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Mark Scheme (Results)
Summer 2008

GCE

GCE Applied ICT (6959/01)

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General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.

- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.

- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.

- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.

- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.

- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.

- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.

- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

Mark Scheme Unit 9 June 08
Activity 1

Required evidence:
Diagrams illustrating what a peer-to-peer network and a client-server architecture might logically look like
The scenario describes three accountants and a secretary.
Minimum network size is therefore 4 computers.

Diagram showing peer-to-peer network should show a distribution structure with connection to each computer. The diagram should make it clear its a distributed system with no central server. Possible architectures: ring, star (using a mini-hub), WiFi. (Must be at least 4 computers.)

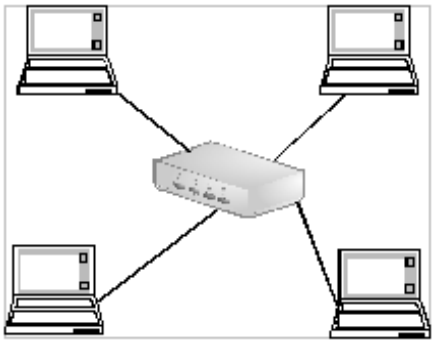


Diagram shows star,
connected by mini hub / switch.

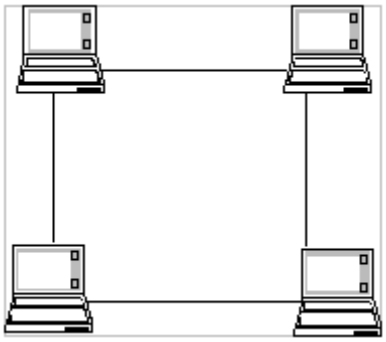


Diagram shows ring.

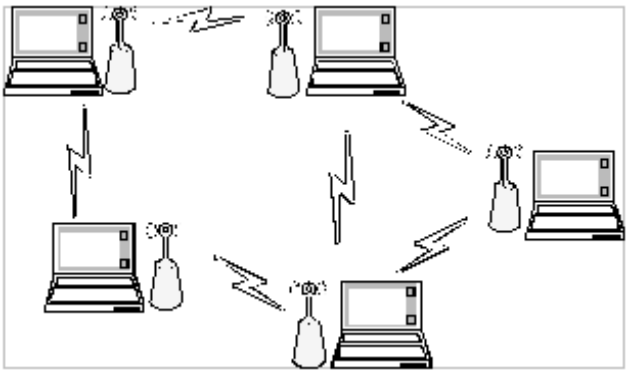
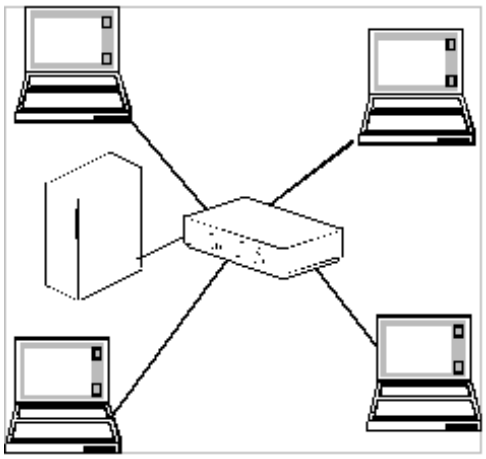
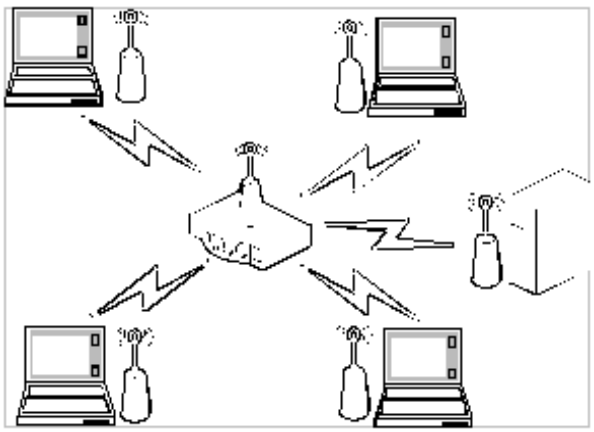


Diagram shows WiFi mesh **1 mark**

Diagram showing client server centralised system, each computer accessing a central server through a hub, switch, or WAP. Ring topology also possible.
Examples of diagram (Must be at least 4 computers plus server.) **1 mark**





Document explaining the advantages and disadvantages of setting up several independent peer-to-peer networks rather then connecting to a central network.

