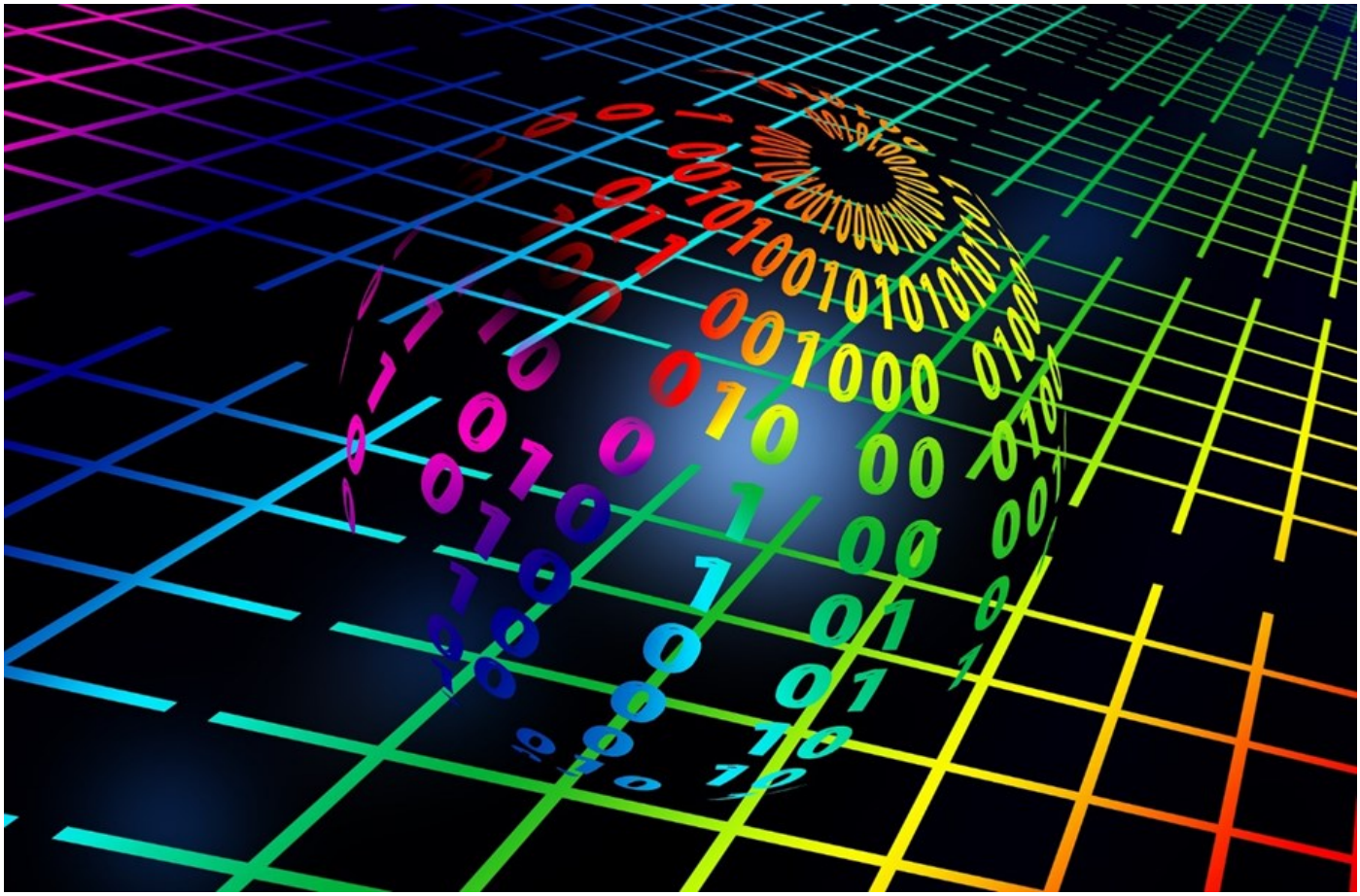
EDULiTO

Network Topologies, Protocols and Layers

Topic Tests



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Topic Test Network topologies, protocols and layers

1. (a) What is meant by network topology? [2]

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b) Two common types of network topology are star and mesh networks. Draw a diagram to show the structure of each type of network. [2]

Star Network	Mesh Network

(c) Outline the advantages and disadvantages of each type of network in the table below. [4]

Type of Network Topology	Description	Advantages	Disadvantages
Star	Nodes linked to a central device hub/switch Used for LANs		
Mesh	Every node links to every other node Commonly used for WANs		

2. (a) What is meant by Wi-Fi frequency? Use the words to fill the gaps in the text. [5]

frequency shorter wireless higher radio

WiFi is a technology that uses …… waves to provide network connectivity.

Wifi provides …… connectivity to your devices by emitting a ……

between 2.4 and 5GHz

In radio waves the …… the frequency the …… the range

(b) Wifi operates on different channels. You can choose the channel so that you get a better connection. Every Wi-Fi network transmits and receives data on a certain frequency, or channel. As Wi-Fi data is digital, many different devices can communicate successfully on the same channel. Complete this table that compares two frequency bands. [6]

Band	**2.4 GHz**	**5 GHz**
Channel	Three non-overlapping channels	23 non-overlapping channels
Standard	Wireless-B, G, and N	Wireless-A, N, and AC
Network Range		
Interference		
Recommended use for home network		

(c) What is Wi-Fi encryption? [2]

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(d) Why is Wi-Fi encrypted? [1]

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3. What is a wired ethernet network? [1]

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4. (a) Explain the meaning of network protocol? [2]

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(b) Complete the first column of this table to show the names of each network protocol.

