

**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

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.

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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]