Advantages, must be expanded to get a mark
Any **three** of:
Simple procedures to use and set up
Accountants will have ownership of their own mini network
Only accessible by Finance Department personnel
Secure from external problems, viruses, worms, security, etc.
There will be a faster start up and log on if decentralised rather than centralised
Not reliant on main network.
No server, therefore cheaper.
No network manager, therefore cheaper.

Maximum 3 marks

Disadvantages, must be expanded to get a mark
Any **three** of:
No network manager – will have to manage the network themselves including upgrading, adding users.
Maintenance more difficult as not part of a central network
Lack of access to centralised services such as email, access to Internet, file sharing, etc.
More difficult to share real time data with other users / slower performance when sharing data.
Security on actual computers may be low.
Limitation on number of nodes, dependent on OS. accept double figures
Software installation has to be done on separate computers.

Maximum 3 marks

Total marks for Activity 1: 8

Activity 2

Evidence required

Notes explaining the function of each component.

These are the BCS definitions

For each device, one mark for an explanation similar to the one given. One mark for a more detailed explanation / expansion. Needs first mark to access the second.

7 definition marks

Only 4 extension marks possible.

Bridge not recommended 1 mark

Provides a link between two local area networks / parts of network. It may also convert the data into the appropriate form for the other system.

It is simply a link. There is no concept of it providing an entrance to a computer network.

Gateway recommended 1 mark

Is a computer system that links two dissimilar networks. Gateways usually provide a single point of entry to a secure computer network.

The gateway converts data passing through it into the appropriate form for the second network.

the gateway can monitor usage and also limit access between the networks to authorised users.

Hub not recommended 1 mark.

Allows any two computers connected to the hub, or through other hubs, to send data to each other.

A simple hub can only deal with one link at a time and can be slow if many computers are using the same hub.

Repeater not recommended 1 mark.

Are used to link two cable segments. Because of the loss of signal strength in network cables, a repeater amplifies the signals it receives before passing them on.

Router recommended 1 mark not recommended 1 mark.

Are sophisticated switched hubs. They hold information about the addresses of computers attached to the network and can forward data efficiently via an appropriate route.

They are generally used as Gateways where a LAN is connected to a larger network such as the Internet.

Switch recommended 1 mark not recommended 1 mark.

Also called a switched hub. They act like hubs but have switching circuitry which allows them to deal with many connections simultaneously.

Server recommended 1 mark

Is a computer on a network that provides a resource that can be used by any authorised client station.

Servers include e.g. file server, print server, database server, web server.

Maximum 11 marks

Your recommendation as to which components will be required for your network together with reasons why the others would not be of any use.

The recommendations must be justified.

Recommendations should take into consideration performance and be related to the scenario.

Server recommended 1 mark
Gateway recommended 1 mark
Router or Switch recommended 1 mark
Router or Switch not recommended 1 mark
Hub not recommended 1 mark
Bridge not recommended 1 mark
Repeater not recommended 1 mark

Max 6 marks

Total marks for activity 2 : 17 marks

Activity 3

Evidence required

A one page design for the total network

A diagram showing how you propose to network the equipment at the Head Office Site

A network layout diagram in an appropriate format showing the logical layout of the network. The diagram should be comprehensive, showing how each building is connected back to the centre and a minimum of how each room or set of computers is connected (showing hundreds of individual PCs would probably not be the most effective method of presentation). The diagram should show how switches/hubs, access points, and routers are used together to create the network. There are many possible configurations for the network and thus any sensible layout is acceptable

The network diagram must be understandable.

