UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Advanced Subsidiary Level and GCE Advanced Level

MARK SCHEME for the October/November 2010 question paper for the guidance of teachers

9713 APPLIED ICT

9713/32 Paper 3 (Written B) maximum raw mark 80

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1 **(a)** Any **five** points from:
- bar code is read at the POS terminal
- bar code is unique identifier of the product and the key field in stock file/database
- bar code number is searched for on file until matching record found
- number of that item is stock is reduced by 1 and system checks value against minimum stock level
- if min stock level reached/below then system automatically re-orders
- automatic printout of orders/sends message to suppliers
- when new goods arrive, bar codes allow update of number in stock [5]

(b) Any **five** points from:
- when re-order required supplier is notified automatically
- quantity required in order
- date and time to be delivered
- stock control program determines these values
- based on past sales trends
- and predicted sales determined by external factors e.g. weather forecast/TV schedule
- unable to cope with sudden increased demand [5]

2 **(a)** Any **three** points from:
- information gathered from a shop already using new system
- data gathered at different times of the day
- data gathered on different days of the week
- customers are interviewed after processing/observer watch the customers being served
- POS records examined to find data
- a number of till operators/customers sampled for questionnaire
- sensors/data loggers count and time customers [3]

(b) Any **three** points from:
- number of customers at a given time of day
- number of tills/checkouts
- number of items per customer throughout the day
- time taken to serve a customer
- as a function of number of items [3]

3 (a) Any **five** methods from:

CAI (computer aided instruction) or CBT (computer based training)
- uses computer to deliver subject knowledge

CAL (computer aided learning) or CBL (computer based learning)
- doesn't replace teacher/lesson
- used as a learning resource in same way as text book used
- teacher controls the learning process

CMC (computer mediated communications)
- uses email, instant messaging and chat rooms
- allows tasks to be sent/received by email

CAA (computer aided assessment)
- asks questions and records responses (summative assessment)
- no suggestions for improvement given
- reviews answers to specific questions (formative assessment)
- suggests areas of improvement based on responses
- allows on screen marking to be done [5]

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

Disadvantages:
- very sterile learning environment
- easier to "cheat"
- tendency to do "other things" if not supervised
- health risks associated with over-use of computers
- some trainees may not be computer literate
- expensive to create resources (not hardware)
- no 'expert' assistance if required to answer unusual question
- fails if power cut/computer breakdown unlike teacher led course [4]

4 (a) Any **four** points which must include **last point** from:
- system asks questions user responds on screen
- future questions are based on user responses
- searches knowledge base for information to match response
- uses rules base and inference engine to simulate human reasoning
- makes use of an explanation system to indicate how answer found
- rules base made up of inference rules and ….
- …. inference engine uses these to draw conclusions
- output often in the form of probability/risk to company/premium rate for user/whether to offer insurance or not [4]

(b) Any **four** descriptions of:
- use of Gantt Charts which includes % completion/mile stones/progress dates etc.
- use of Pert Charts to aid decision making
- event chart diagrams to map out project
- run charts to show time sequence
- critical path analysis to identify critical items
- time management software to monitor productivity/send emails [4]

5 **(a)** Any **two** points from:
- temperature sensors to measure air temperature
- remote control to adjust settings
- humidity sensors to measure office conditions
- display unit to show conditions
- input keypad to enter desired values
- analogue-to-digital converter (ADC)
- actuators to control pumps etc. [2]

(b) Any **three** points:
- sensor sends signal to microprocessor this is converted to digital by ADC
- microprocessor compares temperature value with stored/input range
- if temperature below range it sends signal to actuator(s) to turn on heat
- if temperature above range it sends signal to actuator(s) to turn off heat/turn on coolers
- If temperature within set range system no change made
- system is continually monitored by processor (not by sensor) [3]

6 **(a)** Any description of **five** methods from:
- primary research
  - prospective/existing customers interviewed/questioned by organisation
- secondary research
  - examine data already published to determine preferences
- prototype version shown to selected audience and reactions gathered
- CAPI (computer assisted personal interviewing)
  - sit in front of computer and answer on screen questions
  - interviewer asks questions prompted by computer
- CATI (computer assisted telephone interviewing)
  - call centres used in this technique
  - computer dials phone numbers of target audience and then interview takes place
  - operator uses script to conduct interview
- CAWI (computer aided web interviewing)
  - database of people willing to take part in research
  - customer logs on to web site and answers questions
  - use pop ups on selected web sites
- focus groups to answer questions [5]

