

Communication Spec

- Networks:**
- Explain the characteristics of networks and the importance of different network types, including LAN and WAN.
 - Describe the importance of common network topologies, including ring, star, bus and mesh, and their advantages and disadvantages.
 - Explain the importance of connectivity, both wired and wireless.
 - Explain and give advantages and disadvantages of circuit switching and packet switching.
 - Explain the importance and the use of a range of contemporary network protocols, including Ethernet, Wi-Fi, TCP/IP, HTTP, HTTPS, FTP and email protocols.
 - Describe the typical contents of a TCP/IP packet.
 - Explain the importance of layers and the TCP/IP 5-layer model.
 - Describe methods of routing traffic on a network and calculate routing costs.

- Internet:**
- Explain how Domain Name System (DNS) servers and Internet Protocol (IP) addresses work.

A large comprehensive school has over 500 computers connected to their *Local Area Network (LAN)* with a connection to the Internet.

- (a) Describe, in detail, four *disadvantages* for the school of having a network of computers compared to stand alone computers. [8]

Disadvantage 1

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Disadvantage 2

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Disadvantage 3

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Disadvantage 4

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2 A small business has three stand-alone computers, a printer and an internet connection in an office.

(a) State **two** advantages of connecting the computers to create a local area network.

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2

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..... **[2]**

Explain the difference between a bridge and a gateway [2 Marks]

Explain the difference between a hub and a switch [2 Marks]

4. There are many different types of network topology, of which *Bus* and *Star* are types.

(a) Draw a diagram of a *Star* topology network clearly labelling all important hardware. [3]

- (b) Star topology networks are more commonly used than Bus topology networks. Give two advantages and two disadvantages of a Star topology network compared to a Bus topology network. [4]

Advantages:

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Disadvantages:

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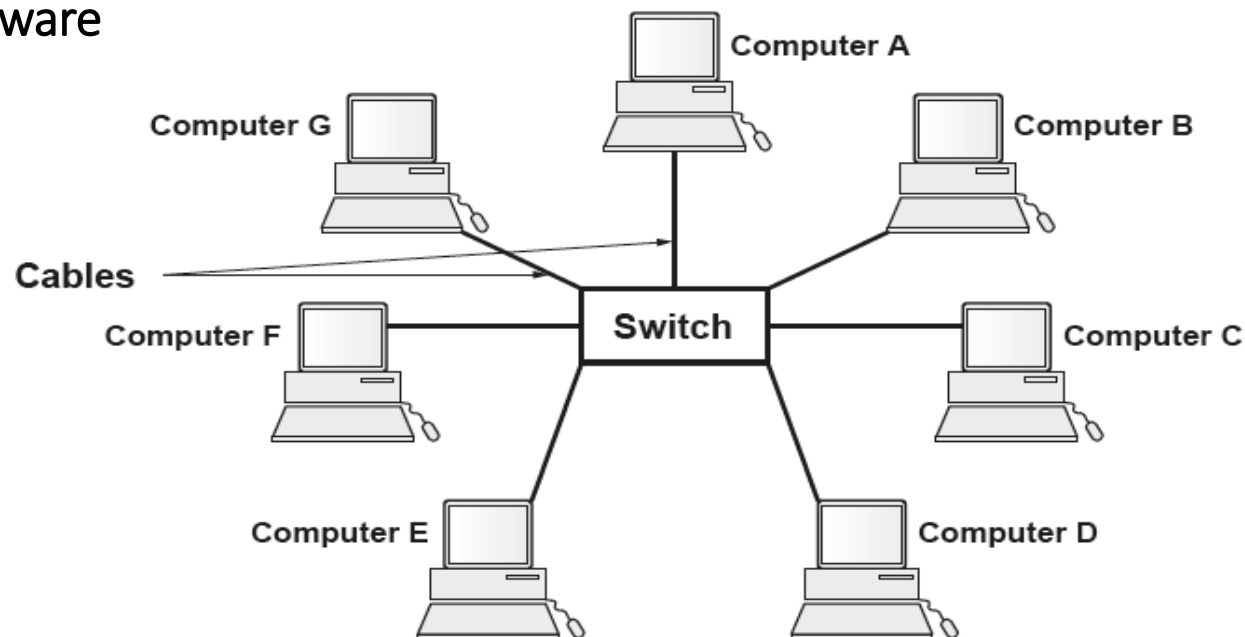
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2016 - Hardware



- (a) Other than the items labelled on the diagram above, state the hardware required by every computer to connect to a network. [1]