A device must be labelled to gain marks specific to that device.

1 mark each for.

1. Server in server room
2. Cables shown
3. Types of cables
4. links to external computers
5. Switch / hub to router
6. Sensible position of switches / hubs
7. Sensible, short Server to router connection
8. Sensible number of PCs and non-networked printers
9. Correct connections for architects shared plotter, networked.
10. Photocopier and fax in finance and admin.
11. Shared printers, 1 in finance, 3 in admin.
12. Sensible position of access points / cable in David's office.
13. Sensible network nodes. Probably:
    David, architect, finance, statistician
    Admin, IT, Server room

Maximum 12 marks

Notes justifying each (major) decision made with regard to the network design

Notes justifying selection of components, selection of cable types and location of components. 1 mark for each valid point.

There are no marks for descriptions of what is in the diagram.

Maximum 10 marks

A scheme for IP addresses with some indication of the actual IP addresses to be used.

Any logical grouping of IP addresses within the network range specified is acceptable assuming a Class B / C private network:

The more fully specified the ranges of addresses are the more marks that should be allocated up to a maximum of 7. e.g.

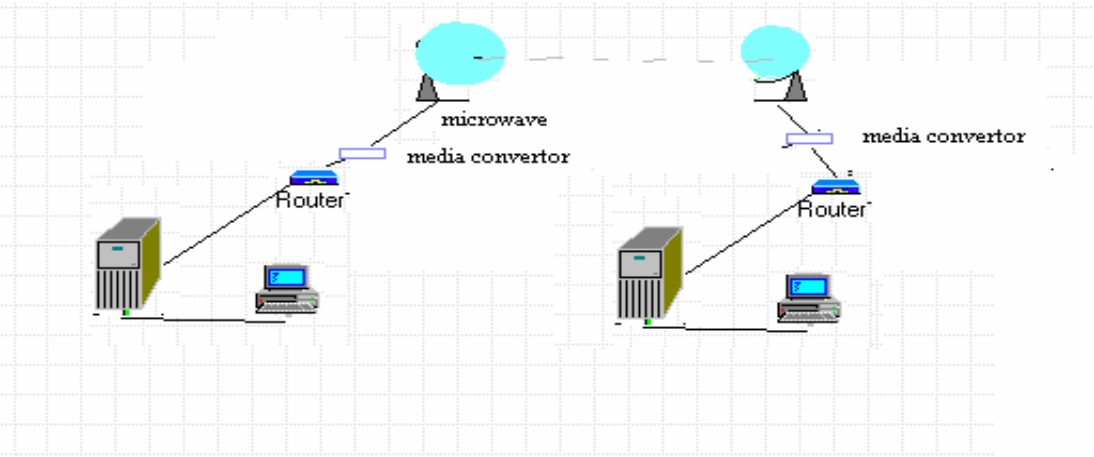
Address range	**1 mark**
Addresses for devices e.g. printers	**1 mark**
Address for (DNS)server	**1 mark**
Addresses for router / gateway	**1 mark**
Indicating which addresses are dynamic and which are static / explain the use of DHCP	**1 mark**
Addresses for remote computers	**1 mark**
Explanation of subnet mask / category B / C	**1 mark**
Justify category	**1 mark**
Explain structure of chosen category.	**1 mark**

Maximum 7 marks

Notes describing the different methods of connecting the developments to the Head Office.

1 mark for diagram **OR** 2 marks for 3 explanation points
1 mark for 2 explanation points

