

Computer Science (9-1)

1.3 – Computer networks, connections and protocols
Antony Gallagher

Please note that you may see slight differences between this paper and the original.

Candidates answer on the Question paper.

OCR supplied materials:

Additional resources may be supplied with this paper.

Other materials required:

- Pencil
- Ruler (cm/mm)

Duration: Not set

Candidate forename		Candidate surname	
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Centre number						Candidate number				
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INSTRUCTIONS TO CANDIDATES

- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. HB pencil may be used for graphs and diagrams only.
- Answer **all** the questions, unless your teacher tells you otherwise.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- Where space is provided below the question, please write your answer there.
- You may use additional paper, or a specific Answer sheet if one is provided, but you must clearly show your candidate number, centre number and question number(s).

INFORMATION FOR CANDIDATES

- The quality of written communication is assessed in questions marked with either a pencil or an asterisk. In History and Geography a *Quality of extended response* question is marked with an asterisk, while a pencil is used for questions in which *Spelling, punctuation and grammar and the use of specialist terminology* is assessed.
- The number of marks is given in brackets [] at the end of each question or part question.
- The total number of marks for this paper is **68**.
- The total number of marks may take into account some 'either/or' question choices.

1. An office has a LAN (Local Area Network). The office has four employees who each have a laptop. The office also has one server and one networked printer.

The office is set up as a star network with a switch at the centre. All devices are connected to the network using cables.

- i. Draw the devices and connections in the office star network. All devices must be clearly labelled.

[3]

- ii. Describe the role of the switch in the office network.

.....

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.....

.....

[2]

2. A law company currently use a Local Area Network (LAN) linked to a Wide Area Network (WAN). They want to upgrade their system to utilise cloud storage.

Define what is meant by a Wide Area Network.

[1]

3. The owners of a large bakery have a Local Area Network (LAN) with a star topology. They order their supplies over the Internet. When data is transmitted from the bakery to the supplier, network protocols are used.

The owners of a large bakery have a Local Area Network (LAN) with a star topology.

Explain **four** reasons why the bakery may use a star network topology for their LAN.

.....

.....

[4]

4. A house has computers in each room and a central router. Every room allows both Ethernet and WiFi connections to the router.

i. Describe the purpose of the router in the house's network.

[2]

ii. Identify **two** additional items of network hardware, apart from cables and a router, that may be used within the house network.

1

2

5. An office has a LAN (Local Area Network). The office has four employees who each have a laptop. The office also has one server and one networked printer.

The office introduces a WAP (Wireless Access Point) to allow network access to wireless devices.

The office manager has noticed that the performance of the network has recently decreased.

i. Describe how introducing wireless access could have slowed down the network.

[2]

- ii. Identify **two** other factors that can affect the performance of a network.

1

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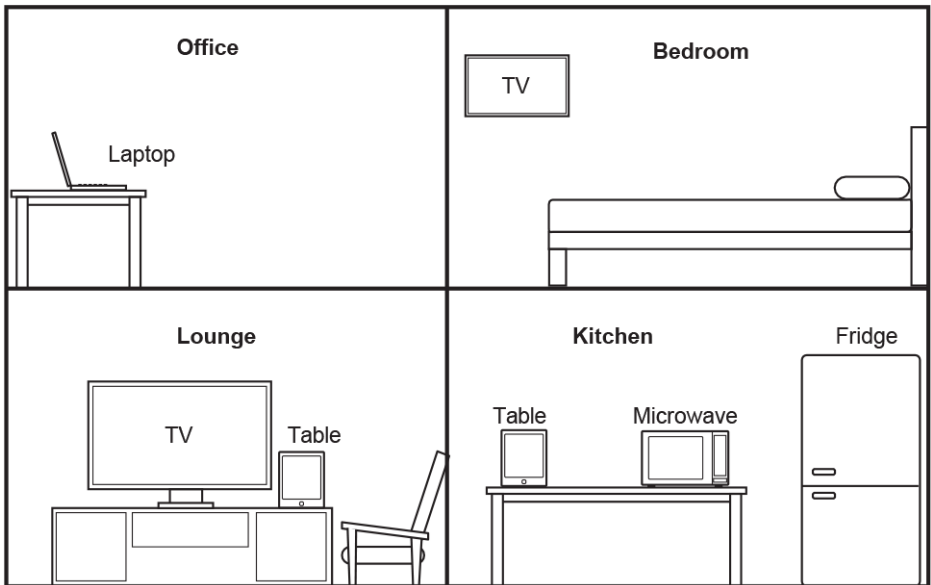
2

