GCE

Applied ICT

Advanced GCE **G055**

Networking Solutions

Mark Scheme for June 2010

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There are 100 marks available for this test. They are allocated as follows:

- Tasks 2, 3 and 4   30
- Section A of the test paper   50
- Section B of the test paper   20

TASK 2

DIAGRAM

Fig. 2 - Two rooms rented by NWS   ▢ Network/phone connection port
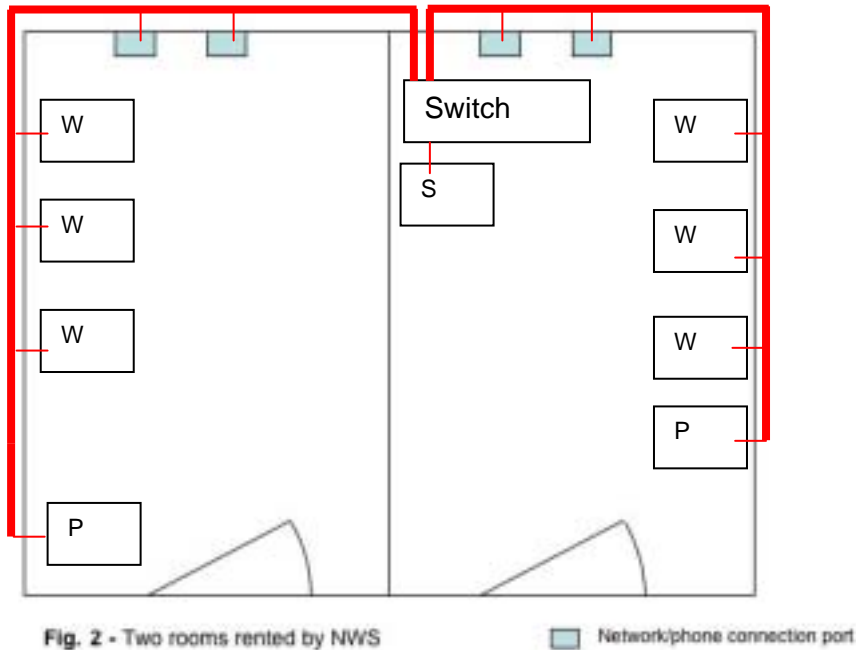
W= workstation   P= printer   S=server

A	1 mark for a correct diagram (one network, contains at least one connecting device and cabling going to device and connection to network ports)
B	1 mark for everything shown as connected (all devices in both rooms connected to a connecting device, candidate may only show one printer)
C	1 mark for cabling placed sensibly/safely

Maximum 3 marks for diagram

[3]

TABLE

Hardware devices – 1 mark for each device from the list below on the diagram and in the table and up to 2 marks for justification for each. Up to a maximum of 5 devices.

Hardware device (on diagram)	Justification
Switch/router	To connect all workstations (1) to the server and internet port (1) To provide fast and secure connection (1) to the server and internet/phone ports (1)
Cabling (UTP, STP or wireless)	To provide the physical connection (1) between workstations and connecting device (1) Cable or wireless is flexible(1) acceptable speed (1) covers required distance (1) copes with electrical interference (1)
Connectors (must match cable)	To terminate cable (1) to form connection between cable and port (1)
(File/web/proxy) Server	To store all documents (1) centrally (1) To control access to documents/internet (1) for all NWS users (1)
Network printers	To manage printing (1) for all workstations (1)
Workstations	For individual users (1) to be able to use the network (1)
IP Phone	Voice communication through network (1) no need for separate telephone lines (1)

Maximum 15 marks for table

[15]

EVALUATION

Band	Criteria	Marks
L	Some comment is made on the methods(s) used (1)	1
M	A strength OR a weakness in the method(s) used is identified	2
H	A strength AND a weakness in the method(s) used are identified	3

Maximum 3 marks for evaluation

[3]

TASK 3

Band	Criteria	Marks
L	A limited number of security issues are identified. Written work may contain a number of errors.	1-3
M	A range of security issues are identified. Some description is made for how issues will be dealt with. Written work may contain a few errors.	4-6
H	There is full explanation of range of security issues and methods for dealing with them. Work contains very few or no errors.	7-9

Security issue to be considered (l) e.g.	How it will be dealt with
Data and software loss	Data storage offered, duplicate copies kept, companies encouraged to keep their own copies as well.
Unauthorised access to confidential information	Restriction of access to office networks from outside. Whole network segmented with security across each segment.
Malicious or accidental damage to data	Password system to prevent unauthorised access. Password policies, Contracts covering use of network. Restrictions on access to office networks from outside. Firewall.
Viruses	Regular virus checking on servers, firewall protection and virus scanning on entry to main network. Contracts covering use of network.
Unauthorised access by network users from other businesses	Access rights set up, protected from unauthorised access from outside. Network within building segmented with no cross traffic.
Theft of equipment	Building security system – locked entrance to office area and to individual offices.