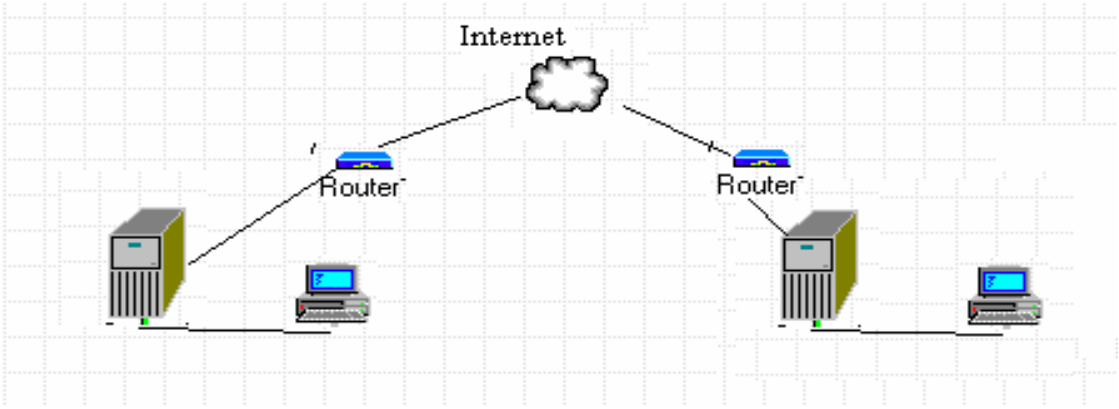
Microwave



Connection from PC to router could be WiFi

- Microwave dishes used to transmit data over long distances.-4 miles an easy distance
- Uses high frequency microwave to carry data
- Relatively easy to set up for a contractor
- Speed typically 1-10 mbps

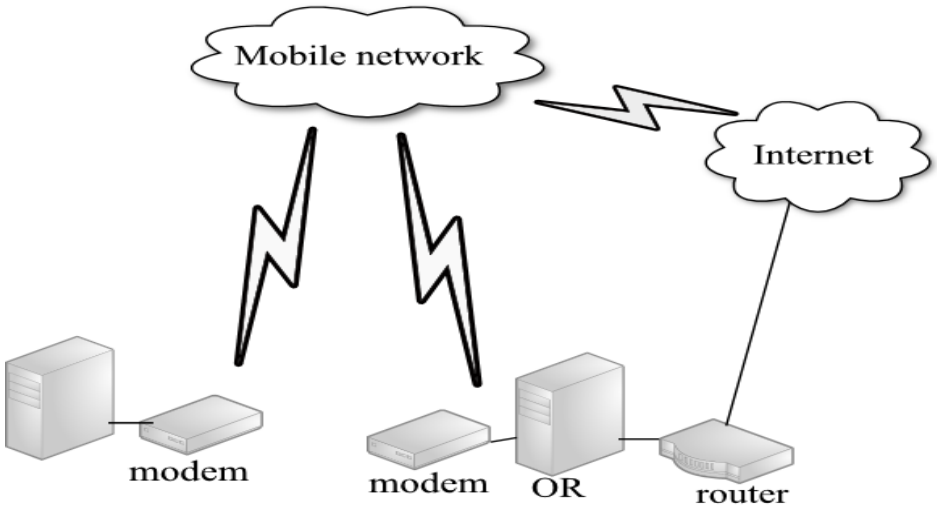
Connection via the Internet



Connection from PC to router could be WiFi

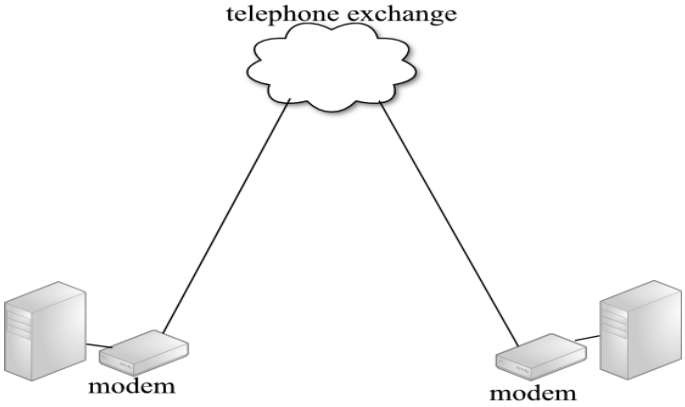
- Connect at both ends to Internet using normal Internet routing
- No special contracting required.
- Speed depends on ISP

Connection via mobile telephone system



- Connect at development end by radio / 3G modem
- Connect at head office via modem or Internet
- No special contracting required.

