MARK SCHEME for the May/June 2012 question paper
for the guidance of teachers

9713 APPLIED ICT
9713/32 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.

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

- Cambridge will not enter into discussions or correspondence in connection with these mark schemes.

Cambridge is publishing the mark schemes for the May/June 2012 question papers for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.
1 (a) Any four devices identified and one purpose for each given from, e.g.:

Network Interface Card/NIC
- for a system to communicate with network
- interface between network cable and computer
- prepare and send network traffic to/from computer

Hubs
- receives and/or sends packets to all devices connected to it

Switches
- direct flow of data packets to specific/individual devices connected to it
- stores details of MAC address of connected device(s) in order to direct packets

Cabling/wireless link
- carry data

Bridge
- to link sectors of network
- to convert protocols of one network to those of another

Router
- to send data to other networks/between LAN and WAN
- forwards a data packet to its destination

Proxy server
- act as intermediary between client devices and servers
- to cache frequent requests for data/web pages to speed up access for client device

Firewall (hardware) to control data traffic
- to analyse traffic
- to allow or deny access by network traffic

Servers
- File servers to store user data
- Application servers to distribute software to client devices

(b) Any four from:

Examines IP address in packet and uses look up table of allowed IP address/forbidden addresses
Checks allowed domain names in allowed/forbidden table
Filters on keywords/code sequences in data packets
Blocks/allowed ports for data transmission
Can be set to stealth mode so that packets are not bounced back
Can monitor traffic flow
Can act as a proxy server to control access
Can act as authenticator for remote access e.g. manages passwords
(c) Any four points from:
- Source port/IP address which is the port of sending device
- Destination port/IP address to know where the data is to be forwarded
- Number in the sequence of packets
- ACK number (if set)
- Data offset value – showing where the header ends and data begins
- Checksum for error detection
- Options flag to permit further information
- Padding to fill in header before data
- Total length of packet
- Time to live

2 (a) Any 3 described plus a benefit point from:-
   twisted pair
   - Electrical cable with at least two central wire conductors surrounded by layers of insulation
   - Carries data at high speed
   - Higher bandwidth than WiFi
   - Reduction in data loss due to lower susceptibility to electrical/magnetic interference
   - Lower susceptibility to interception
   - Fairly cheap to run a link

Fibre optic
   - Made of high quality glass using light as carrier of data
   - Higher speed data transfer than copper or WiFi
   - Bandwidth is greater than copper or WiFi
   - Longer lengths possible c.f. copper cable
   - Can be used for external links between buildings
   - More secure as data cannot be read while in transit/glass has to be broken to be tapped into

WiFi
   - Communication is by radio waves
   - No need for wires hence less costs installing
   - Easy to just fit an access point than wire up a switch
   - Most laptops have WiFi and can quickly be given access rights
   - Enables mobile connections
3 (a) Any four devices described and one purpose identified or example given from:

- Joystick/flight yoke for use by hand linked to potentiometer to record movement by pilot/manoeuvre aircraft
- Pedals for use by feet linked to sensor to record movement by pilot
- Switches to control inputs to system e.g. lower under-carriage
- Microphone to communicate with instructor
- Loudspeakers/headset/headphones to output sound to provide feedback to pilot
- Throttle levers linked to sensor/potentiometers for input of engine control
- Instruments/dials/display showing current conditions of plane
- Navigation display to show direction/location
- Large display/screen to project image for pilot to interpret

(b) 6 points from:

**Advantages:**
- There may be no aircraft available to permit training
- Passengers would not be happy if a trainee was undertaking tasks
- Extremely unusual events can be programmed into the simulator
- Events can be repeated as often as required
- The operator can adapt the program to suit trainee’s performance
- Training can be recorded for future use/automatic assessment
- Weather conditions can be created at will
- Cheaper than using real aircraft/flights
- Safer than using real aircraft

**Disadvantages:**
- Pilots may not consider the simulator as real
- Simulators are very expensive to buy and run
- Not all events/parameters/conditions can be simulated

Max 5 marks if all advantages or disadvantages

4 (a) Any four points from:

- Shows clearly the stages/tasks in a big project/project milestones
- Can be used as a communication device between team members
- Can be used to motivate teams by showing progress
- Allows tasks to be better co-ordinated
- Problems can be resolved by seeing the effect of moving resources
- Permits time management of project/shows end time of project
- Allows flexibility in project management
- Permits more efficient management of tasks/show timings of each task/deadlines
- Parallel and sequential tasks with appropriate examples can be represented
- Progress of each task with appropriate example can be shown