[9]

Section A

1a One mark for a point and one for expansion of any of:

- Shared broadband access on Centre's network (1) reduced set up / cost to NWS (1)
- Integrated phone system (1) no extra bills for NWS (1)
- On site technical support provided by Centre (1) NWS can use this rather than providing this themselves (1)
- Shared data storage provided by Centre (1) useful back up facility for NWS (1)

[2]

1b One mark for a point and one for expansion of any of:

- Shared broadband (1) may be slow at peak times (1)
- Lack of control of internet and phone access (1) this is done by the Centre (1)
- Reduced security (1) because of shared network use and public wireless network (1)

[2]

2 One mark for each correctly identified connector or connecting device up to max 2

Up to 2 marks for each description of suitability, one mark for point and one for expansion, up to max 4 marks.

Transmission Media	Connector	Why suitable
Fibre optic	SC or ST	Speed (1) up to 100Mbps (1) Small (1) many wires in one cable (1) Covers required distance (1) up to 1Km (1) Reliable (1) immune to electrical interference (1)
Shielded Twisted Pair	RJ-45	Speed (1) up to 1Gbps (1) Reliability (1) increased resistance to interference (1) Small (1) fits easily into trunking (1) Covers required distance (1) up to 100m (1)

[6]

3 One mark for function and one for expansion of any of:

Wireless hub
Receives radio signals (1) broadcasts them to visitors' laptops/PDAs (1)
Boosts radio signals (1) by repeating them (1)
Provides connection point (1) for all visitors' laptops/PDAs (1)
Provides access to the internet (1) for all visitors (1)

Modem
Sits between network and internet (1) providing connection for small businesses (1)
Converts data (1) between computer signals and telecommunication signals (1) between digital and analogue **if necessary** (1)
Establishes, maintains and terminates the connection (1) to the internet service provider (1)

Firewall
Sits between the network and the internet connection (1) for security for small businesses (1)
Blocks access (1) from unknown or requested addresses (1)
Alerts Centre's network supervisor (1) if suspect activity detected (1)

[6]

4 Up to three marks each for any **two** of:

Network operating system software
Controls all network operations (1) on all servers (1)
Manages small business users (1) logging them in and out and servicing requests (1)
Manages resources (1) such as data storage drives, internet access, IP phones, etc (1)
Controls access (1) by users of different small businesses (1)

Print Server software
To manage a print queue (1) for a small business's own network (1) for Centre staff and visitors (1)
Control the order devices use the printer (1)
Can assign priorities for visitors or Centre staff (1)
Monitors printing activity by visitors (1) in order to charge for printing (1)
Manages sending of files to printer from wireless network/staff computers/small business computers (1) reports problems to users (1)

 Max 3 marks for each type of software **[6]**

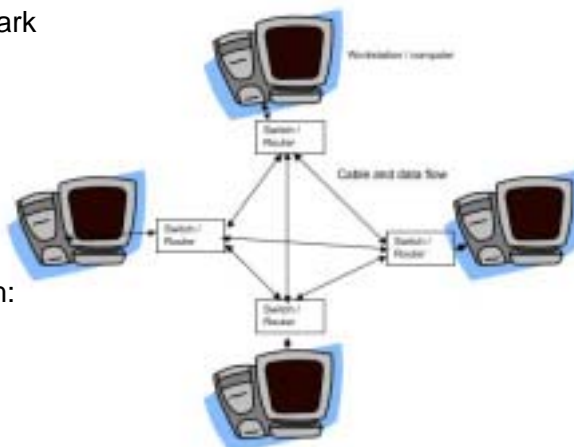**5a** Standard mesh topology diagram – 1 mark

Label showing data flow in
both directions between
computers – 1 mark

One mark for each of up to 2 labels from:
        Workstation / computer
        Switch / router
        Cable

[4]

5b   1 mark for any of the following up to max 2 marks

A 1st floor ICT room device sends its data to the switch or router it is connected to (1)
The switch or router inspects the data for the destination address of the device on the 4th floor (1)
The switch or router sends the data to the destination address on the 4th floor (1)
The switch or router will send the data to another switch or router if there is a queue (1)

[2]

5c   1 mark each an advantage, a disadvantage and a statement of suitability

Advantages
- Gives a fast connection between two rooms
- Gives a secure connection between two rooms