.....

.....

[2]

6. Hope has a network in her house. The main devices are shown in the diagram.



Devices on the network do not currently have Internet access.

Identify one device that Hope can use to connect her home network to the Internet.

..... [1]

7. A house has computers in each room and a central router. Every room allows both Ethernet and WiFi connections to the router.

Identify if the house network is a LAN (local area network) or a WAN (wide area network). Justify your choice.

Network type:

.....

Justification:

.....

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.....

[3]

8. The owners of a large bakery have a Local Area Network (LAN) with a star topology. They order their supplies over the Internet. When data is transmitted from the bakery to the supplier, network protocols are used.

Give **two** reasons why the bakery may use a star network topology for their LAN.

1
.....

2
.....
.....

[2]

9(a). A law firm currently use a Local Area Network (LAN) linked to a Wide Area Network (WAN). They want to upgrade their system to utilise cloud storage.

Explain **two** advantages to the law firm of storing their data in the cloud.

.....
.....
.....
.....
.....
.....

[4]

(b). Explain **two** disadvantages to the law firm of storing their data in the cloud.

.....
.....

[4]

(c). Define what is meant by a Wide Area Network.

[1]

10. The IP address 192.149.119.226 is linked to the website with a URL of <https://www.ocr.org.uk>
When <https://www.ocr.org.uk> is entered into a browser, the website homepage is loaded.
Describe the relationship between the website URL (<https://www.ocr.org.uk>), the IP address and the webserver.

11. The following table has descriptions of Ethernet and WiFi.

Tick (✓) **one** box in each row to identify if the description is more appropriate for Ethernet or WiFi.

Description	Ethernet	Wifi
A wired connection		
More likely to be affected by interference		
Data can be transmitted at a faster speed		
Wireless transmission		
Shorter transmission range before data is lost		

[5]

12. Naomi's office has five computers connected into a Local Area Network (LAN). There is also one printer that all the devices can print to.

Ethernet cables are used within the office building.

Tick **one** box in each row to identify if the statement about Ethernet is True or False.

Statement	True	False
Ethernet is a protocol		
Ethernet uses wireless data transmission		
Ethernet can transmit data at speeds of up to 100 Gbits per second		
Ethernet is a protocol within the TCP/ IP stack		

[4]

13. A bank uses a local area network to connect all the computers in its head office.

Computers in the network can be identified using both IP addresses and MAC addresses.

Describe **two** differences between IP addresses and MAC addresses.

.....

.....

.....

.....

----- [4]

14. Computers access the Internet using the TCP/IP model.

- i. The TCP/IP model uses layers including the application layer and transport layer.

Explain why the TCP/IP model uses layers.

----- [2]

- ii. TCP/IP is one example of a protocol.

Give the name of **one** appropriate protocol for each task in the table.

Task	Protocol for this task
Sending an email from one mail server to another	
Transmitting a file from a client to a server	
Viewing a website using a web browser	
Downloading an email to your computer	

[4]

15. The owners of a large bakery have a Local Area Network (LAN) with a star topology. They order their supplies over the Internet. When data is transmitted from the bakery to the supplier, network protocols are used.

Define what is meant by a 'network protocol'.

.....

.....

