

**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

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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

[8]

(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/allows 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

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- (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

[4]

- 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

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- 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 of 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
- [8]

- (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
- [6]

- 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
- [4]

- (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
- [4]

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- (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]

- 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

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- 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

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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 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

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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 for 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.