

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

9713 APPLIED ICT

9713/31

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 in 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]

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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]

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- 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]

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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]

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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]

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(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
 - chooses 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]