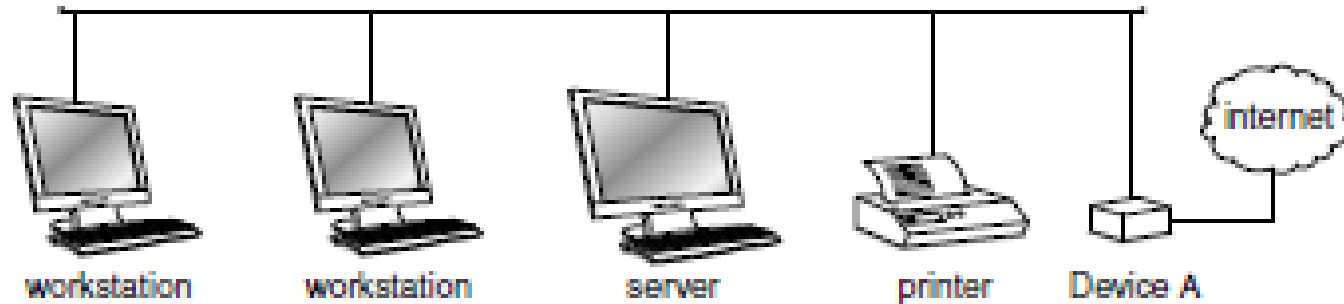
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- (b) Describe how a packet is transmitted from computer **A** to computer **D**, including the role of the switch. [5]

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The following diagram shows how the computers in Mr Singh's office are connected to each other to form a LAN.



(a) State the correct name for this network topology.

..... [1]

(b) State the name of the Device A which connects the server to the internet.

..... [1]

(c) Give **three** functions of the server in this network.

1

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2

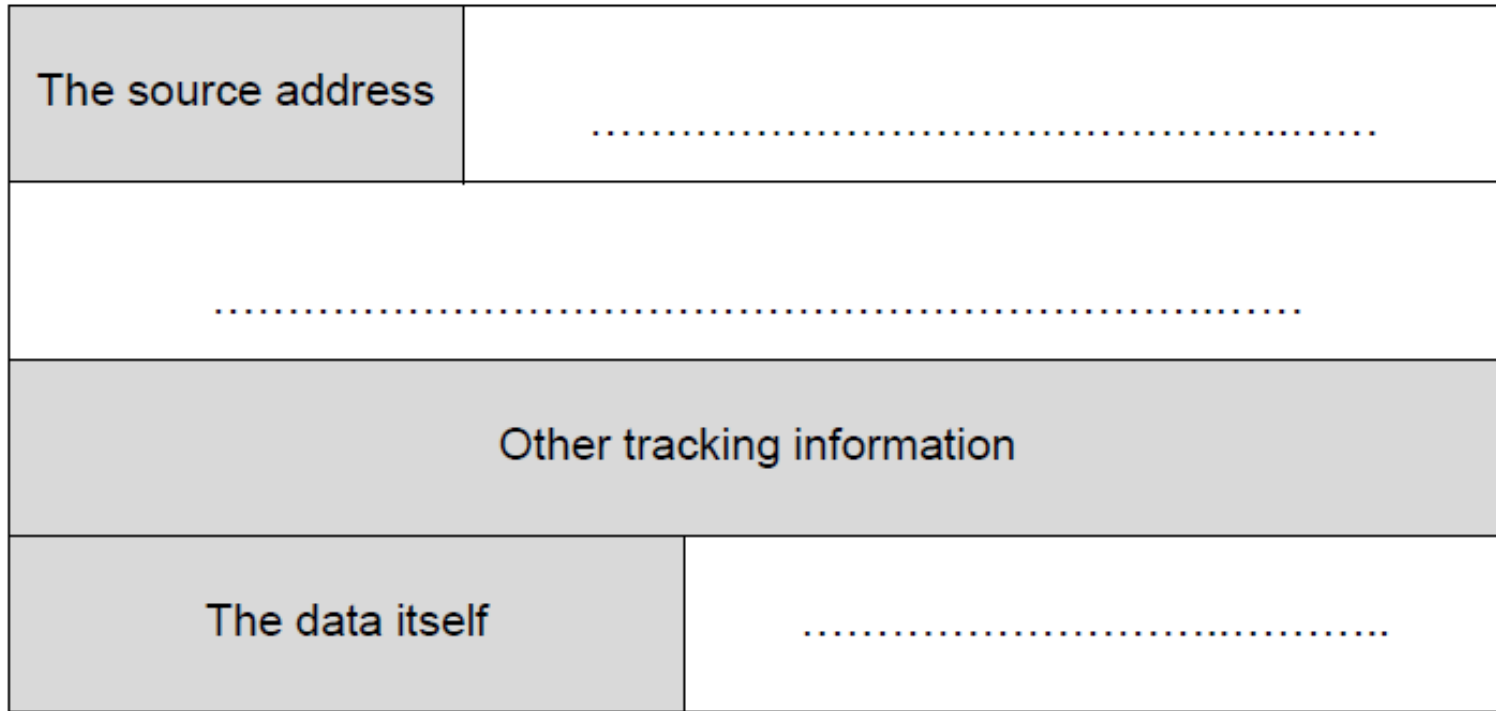
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..... [3]

TCP/IP is a protocol used for communication between computers when transmitting data over networks.

