Chhetri Academy

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GCSE COMPUTER SCIENCE

4.1

Edexcel 1CP2 | Specification point 4.1.8

Characteristics of network topologies (bus, star, mesh)

Untiered

Past paper question booklet

7	2019-2025	Untiered
question groups	available papers	tier

Before you begin

1. Show working and use units where appropriate.
2. Use extra paper if you need more space.
3. Print at actual size (100%) for measurement questions.

Name _____ **Date** _____

Whole questions are retained for context; some parts cover other points. Legacy sources are labelled.

2 A hotel chain stores guest information in a structured database.

(a) Describe how guest information would be structured in a database.

(2)

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(b) The chain has hotels in several countries.

State the type of network needed to connect these hotels to the head office.

(1)

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(c) The hotel chain is considering replacing local backup methods with 'cloud' storage.

Discuss the advantages and disadvantages of using 'cloud' storage for backup.

(6)

(d) Identify the protocol used to transfer data in networks.

(1)

- ☒ **A** HTML
- ☒ **B** TCP/IP
- ☒ **C** ISP
- ☒ **D** URL

(e) Describe a mesh network topology.

(2)

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(Total for Question 2 = 12 marks)

3 Gemma manages a network for an organisation.

(a) Two computers are assigned the same IP address.

Explain why Gemma must change the IP address of one of the computers.

(2)

(b) Identify the network topology that requires a server.

(1)

- ☒ **A** Bus
- ☒ **B** Mesh
- ☒ **C** Ring
- ☒ **D** Star

(c) The network transfers data at 3 Gbps.

Construct an expression to show how many bytes can be transmitted in 10 seconds.

You do not need to carry out the calculation.

(3)

(d) Identify the number of bits in a nibble.

(1)

- ☒ **A** 2
- ☒ **B** 4
- ☒ **C** 8
- ☒ **D** 16

(e) Identify the type of software used to compress files.

(1)

- ☒ **A** Backup
- ☒ **B** Utility
- ☒ **C** Security
- ☒ **D** Network

(f) Identify the email protocol.

(1)

- ☒ **A** FTP
- ☒ **B** HTTP
- ☒ **C** SMTP
- ☒ **D** TCP/IP

(g) State the role of an ISP.

(1)

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(h) A search engine selects information taken from the results of a search for 'Pearson'. The information is displayed here as a 'knowledge graph'.

Pearson
Publishing company

Pearson

pearson.com

Pearson plc is a British multinational publishing and education company.

Stock price: PSON (LON) 927.60 GBX −1.80 (−0.19%)
24 Aug, 16:35 BST – Disclaimer

Headquarters: London

CEO: John Fallon (1 Jan 2013–)

Founder: Samuel Pearson

Founded: 1844

Profiles

Twitter

Identify the property of the data that allows this information to be selected.

(1)

- ☒ **A** Formatted
- ☒ **B** Hyperlinked
- ☒ **C** Structured
- ☒ **D** Virtualised

(Total for Question 3 = 11 marks)

7 A company moves its business online.

(a) Identify **one** way in which a WAN differs from a LAN.

(1)

- ☒ **A** LANs do not transmit data in packets
- ☒ **B** LANs use fibre optic cables
- ☒ **C** WANs are always connected via gateways
- ☒ **D** WANs are always wireless

(b) An employee accesses her work email using a smartphone and a laptop.

Explain why the IMAP protocol is more suitable for this than the POP3 protocol.

(2)

(c) Describe the role of the transmission control protocol (TCP).

(4)

(d) Describe the role of a server in a client-server network.

(2)

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(e) Draw lines to show how all these devices would be connected using a bus topology.

(2)









(Total for Question 7 = 11 marks)

1 Networks

(a) Devices are connected to networks.

(i) Give **two** reasons for connecting computers in a network.

(2)

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2 .....

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(ii) Describe **one** way a local area network (LAN) is different from a wide area network (WAN).

(2)

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(iii) A network has a speed of 17.08 megabits per second.

Identify the equivalent speed in bits per second.

(1)

☒ **A** 17 080

☒ **B** 17 080 000

☒ **C** 17 080 000 000

☒ **D** 17 080 000 000 000

(iv) Define the term 'latency'.

(1)

(b) Data is split up into packets for transmission over a network.

