MARK SCHEME for the May/June 2010 question paper

for the guidance of teachers

9713 APPLIED ICT

9713/33   Paper 33 (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.

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

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UNIVERSITY *of* CAMBRIDGE
International Examinations

1 (a) Any **three** points from:
- passport type
- country of issue
- nationality
- passport number
- entry and exit stamps with dates/ countries visited
- photograph
- name of passport holder
- date of birth
- place of birth
- occupation
- issuing office
- holder's signature
- gender
- date of issue/expiry
- any visa associated with passport
- additional security information/biometric data

(b) Any **two** points from:
- embedded chip in one of the passport pages / similar in concept to a smart card holding biometric and other data
- use of embedded "ring circuit"/RFID for communication

(c) Any **three** points from:
- information on the chip is quicker to read **by computer**
- easier to update from a computer
- more information can be stored on the electronic passports
- more difficult to "tamper" with the information
- more difficult to **produce** illegal/non-authorised/forged passports
- difficult for somebody to **use** the wrong/stolen passport
- remote processing of passport (using RFID)
- **could** be a **smart card**/smaller …
- … description of facial/iris recognition system

(d) Any **four** points from:
- take fingerprints on non-air side of airport
- restricting access to secure areas for staff/passengers
- re-take fingerprints on boarding side
- fingerprints are stored electronically and can be accessed at any terminal
- very difficult to forge a finger print/ fingerprints provide greater security
- system check if 2 sets of fingerprints match up
- compares fingerprints with pre-stored values on security database/passport
- it is possible to store the fingerprints electronically on passport
- computer database can match fingerprint to a suspect if passport false
- computer database can match fingerprint to known criminal
- audit trail of employee movements

2 **(a)** Any **three** points from:
- lead passenger will have paid by credit card number
- and has to give passport number…
- … name matched up with credit card holder and/or passport
- ticket details emailed to lead passenger
- email printout used as confirmation
- email contains a unique (bar) code which identifies passenger
- check-in details match up with stored passenger details

(b) Any **three** points both for passenger and airline from:
- reduces booking expenses for airline
  - no need to print out tickets
  - no need for postage or envelopes
  - saving on staff and accommodation costs
- passenger feels more in control by selecting seats in advance
- more convenient/easily re-printed
- can't be lost/stolen/mis-placed
- less prone to fraud
- passenger can print out own ticket, no waiting for delivery
- speeds up check-in at airport benefits passengers and airline/cuts down queues
- easier for passenger to buy tickets (i.e. online bookings/no need to go to travel agent)
- system remembers customer details
  - from history
  - from membership number
- simpler for passengers at airport; only need a form of id

3 **(a)** Any **three** points from:
- no long queues at desks
- can be more terminals than desks
- Kiosks not under time pressure (unlike check-in staff)
- Kiosk available 24/7 and not affected by staff taking breaks
- no language problems/multi-language
- no interpersonal arguments
- passengers don't mind dealing with trivial/ embarrassing questions
- terminal may be easier for passengers with communication difficulties
- more information generally available
- information more likely to be up to date/less inaccurate
- faster processing at check-in desk as fewer questions to be discussed

(b) Any **six** points discussing the **risks** from:
NOT what a hacker can do.
- hackers/fraudsters **might** gain access to database/server
  - use of firewalls
  - physical guards
  - sensitive data travels to and from the kiosks
  - encrypt the data to make it meaningless
  - authentication techniques e.g. user ids/ passwords
  - levels of access
  - need to log out
  - digital certification
  - need for security if kiosks use Wi-Fi
- people can overlook passengers typing in personal data
- viruses sent to the system **if external data link** in kiosk
  - anti-virus software which is updated regularly
  - prevent customers being allowed access to memory devices
  - use of firewalls
- 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

4 (a) Any **two** points covering either design or installation from:
- knowledge engineer collects information from experts **and from other systems** (needs at least two sources)
- a reference to data mining
- a knowledge base is designed
- implement forward chaining in system
- a rules base is designed to be used by the inference engine
- develop a suitable user interface with validation rules
- design the questions for a user
- create an explanation system for output
- system would be checked using data with known outcomes
- production of user manuals/training of staff in E/S use
- a test plan designed with known answers from experts
- an implementation plan set up

(b) Any **three** from:
- using built in **text editor** of the system
- system adds new facts automatically to database
- from company server
- remote access to knowledge base and amended
  - by research staff
- using **text editor** directly on knowledge base

5 Any **five** points from:
1 mark for identifying method, 1 for expansion
- 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)
  - basically call centres used in this technique
  - computer dials phone numbers of target audience and then interview takes place using script
- 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/adverts on selected web sites
- Use of person-person interviews and techniques

6 Any **five** points from:
- pH sensor and/or temperature sensor send signal to microprocessor
- signal converted to digital by ADC if signal is analogue
- microprocessor compares input values …
  …against previously stored **range**
- if pH too low, sends signal to **actuator to open valve** and add acid
- if ph in range then do nothing/signal sent to close valve
- if temperature too low, sends signal **to actuator to turn** on heater
- system continually monitors pH and temperature
- if temperature is in correct range then do nothing/signal sent to actuator to turn heater off
- microprocessor sends signals to control room displays to allow operators to monitor conditions
- microprocessor can send signals to warn operators of malfunction
- sensors also on heater and acid feed …
- …to warn of (local) malfunction e.g. out of acid/heater not working

