supplier to request sending of new stock
To arrive at a time/date when required for sale/no need to store large numbers of items
Item can be sent directly to customer from supplier
Item barcode scanned when stock arrives
Stock levels automatically increased by software when new stock arrives [4]

(b) Any **four** from:
Login/logout feature
Menu/list of sections of products sold e.g. TVs
Hyperlinks to latest offerings
Hyperlinks to product details
Hyperlinks to details of damage to items
Watch list for items buyer interested in
Search facility to find a specific music centre/camera etc
Bid lists to show latest bids on items
Time remaining for bidding facility
Buy now facility to avoid having to bid
Highest bid facilities to alert of highest bid/new bid
Link to secure payment form
Currency conversion facilities/show in different currencies
Shopping basket with products chosen/checkout facilities
Secure payment facilities/storage of credit card or payment details
Delivery/order/purchase/order history tracking facilities
Contact details for BAC/feedback options
FAQs/Help facilities
Site map of website [4]