[1]

16. TCP/IP is a set of protocols based on layers.

i. With regards to network protocols, define what is meant by a 'layer'.

.....

.....

[1]

ii. Describe **one** advantage of using layers to construct network protocols.

.....

.....

[2]

17. The owners of a large bakery have a Local Area Network (LAN) with a star topology. They order their supplies over the Internet. When data is transmitted from the bakery to the supplier, network protocols are used.

TCP/IP is a set of protocols based on layers.

i. With regards to network protocols, define what is meant by a 'layer'.

.....

.....

[1]

ii. Describe **one** advantage of using layers to construct network protocols.

.....

.....

[2]

18. For each of the scenarios below, identify the most appropriate protocol to be used and explain the function of the protocol.

i. A user wants to transfer a file directly from his computer to his friend's computer.

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[2]

ii. A customer wants to securely log into her bank's website to check her account balance.

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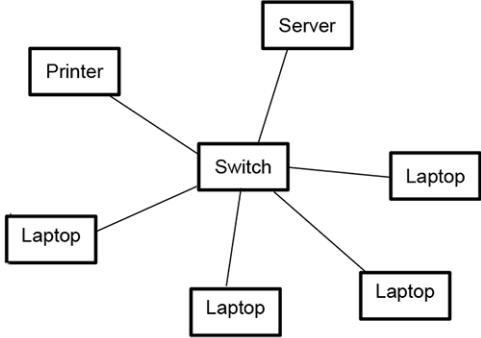
.....

.....

[2]

END OF QUESTION PAPER

Mark scheme

Question	Answer/Indicative content	Marks	Guidance
<p>1</p> <p>i</p>	<p>1 mark per bullet</p> <ul style="list-style-type: none"> • Four laptops/computers, a server and printer present and clearly identifiable (positions do not matter) • Switch as a device clearly identifiable... • ...all devices directly connected to the switch and only the switch (FT from MP2) <p>e.g.</p>  <pre> graph TD Switch[Switch] --- Printer[Printer] Switch --- Server[Server] Switch --- Laptop1[Laptop] Switch --- Laptop2[Laptop] Switch --- Laptop3[Laptop] Switch --- Laptop4[Laptop] </pre>	<p>3</p> <p>AO2 1a (3)</p>	<ul style="list-style-type: none"> • Printer may be connected to the server or to the switch. • Accept PC for laptop • If the candidates has given server/switch or switch/server in the centre, mark the first one in their list. If they give server/switch, they do not get MP2, but allow access to MP3. <p>Examiner’s Comments</p> <p>Most candidates were able to gain at least 1 mark by drawing the required elements.</p> <p>Fewer candidates were able to correctly label the central device as the switch; many incorrectly labelled this as the server, or server/switch. This error demonstrates a misunderstanding that all devices connect centrally to a server, instead of a device such as a switch.</p> <p>Some candidates did not clearly label their devices or did not fully apply the scenario to the diagram i.e. labelling 'device' instead of the specific laptop, printer, server as required.</p>
<p>ii</p>	<p>1 mark per bullet to max</p> <ul style="list-style-type: none"> • To connect the devices together • Receives data/packets/traffic • Direct/send data/packets/traffic only to its destination • Creates/generates a list of devices connected to it as it receives signals • Uses MAC addresses of devices connected to it 	<p>2</p> <p>AO1 1a (1)</p> <p>AO2 1a (1)</p>	<ul style="list-style-type: none"> • Do not award information, penalise once. • Do not award packet switching out of context. • Accept MP3 by example <p>Examiner’s Comments</p> <p>This question required an understanding of the purpose and function of a switch in a network.</p> <p>A surprising number of candidates thought that the switch turns the network on and off.</p> <p>The better answers conveyed that signals were transmitted from the devices to the switch, and that the switch then transmitted the signals to the destination.</p>