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

Advantages:
- can obtain quote any time of day
- can compare several quotes in less time
- web site searches all allied insurance companies
- no embarrassment when asked personal questions
- information on site can be updated faster than material in an office
- being online there is no pressure to rush

Disadvantages:
- some companies don't allow quotes through secondary web sites
- unless insurance requirements fairly standard, difficult to obtain/tailor policy to meet user requirements on line
- lack of personal explanation of terms
- open to "spamming" by search companies [6]

7 **(a)** Any **eight** points described from:

Types:

- modems } 1
- wifi/Ethernet } 2
- internet protocol (IP) } 3
- transmission control protocol (TCP) } 4
- user datagram protocol (UDP) } 4
- file transfer protocol (FTP) } 5
- hypertext transfer protocol (HTTP) } 5
- telecommunications network (TelNet) } 5
- secure shell (SSH) } 5

Layers:

- physical } 1
- data link } 2
- network/internet } 3
- transport } 4
- applications } 5

Examples:

- basic communication } 1
- go between from network layer to physical layer } 2
- acts on requests for services from network } 2
- forwarding packets (data gets to source) } 3
- also responsible for routing } 3
- divides data into packets for transmission … } 4
- … and adds addresses of source device } 4
- delivers services to network/internet layer } 5 [8]

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

- verifies data transmitted accurately/correctly
- parity can be *even* or *odd* according to number of 1 – bits
- first bit of a byte is parity bit; next 7 are packet of data
- e.g. **1** 0 1 1 0 1 0 0 needed a 1-bit to give even parity
  0 1 1 1 0 1 0 0 only needed a 0 since already even parity
- if packet arrives at destination and parity doesn't match up then an error in transmission has occurred
- if more than one bit has been changed or bits transposed, parity check may not pick up transmission error
- references to block parity to locate errors in blocks of data [5]

8 (a) Any **seven** points from:

Ring:
- drawing/description of ring topology
- advantages:
  - performs well if network traffic is heavy
- disadvantages:
  - faulty connection between 2 stations can cause network crash
  - difficult to add a new device once network already set up

Bus:
- drawing/description of bus topology including terminator
- advantages:
  - easy to add in new devices even if network already set up
  - one device failing doesn't affect rest of network
  - no need to rely on hub or switch
  - less cabling needed reducing cost
- disadvantages:
  - hard to identify problem if fault occurs
  - if there is a fault in spine, all stations on network fail
  - network topology is out-dated

Star:
- drawing/description of star topology
- advantages:
  - if one device fails, rest of network is not affected
  - can investigate network problems while it is running
- disadvantages:
  - if the hub breaks down the whole network crashes
- requires more cabling

Tree:
- drawing/description of tree topology:
- advantages:
  - brings together advantages of star and bus topologies
- disadvantages:
  - brings together all the disadvantages of star and bus topologies
  - difficult network to wire up [7]

(b) Any **five** points from:
- hackers/fraudsters gaining access to database/server
- obtaining personal data
- use of firewalls to monitor traffic
- encrypt the data to make it meaningless
- authentication techniques
- user ids and passwords
- digital certification
- users sent login details by passport office after verification

- viruses sent to the system
- anti-virus software which is updated regularly
- prevent customers being allowed access to storage devices
- use of firewalls to restrict access

- spyware giving access to system which can look for security information on the system
  - use of anti-spyware software
  - use separate systems for customer information and security [5]

(c) Any **six** points from:
- network hub to send data packets to correct device
  - number of devices connected to it
  - doesn't read data just sends it on to other computers in network
  - sometimes amplifies the signal (active hub)
  - a passive hub doesn't amplify signal

- switched hub (switch)
  - normal hubs only allow one packet of data through at a time
  - switches know addresses of each device
  - when sent packet from device notes address of sending device …
  - … forwards packet to other computers and hubs/switches which are connected to it (except sending computer)

- router/bridge to act as a gateway/link to WAN
  - enables data to be routed between different networks
  - choses another route if traffic heavy
  - can incorporate a firewall
  - its function is to transport TCP/IP protocols between two networks
  - ... and to allow private networks to be connected to other networks such as the internet

- cabling can be twisted pair, coaxial or fibre optics/wireless communication link

- servers to link computers/store files/applications
  - can be for storage, web, proxy, email, etc.

- network interface card (nic)
  - allows the processor to connect to a server
  - allocated IP address of the computer [6]