- (a) Complete the diagram below, which shows the typical contents of a TCP/IP packet. [3]



What is the role of a checksum within a data packet? [2 marks]

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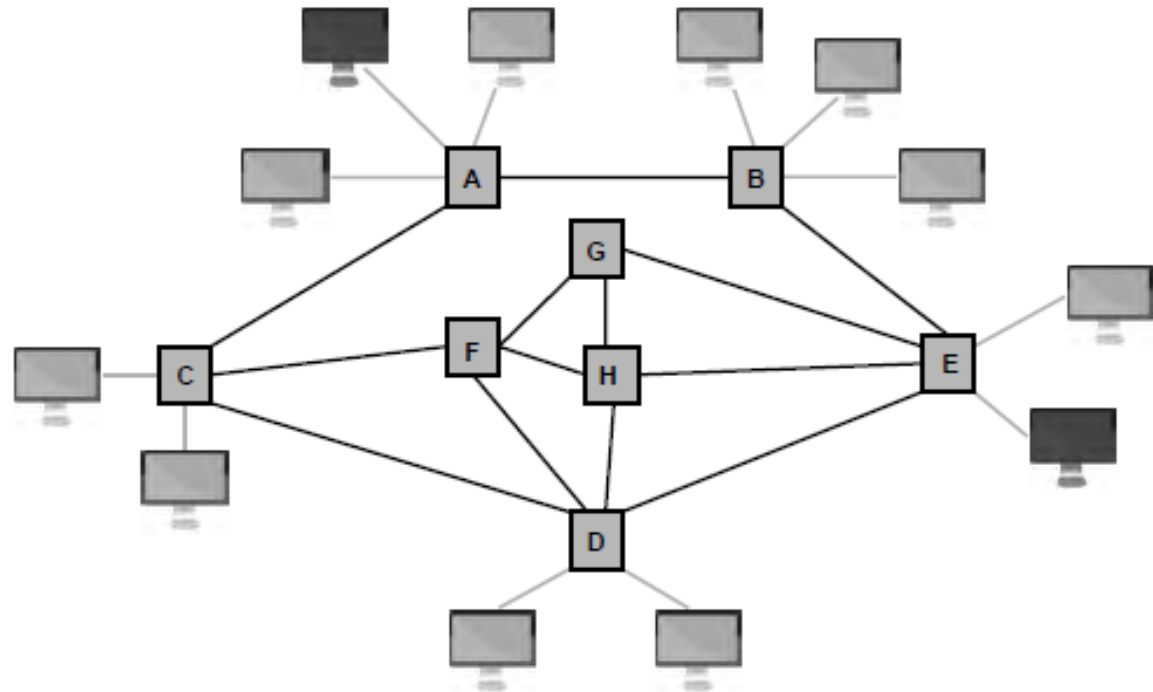
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13. Below is a diagram of a *Wide Area Network (WAN)* such as the internet.

The nodes labelled **A** to **H** are managed by routers.



Data is transmitted on this WAN using *packet switching*.

Describe how data might be transmitted on this network, explaining:

- how *packet switching* and *routing* operates;
- the contents of a *packet*;
- the benefits of transmitting packets using routers.

[12]

Quality of written communication will be assessed in this question.

- A DNS server will contain a list of domain names
- A DNS server will contain a list of corresponding IP addresses
- A web site address is typed into the address bar of a browser
- The browser checks the local (cached) host file to check if it already holds the IP address
- The local (your domain) DNS server is queried for the IP address
- If the local DNS server does not hold the IP address then the query is passed to another DNS server at a higher level until the IP address is resolved
- The address is passed on to DNS servers lower in the hierarchy
- When the full address has been resolved, the IP address is then passed to your browser
- The browser then connects to the IP address of the server and downloads the web site.

Sample - DNS Mark scheme

Band	AO1 (Max 6 marks)
2	<p>4 - 6 marks</p> <p>The candidate has:</p> <ul style="list-style-type: none"> • shown clear understanding of the requirements of the question and a clear knowledge of the indicative content. Clear knowledge is defined as a response that provides four to six relevant detailed points from the indicative content • addressed the question appropriately explaining how a domain name is used to access a web site including the role of Domain Name System (DNS) servers with minimal repetition and no irrelevant material • used appropriate technical terminology referring to the indicative content accurately.
1	<p>1 - 3 marks</p> <p>The candidate has:</p> <ul style="list-style-type: none"> • attempted to address the question and has demonstrated some knowledge of the topic specified in the indicative content. Some knowledge is defined as a response that provides one to three relevant points from the indicative content • addressed the question explaining how a domain name is used to access a web site including the role of Domain Name System (DNS) servers • used limited technical terminology referring to the indicative content.