					A small number of candidates were able to demonstrate an understanding of how the switch records the MAC addresses of the devices attached to it and then uses these to forward data packets.
			Total	5	
2			<ul style="list-style-type: none"> The computers are geographically remote/ distanced/ more than a mile apart Communication medium is not owned by the law firm 	1 (AO1 1a)	<p>1 mark only to be awarded for a correct definition.</p> <p>Accept responses such as the company doesn't own the infrastructure.</p> <p>Do not accept 'Network over a wide area' or similar arrangement of wording.</p>
			Total	1	
3			<ul style="list-style-type: none"> It is easy to add a new node or device Management of the network can be done centrally Fewer data collisions can occur If a node or device fails it does not affect the rest of the network A signal does not need to be transmitted to all computers in the network 	4	<p>1 mark is to be awarded for each correct reason to a maximum of 4 marks.</p> <p>Any valid comparisons to other topologies can be awarded marks.</p>
			Total	4	
4		i	<p>1 mark per bullet to max 2</p> <ul style="list-style-type: none"> Directs packets/data to destination / directs packets/data in a network Receives packets/data from the network/Internet Forwards packets/data to other computers on the network/Internet Connects (different) networks together / e.g. joins home network to Internet Has (public) IP address for LAN Designates (private) IP addresses to network nodes 	2 AO1 1a (1) AO1 1b (1)	<p>Controls flow of data as BOD for bullet 1.</p> <p>Bullet 1 needs to refer to the router directing the destination e.g. it is making a decision/choice on where to send it.</p> <p>Bullet 4 - it has to be referring to the connection between the Internet and home network, or forwarding of data between them. Just referring to accessing Internet is not enough.</p> <p>Do not allow information for data/packets</p>

					<p><u>Examiner's Comments</u></p> <p>This question required candidates to demonstrate their understanding of a router and its purpose in a network. Candidates need to have an understanding of the purpose of the hardware in a network as to the roles it performs, and how it does this. Less able candidates gave generic descriptions such as 'it connects devices together', or 'lets a user go on the Internet'. These are not in-depth enough to explain the actual purpose of the router, i.e. to receive packets from a computer, read the address and forward the packet to its destination. Similarly, with access to the Internet, the router receives the package to go onto the Internet, packets it appropriately for the new type of network and then sends it onto the new network. The more able candidates were able to describe the purpose of directing packets to their destination, as opposed to sending it arbitrarily to other devices.</p>
		ii	<p>1 mark per item to max 2 e.g.</p> <ul style="list-style-type: none"> • Network Interface card / NIC • Wireless access point / WAP • Wireless network interface card / WNIC / wi-fi card • Bridge • Switch • Hub • Repeater / wireless extender/booster • Server 	<p>2 AO1 1a (2)</p>	<p>Accept modem, power line adapter, Ethernet jack</p> <p>Must be an item of network hardware</p> <p><u>Examiner's Comments</u></p> <p>Many candidates were able to identify at least one device, most commonly switches and hubs.</p>
			Total	4	
5		i	<p>1 mark per bullet to max 2</p> <ul style="list-style-type: none"> • Wireless transmission is slower than cabled • More devices/users could be connected e.g. mobile phones / increase in traffic • ...reducing bandwidth available for each user / insufficient bandwidth for users/demand 	<p>2 AO1 1b (1) AO2 1b (1)</p>	<ul style="list-style-type: none"> • Bod - wireless has less bandwidth <p><u>Examiner's Comments</u></p> <p>This question required an understanding of the differences between wired and wireless transmission.</p>