Connection via leased line



- Permanent / automatic phone connection
- No special contracting required.
- guaranteed service level

Maximum 4 marks

The recommendation must be justified. The quality of the justification is the most important element of this rather than the particular recommendation as all three solutions are viable. The justifications should be related to the scenario. They could involve:

- security
- cost
- performance

Maximum 3 marks

Total marks for activity 3 : 36 marks

Activity 4

Required evidence:

The six slide presentation, with speaker's notes, printed out with one slide per A4 page.

- The purpose of each of the four layers of the TCP/IP model.
- The functions of each layer of the TCP/IP model , the protocols and their roles.
- Compare the OSI model and the TCP/IP model.

The purpose of each layer of the TCP/IP model, the protocols and their roles.

Application
Handles issues of representation, encoding, and dialog control.
Protocols - DHCP, gopher, IMAP4, IRC, NNTP, POP3, *FTP, HTTP, SMTP, DNS, TFTP, SMB, AFP, ASP,* and many others

Transport
Deals with the quality of service issues of reliability, flow control, and error correction.
Protocols - *TCP, UDP, ATP,* DCCP, SCTP, RTP, and more

Internet
Divide TCP segments into packets and send them from any network. The packets arrive at the destination network independent of the path they took to get there.
Protocols - *IP, AARP,* RARP, ICMP, RIP, and many more

Network
Known as the host-to-network layer. This layer is concerned with all of the components, both physical and logical, that are required to make a physical link.
Protocols - *Ethernet,* 802.11, WiFi, PPTP, PPP, and many more

For each layer, 1 mark for Purpose, 1 mark for Function identifying at least **one** correct protocol with explanation.

Maximum 8 marks

Compare the OSI model and the TCP/IP model
1 mark for either a table or text that shows how the TCP/IP model compares with the 7 layers of the OSI model.

OSI Model	TCP/IP
7) **Application**	**Application**
6) **Presentation**	
5) **Session**	
4) **Transport**	**Transport**
3) Network	**Internet**
2) **Data Link**	**Network access**
1) **Physical**	

1 mark for describing **three** similarities.
1 mark for describing **two** differences
1 mark for describing a **further** similarity **and** difference

Similarities include:

- Both have layers.
- Both have application layers, though they include very different services.
- Both have comparable transport layers.
- Both have comparable network layers.
- Both models need to be known by networking professionals.
- Both assume packets are switched. This means that individual packets may take different paths to reach the same destination. This is contrasted with circuit-switched networks where all the packets take the same path.

Differences include:

- TCP/IP combines the application, presentation and session layer into its application layer.
- TCP/IP combines the OSI data link and physical layers into the network access layer.
- TCP/IP appears simpler because it has fewer layers.
- TCP/IP protocols are the standards around which the Internet developed, so the TCP/IP model gains credibility just because of its protocols. In contrast, networks are not usually built on the OSI protocol, even though the OSI model is used as a guide.

Maximum 3 marks

Total marks for activity 4 : 11 marks

Activity 5

Required evidence

A contingency plan for the network to include:

Prevention of network problems occurring as a result of natural disasters
Disaster recovery

Examples
Prevention of problems occurring:

1. Routine, documented backup procedures
2. Back up for hardware, back up server, store of spare parts
3. Isolation of parts of network
4. UPS
5. File server on first floor
6. Other sensible and relevant
7. network monitoring software / policy / code of conduct
8. sensible example of preventative maintenance
9. hot swappable components / mirroring / RAID

Recovery of Data

1. Off site storage of data
2. Have a documented recovery procedure
3. Maintain accurate documentation of hardware and software configurations. Copies of software securely stored
4. Temporary hardware loan arrangements
5. standby replacements, machines or other essential items
6. alternative site
7. Other sensible and relevant

Up to 2 marks for each strategy with an explanation of why needed or how to set up. Maximum of 16 marks

Maximum 16 marks

Total marks for activity 5 : 16 marks

Standard ways of working **2 marks**

headers & footers with candidate name, centre number & activity number
presented as required: treasury tag, number of pages, font size etc

Total marks for paper 90

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