(b) Any four points from:

- An item would be ordered to be delivered at a specified time
- Just in time to be fitted to the simulator
- Order triggered automatically by stock control system when stocks are at re-order level
(c) any five points from
   CAD
   Computer Aided Design is used by engineers to design accurate drawings of a component
   Component/prototype can be tested before it is produced
   Can modify designs as result of testing under variety of conditions
   3D views can be created from 2D drawings
   Can zoom/view from different angles
   Total cost of a product can be calculated using a database of parts held by program

   CAM
   Computer Aided Manufacture linked to computer system
   CAD generates a list of instructions for the Computer Numerically Controlled lathe/similar
   appropriate device
   To cut product to designed dimensions
   Using LOGO type commands
   And monitoring the dimensions of the prototype

5 (a) Any four points from:
   Facts base
   Holds the data collected from experts

   Rules base
   Holds the rules as a series of IF...THEN...
   Tests the input data
   Backward/forward chaining

(b) One item identified and one description from:
   Explanation system
   providing a trace of the reasoning that produced a decision

   User interface
   using a display
   to allow user to input data/request

   Inference engine
   which reasons by chaining
   used in conjunction with rules base to reason through a problem
   to provide a solution

   Knowledge base editor
   used to edit data
   input/update facts
6 Three services plus one example from:
   Education and learning opportunities
   such as places in senior schools/universities
   
   Motoring
   such as driving licence/car tax
   
   Home
   such as regulations for building/selling
   
   Community
   such as local councillors/crime rates/contacts
   
   Employment
   such as local government vacancies
   
   Financial matters
   such as rates, tax benefits, pensions
   
   Health information
   such as local doctors, hospitals, safe practices
   
   Travel and transport
   such as bus times/company details, passports
   
   Environment
   such as recycling centres, progress towards targets
   
   Crime
   such as location of police stations, crime figures for state, location of courts
   
   Legal rights
   such as DPA, consumer rights, citizenship issues
   
   Electoral issues
   such as registration of voters/electoral timetables/online voting

[6]

7 Three descriptions of reports e.g.:
   Average time of call by operator
   Used to rank operators
   Identify weaker operators for training/sacking
   Comparison with previous sessions
   
   Statistics on number of calls made
   Proportion of calls rejected
   Totals calls by operator
   Identification of best operator for prize
   
   Costs associated with survey
   Operators’ total time
   Call costs
   Computer time costs

[6]
8 Six from:

Video conference
   Greater perception of personal safety than flying abroad
   Can use an encrypted link so information is secure
   Participants can see body language/facial expressions
   Can be called at short notice
   Costs of travel reduced
   Costs of venue reduced

   Requires special conferencing software with CODEC/compression
   Requires specialist hardware e.g. video camera/microphone
   Equipment costs are costs are higher than telephone conference
   Delays in video/audio signals can be problematic
   Time has to be agreed with participants

Phone conferencing
   Participants just log in with touch keys
   Cheaper running costs than other conferencing

   Time has to be agreed with participants
   Call has to be set up with server
   Cannot see other participants
   Never sure whose turn it is to speak

Instant messaging
   Easier to use than e.g. video-conferencing
   Need to log in
   Cheaper provided there is internet access

   Not really suitable for large groups of users
   Some companies block use
   Can be insecure for e.g. transferring confidential documents
9 Any six points with disadvantage(s) from e.g.:
Limited access to:

- Education services
  - limiting school education/university entrance
  - no access to research facilities

- Health services
  - e.g. lack of access to doctor or dentist services lowering life expectancy
  - no access to online services e.g. NHS Direct

- Employment opportunities
  - not knowing if there are vacancies in big cities-going to big city and being turned away
  - no applications for jobs

- Smaller market for local products
  - no online sales for e.g. craft ware
  - no online advertising

- Local government community services
  - house stock availability
  - planning applications

- Local government news service
  - updates not easily accessed
  - policies not easily accessed

- Communications limited due to lack of infrastructure
  - Reduced speed of communication

- Web services such as e-commerce, email, information searching

- Limited ICT skills:
  - Lack of computer skills e.g. not skilled in application use e.g. word-processing
  - Unable to apply or jobs online
  - Lack of skills in e.g. searching for information
  - Reduced access to information
  - Reduced ability to evaluate information/news
  - Reduction in ability to communicate information.

[6]