(i) Each device on a network has a unique identifier that is used when sending or receiving packets of data.

State the name of the unique identifier.

(1)

(ii) Identify the item included between the header and the footer in a data packet.

(1)

- ☒ **A** Data being sent
- ☒ **B** Destination address
- ☒ **C** Packet number
- ☒ **D** Public key

(c) Describe how a firewall protects a local area network (LAN).

(2)

(d) State the name of an email protocol.

(1)

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(e) Explain **one** disadvantage of using a star network topology.

(2)

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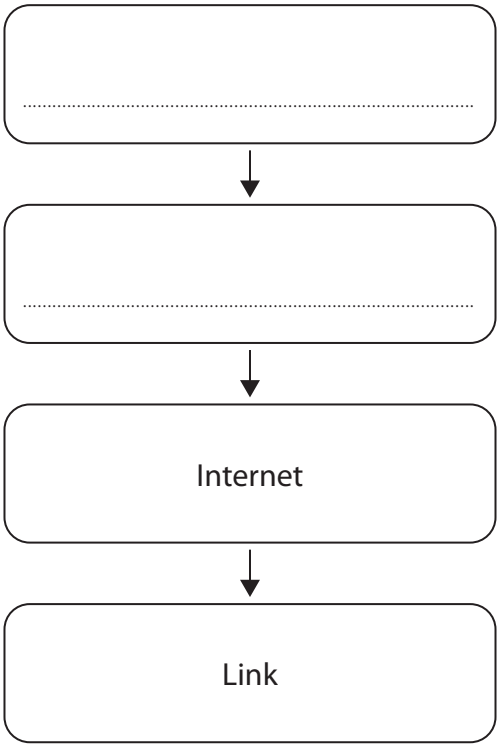
(Total for Question 1 = 13 marks)

2 Networks

(a) Complete the diagram of the 4-layer TCP/IP model.

(2)



(b) Name the network topology that uses terminators to absorb signals.

(1)

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(c) Identify the reason computers are connected in a network.

(1)

- ☒ **A** To improve encryption
- ☒ **B** To prevent hacking
- ☒ **C** To reduce latency
- ☒ **D** To share peripherals

(d) State the network protocol used to request a webpage.

(1)

(e) Explain **one** benefit to a user of using IMAP to access emails.

(2)

(f) A factory has two file servers installed in an office.

A closed-circuit television system monitors the factory.

Explain **one other** method of physical security that could be used to protect the servers.

(2)

(g) Network speed is the current rate of data transmission, measured in bits per second.

Define the term 'bandwidth'.

(1)

(h) High-speed fibre-optic cables form the internet backbone. Routers connect other networks to this backbone.

Describe how a router enables data to arrive at its destination.

(2)

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(Total for Question 2 = 12 marks)

3 Networks

(a) Networks are described in many different ways.

(i) Give the type of network that covers a small geographical area.

(1)

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(ii) Name the characteristic of a wireless network that is measured in metres.

(1)

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(iii) Give **two disadvantages** of a bus network topology.

(2)

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2 .....

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(b) Describe penetration testing.

(2)

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(c) Network protocols control the rules of communication.

(i) Name a network protocol that transmissions from other electrical devices can interfere with and that can be blocked by walls.

(1)

(ii) Name the network protocol used to download a music file from a server.

(1)

(d) Describe how the link layer of the TCP/IP protocol stack works.

(2)

(e) Construct an expression to calculate the transmission rate, in megabits per second, required to transmit a 1.4 gibibyte file in 13 minutes.

You do not need to do the calculation.

(4)

(Total for Question 3 = 14 marks)

4 Networks

(a) A business has one office in New York and one in London.

State the type of network needed to connect the two offices.

(1)

(b) Network protocols govern how data is transmitted between devices.

Complete the table with the network protocol for **each** description.

(3)

Description	Network protocol
Allows two computers to establish a connection across a network	
Allows connection to a network using radio waves	
Allows upload and download of files across a network	

(c) Describe the role of an ethical hacker in network security.

(3)

(d) A business employs 20 people.

Each employee has a laptop.

The business is relocating to a new office building.

Employees need to access resources and connect to the internet.

Discuss the type of network the business should install in its new building.

Your answer should consider:

- transmission media
- network topology.

You do not need to consider cost of materials or installation.

(6)

(Total for Question 4 = 13 marks)