



4.9.4.1 TCP IP

1) A company is setting up a website and an online file-sharing service. Users will access the website through a web browser and upload/download files from the server.

a) State the names of **two-application layer** protocols that the server must implement and explain what each will be used for.

Protocol	Purpose
FTP	Used to transfer files between the server and clients.
HTTP/HTTPS	Used to transfer webpages between the web server and clients.

[4 marks]

2) Explain how the **transport layer** of the TCP/IP stack determines which application layer software on the server should deal with a received request.

- The transport layer uses the port number to determine which server/software should deal with the request

[1 mark]

3) Describe the role of the transport layer of the TCP/IP stack in the transmission of an email from a computer to an email server.

- Establish an end-to-end connection
- Perform error detection
- Split data up into segments
- Add port number to the header // Use the port number to pass the data to the correct software in the application layer

[3 marks]





4) Describe **one** function of the **network layer** of the TCP/IP stack.

- Adds source and destination IP addresses to the packets
- Uses routing information to determine where to forward the packet
- Creates a checksum for the packet header // performs error detection on the packet header
- Encapsulating/splitting data into datagrams // reassemble data from datagrams

[1 mark]

5) Explain what a well-known port is **and** why an email server must use one.

- A reserved port number that has a specific purpose // a port assigned by the Internet Assigned Numbers Authority
- The communication is initiated by the sender/client therefore the port number must be the same for all initial email communications

[1 mark]

6) A company uses a file server that stores files on magnetic hard disk drives. These files can be accessed by other computers through a network.

Describe how the individual layers of the TCP/IP stack in the file server would be used to transmit the file onto the network.

In your response, you do **not** need to describe how the file would be transmitted across the network or how the TCP/IP stack would be used in the computer that has requested the file. You only need to write about how the data would be put onto the network by the file server.

[8 marks]

- Four layers of stack are Application, Transport, Network and Link.
- File will be passed down/through each layer in turn.

Application

- File server software will operate in the Application Layer
- File transfer may use FTP protocol

Transport

- Establishes end-to-end connection between file server and computer





- Receives data from the application layer and adds the appropriate source and destination port numbers
- Splits file / data into segments
- Adds checksum to packets // adds error detection information to segment // deals with transmission errors
- Adds sequence number to segments
- May use TCP or UDP protocol

Network

- Adds source and destination IP addresses to packet
- Add time to live to packet
- Uses subnet mask to determine if destination is on same subnet

Link

- Physical interface to network communications medium
 - Uses device drivers // uses network interface card
 - Adds hardware / MAC address of destination / source
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