			<ul style="list-style-type: none"> • Wireless can be limited by interference • ...such as walls that disrupt the signal / from other wireless networks/users 		<p>Many candidates were able to correctly identify that wireless transmission is usually slower than wired transmission.</p> <p>Many candidates were also able to explain potential interference in wireless transmission and what can cause this interference.</p>
		ii	<p>1 mark per factor e.g.</p> <ul style="list-style-type: none"> • Bandwidth available • Number of users (using the network at the same time) • (Number of) data collisions • Interference / by example e.g. walls • Distance data has to travel / signal strength • Amount of data being transferred • Applications being used • Server/CPU performance • Using a hub instead of a switch 	2 AO1 1a (2)	<ul style="list-style-type: none"> • Do not accept wireless/wired connections • Bod answers such as cable length <p><u>Examiner's Comments</u></p> <p>This question required candidates to consider what other else could affect the performance, other than a wireless versus wired network.</p> <p>There were some excellent responses demonstrating a range of knowledge such as differences in bandwidth, the number of users (and collisions), the type of hardware used and even the topology of the network.</p>
			Total	4	
6			Modem / router	1	Mark first given
			Total	1	
7			<p>1 mark for LAN 1 mark per bullet for justification to max 2</p> <ul style="list-style-type: none"> • Small distance/geographical area by example e.g. same building/house • Connected by own hardware/infrastructure / not connecting through Internet / no hired/third-party infrastructure / dedicated connection 	3 AO2 1a (2) AO2 1b (1)	<p>Do not allow – in a local area, local needs to be quantified in some way.</p> <p>No marks for WAN.</p> <p><u>Examiner's Comments</u></p> <p>Most candidates were able to correctly identify the network as being a LAN. Many of these were also able to justify it based on the size of the network. Fewer candidates were able to justify the network beyond its size. Some candidates looked to the next question and took the idea of the network being wireless or using Ethernet connections as meaning it was a LAN, not understanding that a WAN can also make use of these connections.</p>

			Total	3	
8			<ul style="list-style-type: none"> It is easy to add a new node or device Fewer data collisions can occur If a node or device fails it does not affect the rest of the network A signal does not need to be transmitted to all computers in the network 	2 (AO2 1b)	<p>1 mark to be awarded for each correct reason to a maximum of 2 marks.</p> <p>Any valid comparisons to other topologies can be awarded marks.</p>
			Total	2	
9	a		<p>Two advantages from:</p> <ul style="list-style-type: none"> It would offer additional storage (1) so the firm can take on more cases (1) It is a very efficient method of backing up data (1) and so saves the firm time and money (1) It would allow their employees to work from anywhere (1) so they can take cases from other countries (1) It is environmentally friendly (1) Easy to increase availability of storage (1) You don't need specialist network skills (1) so the firm don't need to employ more staff (1) The third party provides security (1) so the firm saves money on staff and software/hardware (1) The third party provides backup (1) so the firm saves money on staff and software/hardware (1) Cheaper as don't need own infrastructure (1) <p>Each advantage needs to be contextualised to gain 2 marks.</p>	4	<p>1 mark is to be awarded for each correct advantage, with a mark for a discussion of the advantage related to the law firm. To a maximum of 2 advantages.</p> <p>The total number of marks to be awarded for this task is 4 marks.</p> <p>Responses which are not contextualised will gain a maximum of 1 mark per advantage (to a maximum of 2 advantages)</p>
	b		<p>Two disadvantages from:</p> <ul style="list-style-type: none"> You need a constant internet connection (1) which lawyers who travel a lot may not always have (1) Reliant on third party to carry out security procedures (1) but the firm are still legally responsible if things go wrong (1) Reliant on third party for back up connection (1) 	4	<p>1 mark is to be awarded for each correct disadvantage with a mark for a discussion of the disadvantage related to the law firm. To a maximum of 2 disadvantages.</p> <p>The total number of marks to be awarded for this task is 4 marks.</p> <p>Responses which are not contextualised will gain a maximum of 1 mark per disadvantage (to a maximum of 2 disadvantages)</p>