Protocol Type	Function	Description
1	This is the basic communication language or protocol of the Internet.	Two Layers: Higher Layer -Transmission Control Protocol, manages the assembling of a message or file into smaller packets that are transmitted over the Internet and received by a TCP layer that reassembles the packets into the original message. The lower layer - Internet Protocol, handles the address part of each packet so that it gets to the right destination. Each gateway computer on the network checks this address to see where to forward the message.

2	This is the underlying protocol used by the World Wide Web.	It defines how messages are formatted and transmitted, and what actions Web servers and browsers should take in response to various commands.
3	This is the use of a Secure Socket Layer (SSL) as a sub-layer under regular HTTP applica tion layering.	It encrypts and decrypts user page requests as well as the pages that are returned by the Web server.
4	This is a standard network protocol used to transfer computer files between a client and a server on a computer network.	It is built on a client-server model architecture and uses separate control and data connections between the client and the server.
5	This is a type of computer networking and Internet standard protocol that extracts and retrieves email from a remote mail server for access by the host machine.	It simply downloads email to your computer, and usually (but not always) deletes the email from the remote server.
6	This is an Internet standard protocol us ed by e-mail clients to retrieve e-mail messages from a mail server over a TCP/IP connection.	This allows users to store their email on remote servers. This two-way protocol also allows the user to synchronize their email among multiple devices, which is extremely important today, when most people have at least two devices - their laptop and smartphone.
7	This is an Internet standard for electronic mail (email) transmission.	

5. What is meant by Packet switching? [3]

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<table>
<tr><th colspan="4">Topic Test 1.5 Network topologies, protocols and layers - Mark Scheme</th></tr>
<tr><th>Question Number</th><th>Answer</th><th>Additional Guidance</th><th>Mark</th></tr>
<tr><td>1 a</td><td>In networks, a topology is a diagram that shows the arrangement of a network [1], including its nodes and connecting lines [1].</td><td></td><td>2</td></tr>
<tr><td>1 b</td><td>Diagram to show:
Star network topology- there is a central computer/hub or server to which all the workstations are connected. [1]

Mesh network topology - every node has a connection to every other node in the network.[1]</td><td></td><td>2</td></tr>
<tr><td>1 c</td><td><u>Star Network</u>
Advantages [1]
• Inexpensive
• Easy to install, wire and maintain
• Easier to detect faults
• If a workstation is removed or faulty this does not affect other nodes.
Disadvantages [1]
• If the switch/hub fails the network cannot function
<u>Mesh Network</u>
Advantages [1]
• Does not require switch/hub
• Extremely tolerant when network is damaged
Disadvantages [1]
• Difficult to set up
• Expensive to maintain and trouble shoot</td><td>1 mark from each section. Max4 marks</td><td>4</td></tr>
<tr><td>2 a</td><td>WiFi is a technology that uses radio waves to provide network connectivity. Wifi provides wireless connectivity to your devices by emitting a frequency between 2.4 and 5GHz
In radio waves the higher the frequency the shorter the range</td><td></td><td>5</td></tr>
<tr><td>2 b</td><td><table><tr><td></td><td>2.4 GHz</td><td>5 GHz</td></tr><tr><td>Network Range</td><td>Wider Range [1]</td><td>Shorter Range [1]</td></tr><tr><td>Interference</td><td>Higher[1]</td><td>Lower[1]</td></tr><tr><td>Use for home network</td><td>Recommended for simple internet browsing [1]</td><td>Recommended for media streaming [1]</td></tr></table></td><td></td><td>6</td></tr>
<tr><td>2 c</td><td>Wireless Encryption - encrypts the messages that are sent between your computer’s wireless network adapter [1] and the wireless router. [1]</td><td></td><td>2</td></tr>
<tr><td>2 d</td><td>Wireless Encryption prevents unknown computers from gaining access to your network. [1]</td><td></td><td>1</td></tr>
</table>

3	A network that uses **Ethernet** cables to connect network devices on a LAN. [1]		**1**
4 a	Network protocols are formal standards and policies comprised of rules, procedures and formats [1] that define communication between two or more devices over a network. [1]		**2**
4 b	1 TCP/IP (Transmission Control Protocol/Internet Protocol) [1] 2 HTTP (Hyper Text Transfer Protocol) [1] 3 HTTPS (Hyper Text Transfer Protocol Secure) [1] 4 FTP (File Transfer Protocol) [1] 5 POP (Post Office Protocol) [1] 6 IMAP (Internet Message Access Protocol) [1] 7 SMTP (Simple Mail Transfer Protocol) [1]		**7**
5	It is a mode of data transmission in which a message is broken into a number of parts [1] which are sent independently [1 and reassembled at the destination.[1]		**3** **/35**