Disadvantages
- Node to node connection not necessary
- Too difficult for the Centre to maintain
- Too difficult for the Centre to expand

Plus a relevant statement of suitability   **[3]**

6a   One mark each for any **three** of:

- Each member of NWS staff will be responsible for sharing files on their computer (1)
- Each NWS user will back up their own computer (1)
- Each NWS computer will run its own security (1)
- Each member of NWS staff will manage their own part of the network (1)
- Access to the internet through the shared access point will be managed by each computer (1)

[3]

6b   One mark each for an advantage, a disadvantage and a statement of suitability

Advantages
- Allows individual NWS staff to control their own data
- NWS has a small network (only 6 users)
- NWS has limited funds and no server is required

Disadvantages
- It will be slow when a lot of file sharing is required
- Relies on NWS staff keeping their data secure

Plus a relevant statement of suitability

[3]

7a   One mark for any appropriate example eg 195.80.125.203

[1]

7b   One mark each for either of:

- B (1) used for medium-sized networks (first octet – 128 to 191) (1)
- C (1) used for smaller networks (first octet – 192 to 223) (1)

[2]

7c   One mark for correct format (1)
One mark for at least two octets correct (1)
One mark for all octets correct – 194.96.125.182 (1)

Maximum 3 marks

[3]

8

Band	Criteria	Marks
L	A limited number of internet services are identified.	1-3
M	A relevant purpose or use by NWS is explained for at least one internet service. A range of internet services are identified.	4-5
H	A relevant purpose and use by NWS is explained for internet services.	6-7

Internet services (S)	Purpose (P)	Use by NWS (U) eg
Email	Allows direct communication between users. Allows non-simultaneous communication between users. Allows files to be attached to messages.	Contact with clients. Mail is stored in mailboxes for future reference. Sending of files between users. Sending sample web pages to clients.
Video-conferencing	Allows a number of users to communicate by video and audio link simultaneously.	Demonstration of web pages for clients. Meetings with designers who are off site. Meetings with remote clients.
Tele-conferencing	Allows a number of users to communicate by telephone connection simultaneously.	Meetings with remote clients. Meetings between designers off site.
Discussion forums	A place for users to exchange ideas and information. Users can start new threads with an original message posting. Users can read and reply to messages in an existing thread.	Designers can post messages asking for help with problems. Designers can look at existing messages for answers to common problems. Designers can exchange ideas.
Newsgroups	A place for users to exchange ideas and information. Users can read and reply to messages Tend to be private to subscribers.	Designers can look up common problems. Designers can look up examples of common practice.
IP Phone service	Telephone communication over the internet. Allows calls to be routed to dedicated phones or to suitably equipped computers. Allows voicemail services operating through computer system.	Calling clients or off-site designers. Receiving call from clients or off-site designers. Making calls between staff in offices. Clients can leave messages outside office hours.

[7]

Section B

9   One mark for point and one for expansion of any of:
- Cables tidy (1) to reduce risk of tripping (1)
- No exposed electrical points (1) to reduce risk of electrocution (1)
- Leave exits clear (1) in case of fire (1)
- Careful lifting of equipment (1) to reduce the risk of back injury (1)
- Isolate power supply (1) to reduce risk of electrocution (1)

[4]

10   SMTP (1st)

One mark for point and one for expansion of any one of:
- Opens a session (1) to connect to the receiving mail server (1)
- Sends an email (1) to a server running SMTP (1)
- Receives emails from SMTP servers (1) for clients (1)
- Authenticates users (1) by name and password (1)
- Uses other TCP/IP protocols (1) for actual transfer of data (1)

[3]

11a Switches (1st)

One mark for point and one for expansion of any one of:
- Segments network (1) into broadcast domains (1)
- Restricts broadcast messages (1) only to devices on virtual network segment (1)
- Reduces throughput (1) of broadcast messages (1)

[3]

11b Any of:
- Where an organisation has a number of separated functions (1) each functional area has its own resources (1)
- Separate offices within one shared office space (1) most traffic stays within one office (1)
- Where there is a very high level of broadcast traffic (1) for particular parts of the network (1)

[2]

12a One mark for:
User problems keep occurring in admin

[1]

12b Full access rights (1) for technical support staff (1) no access rights (1) for non-technical support staff (1)

[2]

13a Collection of web resources (1) accessible through a browser (1)
accessed by username and password (1) only accessible on site (1)

[2]

13b One mark each for any 3 points eg:
access shared documents (1)
work collaboratively on documents (1)
access internal web resources (1)
share web resources (1)
access student data (1)
report problems (1) **[3]**

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