		<ul style="list-style-type: none"> Data stored in the cloud will be vulnerable to hacking and other threats (1) which the firm have no control over (1) Issues regarding data ownership (1) Implications of Data Protection Act (1) <p>Each disadvantage need to be contextualised to gain 2 marks</p>		
	c	<ul style="list-style-type: none"> The computers are geographically remote/ distanced/ more than a mile apart Communication medium is not owned by the law firm 	1	<p>1 mark only to be awarded for a correct definition.</p> <p>Accept responses such as the company doesn't own the infrastructure</p> <p>Do not accept 'Network over a wide area' or similar arrangement of wording</p>
		Total	9	
10		<p>1 mark per bullet to max 5</p> <ul style="list-style-type: none"> The website is hosted on a webserver The website/webserver has an IP address (Browser) sends URL to DNS URL has a linked IP DNS finds IP If DNS cannot find the IP it passes request to higher DNS ...if not found return error IP address sent back to the browser/computer (Browser) sends request to IP/webserver <u>Webserver</u> processes request for the website/webpage ...<u>webserver</u> sends the webpage/file/data to the user 	5 AO1 1b (3) AO2 1b (2)	<ul style="list-style-type: none"> Do not award 'the IP goes to the webserver' Allow domain name in place of URL 'DNS finds the IP of the URL it is given' gets 2 marks, 1 for URL has linked IP and 1 for DNS finds the IP MP 11 do not accept webserver <i>loads</i> the webpage on the user's computer <p>Examiner's Comments</p> <p>This question provided an opportunity for candidates to demonstrating their understanding of the links between URLs and IPs, and how websites are stored on web servers that have a URL and IP address.</p> <p>The better answers gave a detailed explanation of how a URL is converted into an IP address through a domain name server.</p> <p>Some candidates did not explain the relationship, instead giving the purpose of URLs as being user friendly, instead of detailed how it relates to the IP address and web server.</p> <p>Exemplar 5</p>

				<p><i>"OCR" is the domain name of the website, which is easier for the user to remember than an IP address. The domain name server is then used to translate the domain name into its IP address. The computer then sends a request to the webserver hosting the website to send the website with the IP address associated with "OCR", using the http protocol (in this case). The computer then is able to access the website with the domain name: OCR.</i></p> <p><i>* The IP address is used to identify a website / device on the internet. The domain name server stores a log book of each domain name's accompanying IP address.</i></p> <p>This candidate has given a good description of how a website is loaded, with the computer contacting the web server of the website.</p> <p>They have also included (briefly) details about a domain name server being used to convert the domain name into the IP address.</p> <p>Exemplar 6</p> <p><i>The URL is a short substitute for an IP address that is much easier to remember. It was created by a human. When a URL is created, it is assigned to a pre-existing IP address on a webserver somewhere. When a URL is searched for, the IP address that is connected to the URL finds the web server that holds the sites HTML, CSS & JS etc. sends a request the files back to the computer. So when https://www.OCR.org.uk is typed into a search bar, the IP address for this site is used to find the web server that holds the OCR website.</i></p> <p>This candidate begins by describing why a URL is used instead of the relationship between the required parts.</p> <p>They do further down begin to detail how a web server stores the website and that this server sends the website back to the computer.</p>																		
		Total	5																			
11		<p>1 mark per row</p> <table border="1" data-bbox="284 1630 794 2036"> <thead> <tr> <th>Description</th> <th>Ethernet</th> <th>Wifi</th> </tr> </thead> <tbody> <tr> <td>A wired connection</td> <td>✓</td> <td></td> </tr> <tr> <td>More likely to be affected by interference</td> <td></td> <td>✓</td> </tr> <tr> <td>Data can be transmitted at a faster speed</td> <td>✓</td> <td></td> </tr> <tr> <td>Wireless transmission</td> <td></td> <td>✓</td> </tr> <tr> <td>Shorter transmission range before data is lost</td> <td></td> <td>✓</td> </tr> </tbody> </table>	Description	Ethernet	Wifi	A wired connection	✓		More likely to be affected by interference		✓	Data can be transmitted at a faster speed	✓		Wireless transmission		✓	Shorter transmission range before data is lost		✓	5 AO1 1a (5)	0 mark for row with > 1 tick
Description	Ethernet	Wifi																				
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Wireless transmission		✓																				
Shorter transmission range before data is lost		✓																				

