1. The office workers of a large company each use a stand-alone computer.

The company is considering networking the machines.

(i) Describe what is meant by a LAN.

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[2]

(ii) State **two** advantages of having a LAN instead of a set of stand-alone machines.

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[2]

2(a). Describe how packet switching is used to transmit datafrom one computer to another computer on a network.

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[5]

(b). Explain **two** advantages of using packet switching instead of circuit switching to send a message between two computer on a network.

1

2

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[4]

3. InterMovie is a service that allows users to stream movies over the Internet.

When users have played a movie it remains stored in a cache on the user's computer. This means that someone wanting to access the same film in future can stream it from other users rather than directly from the company's servers.

(i) State what this network model is called.

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[1]

(ii) Explain why the company might have opted for this model.

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[2]

4(a). Zuhair wants to create a Local Area Network (LAN) for himself and his family, in his home.

Describe what is meant by a LAN.

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[2]

(b). TCP/IP uses packet switching.

Explain what is meant by packet switching.

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[4]

5. The computers in a car showroom are connected in a network with all data being held in a central server. The computers are used by the salesmen, but can also be used by customers to watch videos of the cars that are on offer.

What is meant by a protocol?

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[2]

6(a). A coffee company has coffee shops located across the country. Each shop has its own Local Area Network (LAN). The company wants to connect the shops in a Wide Area Network (WAN).

(i) Describe **two** characteristics of a LAN.

1

2

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[2]

(ii) Describe **two** characteristics of a WAN.

1

2

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[2]

(b). Describe **one** piece of hardware that each shop will need to connect their LAN to the company's WAN.

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[2]

The new network will enable the company to roll out a mobile phone application that allows people to place their orders before they arrive at the shop. The company is deciding whether to use a menu-driven interface or a natural language interface.

7. A company produces digital photo frames (i.e. photo frames that display digital photographs).

Several of these photo frames can be placed around a house and connected in a peer to peer network.

Describe what is meant by the term ‘peer to peer network’.

--- [2]

8(a). The internet can be considered an example of a WAN.

Describe what is meant by the term 'WAN'.

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[2]

(b). The internet uses a set of protocols referred to as the TCP/IP stack. The TCP/IP stack consists of four different layers, each with its own set of protocols.

(i) Explain why protocols are important on a network.

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[2]

(ii) State the name of the **four** layers of the TCP/IP stack.

1 ---

2 ---

3 ---

4 ---

[4]

END OF QUESTION PAPER

Question			Answer/Indicative content	Marks	Guidance
1		i	• Local Area network • (Over) a small geographical area • Use of hard-wiring / wireless communication	2	
		ii	• Communication between machines / workers • Any machine can be used • Easier to maintain / add / delete software / files • Sharing of peripheral devices / software / data • Monitoring of workers • Simplifies backup procedures	2	Not: Shared processing power Examiner's Comments Most candidates scored well in this question. There were some interesting variations on the accepted version of 'local area network'. There were those who thought that the 'a' stood for 'access'. This sort of response was fine because the candidate had the correct concept and was able to go on and earn the marks, whereas candidates who stated that the 'l' stood for 'large' would then go on to describe the characteristics of a WAN and consequently did not gain marks.
			Total	4	
2	a		• Data is split into equal sized blocks (called packets) • Each packet has a header of information (including destination address and the place of the packet in the complete message) • (Each packet is placed on the network and) each may travel by a different route • (At each node on the network the destination address is read and the) best route is found • Packets need to be reordered at the destination	5	For 'reordered' accept reorganised or similar, but NOT 'reassembled'. Examiner's Comments Another question which is ideal to be answered as numbered points. Some candidates confused circuit and packet switching but most earned two or three marks. The difficult point was that each time the packet arrived at a node another 'best route' needed to be found.