7 (a) Any **six** points from:
- large screen monitors/(digital) projector
  - to enable delegates a realistic view
- **high quality/HD** webcam / **HQ/HD** webcam on each station
  …. that can move and zoom
- to take images in real time to relay back to other delegates
- **several** microphones/speakers/headsets
  - to enable delegates to be heard clearly
- call up device
  - to enable access to communication link
- delegates sit in front of screens with microphones to pick up sound
- cameras provide wide angle view of room
- and can be zoomed onto a speaker
- chairperson controls meeting
- broadband connection/satellite link to suite
- really needs high bandwidth (NOT fast Internet)

(b) Any **six** points from:
- conferencing software/Skype is acceptable
    - compresses audio and video elements produced by the Input devices/microphones and webcams
    - uses CODEC
    - enables sufficient data to be transmitted quickly enough to be in real time
    - software feature to record conference
    - echo cancellation software
    - allows talking in real time to take place
    - keeps communication synchronised
- communication software
    - to allow system access to internet/satellite link to permit transmission
    - software creating UDP packets
- encryption software for signal

(c) Any **six** points from:
- VOIP
- is voice over IP allowing communication over the internet
  disadvantages include:
    - need a special phone or headset in many cases
    - free calls can only be made if recipient uses same system
  advantages include:
    - international/long distance calls are at local rate or even free
    - less hardware needed than with video conferencing reducing costs
- cannot see body language/facial expression

- instant messaging allows interaction between users across internet
  disadvantages include:
    - video is poor unlike VOIP (could be awarded in VOIP but only once)
    - interaction can be slow
    - poor synchronisation
  advantages include:
    - can interact with various IP addresses
     - video can be used unlike VOIP
    - less expensive hardware needed than with video conferencing
- only require low speed internet connection (unlike VC)

8 (a) Any **three** points from:
- audio and video files are usually very large/MP3 or MP4 files are smaller
- MP3/4 compresses files by up to **90%** (needs to imply significant compression)
- e.g. a 60Mbyte CD track becomes a 6Mbyte MP3 file
- sound/video quality is maintained
- normal data compression doesn't reduce file very much and loses quality
- allows a vast number of files to be stored on MP3/4 devices
- faster download over Internet due to compression
- faster downloads due to increased broadband speeds
- it is now possibly to buy on-line and download the MP file
- easier to store MP3 files on HD
- ....than to have lots of shelves holding disks
- Increased storage capacity of solid state devices has increased demand for MP3 MP4 files

(b) Any **four** points from:
- signals from tv station sent to (uplink) satellite dish ….
- … signal is encrypted
- … which points at broadcast satellite orbiting the Earth
- transponder on satellite sends signal to Earth
- where it is picked up by the **receiving** dish
- shape of dish ensures signal converges on LNB (low noise blockdown) converter
- the signal is amplified by the LNB
- satellite receiver box converts signal understood by tv
- signals received need to be decoded/decrypted
- (use of a viewing card) allows decryption to be carried out

(c) Any **three** points to both users and Rock-ICT from:
advantages include for the user:
- not affected **as much** by weather conditions/
- reception not as affected by hills, tall buildings etc. can be better quality than terrestrial
- more tv stations available/can receive programs transmitted from overseas/other side of world
- Electronic Program Guide is much better than terrestrial
- the dish is more compact than a large TV aerial

for Rock-ICT:
- can provide more channels
- pay to view can be implemented generating income
- interactive shows can attract more viewers
- programmes can be repeated filling extra channels
- one satellite can cover a much wider area than a terrestrial system

9 **(a)** Any **two** points from:
  - examination papers are scanned in
  - converted electronically to a file on **server/database**
  - stored in a format to allow interface with "marking software"
  not OMR systems

(b) Any **three** points from:
  - faster broadband connections
  - allow transmission of the large files
  - wider availability of broadband
  - cost of broadband for examiners has fallen
  - high speed/high quality scanners
  - processor speed in computers
  - improvements in security software/protocols
  - use of multi-screen/high resolution screen by examiners
  - reduced cost in ICT systems enabling examiners to buy high specification PCs
  - software developed for on-screen marking
  - It is now commercially viable to develop the software

10 Any **five** points from:
  - transfer of jobs abroad
  - need for training to use the system
  - a new style of working ….
    … involving much less personal contact
  - lack of technical support for some examiners not ICT-literate
  - much of the short answer questions could be done by the software
  - problems associated with working from home e.g. distractions
  - health issues including: RSI risks/back/neck ache/eye problems
  - techniques used to avoid above e.g. regular breaks with exercises
  - stress related problems(e.g. pressure to mark a required number of scripts, fear of being watched by senior examiner/examination board, etc.)
  - may need to work different hours to avoid peak demand on system
  - safety issues: risk of electrocution/trip hazards from trailing wires/heavy equipment hazards