					<p><u>Examiner's Comments</u></p> <p>This question was answered well with the majority of candidates getting each answer correct.</p>															
			Total	5																
12			<p>1 mark for each row.</p> <table border="1"> <thead> <tr> <th>Statement</th> <th>True</th> <th>False</th> </tr> </thead> <tbody> <tr> <td>Ethernet is a protocol</td> <td>✓</td> <td></td> </tr> <tr> <td>Ethernet uses wireless data transmission</td> <td></td> <td>✓</td> </tr> <tr> <td>Ethernet can transmit data at speeds of up to 100 Gbits per second</td> <td>✓</td> <td></td> </tr> <tr> <td>Ethernet is a protocol within the TCP/ IP stack</td> <td>✓</td> <td></td> </tr> </tbody> </table>	Statement	True	False	Ethernet is a protocol	✓		Ethernet uses wireless data transmission		✓	Ethernet can transmit data at speeds of up to 100 Gbits per second	✓		Ethernet is a protocol within the TCP/ IP stack	✓		4	2 ticks in 1 row = 0 mark
Statement	True	False																		
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			Total	4																
13			<ul style="list-style-type: none"> • IP addresses can be changed / are allocated as needed • MAC addresses can't be changed / every device has a fixed MC address <ul style="list-style-type: none"> • IP(v4) addresses are 4 bytes long • MAC addresses are 6 bytes long <ul style="list-style-type: none"> • IP(v4) addresses are normally written in denary • MAC addresses are normally written in Hex <ul style="list-style-type: none"> • IP addresses are configured by software • MAC addresses are configured in hardware <ul style="list-style-type: none"> • IP addresses are used for routing across a WAN / internet • MAC addresses are only used within the LAN <p>[marks in pairs, maximum 2 pairs]</p>	4	For bullets 3 and 4, accept answers where candidates refer to IPv6 being 16 bytes (128 bits). Award one mark if candidates state that IP addresses and MAC addresses are of different size.															

			Total	4											
14		i	<p>1 mark per bullet to max 2</p> <ul style="list-style-type: none"> • A layer can be removed/changed etc. • ...without affecting any other layers • Each layer has its own purpose / separates the purposes / self-contained • ...so it does not need to consider what the other layers do • ...so it can be programming individually • Individual protocols are each smaller/simpler to manage • Different layers can interface with different hardware 	<p>2 AO1 1a (1) AO1 1b (1)</p>	<ul style="list-style-type: none"> • Do not award descriptions of what the layers do - the question asks why layers are used. • Do not award vague answers e.g. layers make it easier to work with <p>Examiner's Comments</p> <p>This question was answered well by many candidates who had clearly been taught the purpose of having multiple layers.</p> <p>Candidates commonly responded with the ability to change one layer without impacting any others.</p> <p>Some candidates did not explain why layers are used, and instead gave detailed descriptions of what each layer did, without actually answering the given question.</p> <p>Exemplar 7</p> <p><i>The TCP/IP model uses layers so network engineers can more easily diagnose & fix problems in a network. If there is a problem client side with email for example, the engineers can fix that problem without needing to stray from the application layer.</i></p> <p>This candidate has given the common response of layers being independent, so one can be changed without impacting on the others.</p>										
		ii	<p>1 mark for each protocol.</p> <table border="1"> <thead> <tr> <th>Task</th> <th>Protocol</th> </tr> </thead> <tbody> <tr> <td>Sending an email from one mail server to another</td> <td>SMTP / Simple Mail Transfer Protocol</td> </tr> <tr> <td>Transmitting a file from a client to a server</td> <td>FTP / File Transfer Protocol</td> </tr> <tr> <td>Viewing a website using a web browser</td> <td>HTTP / Hypertext Transfer Protocol HTTPS / Hypertext Transfer Protocol Secure</td> </tr> <tr> <td>Downloading an email to your computer</td> <td>IMAP / Internet Message Access Protocol</td> </tr> </tbody> </table>	Task	Protocol	Sending an email from one mail server to another	SMTP / Simple Mail Transfer Protocol	Transmitting a file from a client to a server	FTP / File Transfer Protocol	Viewing a website using a web browser	HTTP / Hypertext Transfer Protocol HTTPS / Hypertext Transfer Protocol Secure	Downloading an email to your computer	IMAP / Internet Message Access Protocol	<p>4 AO2 1a (4)</p>	<ul style="list-style-type: none"> • Mark first answer in each box <p>Examiner's Comments</p> <p>This question required candidates to apply their knowledge of different protocols to the given tasks.</p> <p>Many candidates were able to correctly identify HTTP/HTTPS and POP/IMAP for the last two boxes.</p> <p>The sending of an email was commonly mistaken for IMAP.</p>
Task	Protocol														
Sending an email from one mail server to another	SMTP / Simple Mail Transfer Protocol														
Transmitting a file from a client to a server	FTP / File Transfer Protocol														
Viewing a website using a web browser	HTTP / Hypertext Transfer Protocol HTTPS / Hypertext Transfer Protocol Secure														
Downloading an email to your computer	IMAP / Internet Message Access Protocol														