Question			Answer/Indicative content	Marks	Guidance
	b		• Transmission is safer from interception… • …because it is impossible to intercept all the packets as they use different routes • Very efficient use of network… • …as each channel only used for short time / does not tie up a part of the network • If there is an error then only a small, identifiable, part of the data is affected… • …this can be retransmitted easily	4	1 per bullet, max 2 pairs of bullets. Can award marks for opposite points made about Circuit Switching but do not giveexplanation mark Efficient use, not speed Do not credit anything about speed of transmission of the file **Examiner's Comments** This was well answered unless the candidate was confusing packet and circuit switching.
			Total	9	
3		i	• Peer to peer (1).	1	For 1 mark. Accept hybrid of client-server and peer to peer.
		ii	• Peer to peer means there isn't a reliance on the company's server (1) and its connection to the Internet (1). • This means it hasn't got to invest in lots of hardware and bandwidth (1) and the system is likely to be more fault tolerant (1).	2	Up to 2 marks for a valid explanation that demonstrates application of knowledge and understanding to given context.
			Total	3	

Question			Answer/Indicative content	Marks	Guidance
4	a		• A group of computers / devices **(1 – AO1.2)** connected over a small geographical area **(1 – AO1.2)**. The infrastructure is usually owned by the network owner **(1 – AO1.2)**.	2	Up to 2 marks for a valid description.
	b		• Data is split into chunks called packets (1 – AO1.1) which have labels (1 – AO1.1) including address being sent to (1 – AO1.1) and order (1 – AO1.1). Each packet is sent on the most convenient / avoidable route (1 – AO1.2) meaning they may arrive in a different order to which they were sent (1 – AO1.2). Once packets arrive at receiver they are reordered (1 – AO1.2).	4	Up to 2 marks for demonstrating knowledge (AO1.1). Up to 2 marks for demonstrating understanding (AO1.2).
			Total	6	
5			A set of rules… –…to govern data transmission (between devices)	2	Must be rules – plural 1st bullet point **Examiner's Comments** This question was well answered with most candidates gaining full credit.
			Total	2	

Question			Answer/Indicative content	Marks	Guidance
6	a	i	Two of: □ A LAN covers a small geographical area (e.g. a building or campus). [1] □ A LAN uses connections owned by the organisation that owns it. [1] □ More secure than a WAN [1]	2	Only award security mark if it is relative
		ii	Two of: □ A WAN covers a large geographical area.[1] □ A WAN often uses third party connections.[1] □ Less secure than a LAN [1]	2	Only award security mark if it is relative Examiner's Comments These questions were generally well answered, although some candidates described a LAN as having few computers with a WAN having many.
	b		□ A router [1]… □ … A device that passes data between two networks. [1] OR □ A gateway [1]… □ … A device which connects two dissimilar networks to each other.[1]	2	Do not accept MODEM. Do not accept '…connects LAN to WAN' for 2nd mark. Examiner's Comments Most candidates stated a valid creditworthy piece of hardware but their descriptions lacked clarity.
			Total	6	

Question			Answer/Indicative content	Marks	Guidance
7			- Devices on the network have equal status/no (central) server. - Devices on the network share data *(1 per -, max 2)*	2 AO1.1 (2)	Examiner's Comments Candidates invariably achieved a mark on this question for either stating that peer to peer networks allow the sharing of data or that all devices have equal status. Few achieved two marks for stating both of these points.
			Total	2	

Question			Answer/Indicative content	Marks	Guidance
8	a		- Wide Area Network - Collection of connected computers/devices over a large geographical area - Often using 3rd party communications channels (1 Mark per -, max 2)	2 (AO1.1)	Examiner's Comments Although most candidates stated that a WAN is a wide area network, many did not go on to state that devices on a WAN are connected over a large geographical area.
	b	i	- Allowing them to communicate - By ensuring all devices follow the same rules/standards - So they interpret data/signals in the same way (1 Mark per -, max 2)	2 (AO1.2)	Examiner's Comments Most candidates explained what a protocol is rather than why they are important on a network. Candidates should be encouraged to apply their knowledge to the question being asked. Some candidates gained credit for correctly explaining that protocols enable devices to interpret data in the same way, allowing them to communicate.
		ii	- Application - Transport - Internet - Network Interface/(Data) Link/Physical (1 Mark per -, max 4)	4 (AO1.1)	Examiner's Comments Most candidates achieved three or four marks on this question, the layers were accepted in any order. Those who did not, invariably scored zero marks.
			Total	8	