			POP(3) / Post Office Protocol		
			Total	6	
15			<ul style="list-style-type: none"> A set of rules for communication 	1 (AO1 1a)	1 mark only to be awarded for a correct definition.
			Total	1	
16		i	<ul style="list-style-type: none"> A division of network functionality 	1	<p>Candidate's responses may differ from the given answer but must represent conceptually the same thing.</p> <p>e.g. "a layer is where jobs/processes are split up" would receive the mark.</p>
		ii	<ul style="list-style-type: none"> It is self-contained (1)... ...it allows different developers to concentrate on one aspect of the network (1) A layer can be taken out and edited without affecting other layers (1)... ...it promotes interoperability between vendors and systems (1) 	2	1 mark to be awarded for the correct identification and 1 for a valid description up to a maximum of 2 marks.
			Total	3	
17		i	<ul style="list-style-type: none"> A division of network functionality 	1 (AO1 1a)	<p>Candidate's responses may differ from the given answer but must represent conceptually the same thing.</p> <p>e.g. "a layer is where jobs/processes are split up" would receive the mark.</p>
		ii	<ul style="list-style-type: none"> It is self-contained (1)... ...it allows different developers to concentrate on one aspect of the network (1) A layer can be taken out and edited without affecting other layers (1)... ...it promotes interoperability between vendors and systems (1) 	2 (AO1 1a)	1 mark to be awarded for the correct identification and 1 for a valid description up to a maximum of 2 marks.
			Total	3	
18		i	<p>1 mark for protocol, 1 mark for description</p> <ul style="list-style-type: none"> FTP / file transfer protocol Uses a client-server model / sends from client to server / sends from server to client 	2 AO2 1b (2)	If protocol wrong, no mark for description

					<p><u>Examiner's Comments</u></p> <p>Many candidates were able to identify the appropriate protocol of FTP. Few candidates were able to explain the function of this protocol. Common answers including redefining it as transferring a file, and not actually the function of it.</p>
		ii	<p>1 mark for protocol, 1 mark for description e.g.</p> <ul style="list-style-type: none"> • HTTPS / hyper text transfer protocol secure • Encrypts the connection/data / Uses SSL/secure socket layer 	<p>2 AO2 1b (2)</p> <p><u>Examiner's Comments</u></p> <p>If protocol wrong, no mark for description</p> <p>This protocol was often identified correctly and many candidates were able to describe its function in encrypting the data to ensure its security. Some candidates gave a description of it showing a padlock on the browser, but this does not explain the function of the protocol.</p>	
			Total	4	