

THEME A: CONCEPTS · A2.1

Network fundamentals

Original practice questions · 34 marks · about 50 minutes · covers A2.1.1–A2.1.5

Instructions. Answer all questions. The maximum mark for this paper is [34 marks]. The marks available are shown in brackets. Parts badged **HL** assess higher level only content; standard level students may leave these out.

1**Total: 6 marks**

A college has a network covering its campus buildings. Some staff also connect to that network from home over the internet.

- (a)** Define the term **local area network** (LAN). **[2]**

- (b)** Describe how a virtual private network (VPN) allows a member of staff at home to work securely on the college network. **[3]**

- (c)** State **one** characteristic of a personal area network (PAN). **[1]**

A family home has several laptops, a games console and a smart television. The home network is connected to an internet service provider.

- (a) Identify the device that converts the signal arriving on the internet service provider's line into a form the home network can use. [1]

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- (b) Describe the function of a switch. [2]

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- (c) Describe the function of a wireless access point. [2]

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- (d) State the function of a network interface card (NIC). [1]

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A student brings a laptop into school, joins the school network, and then opens an online banking page.

- (a) Identify the protocol that automatically gives the laptop an IP address when it joins the network. [1]

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- (b) Explain why the banking page is served over HTTPS rather than HTTP. [3]

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- (c) Outline **one** reason why agreed protocols are necessary on a network. [2]

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4

Total: 6 marks

TCP and UDP are both transport protocols.

- (a) Describe **two** differences between TCP and UDP. [4]

- (b) Explain why UDP is a better choice than TCP for a live video call. [2]

5

Total: 4 marks

A city fits its traffic lights with small computers that analyse camera images where the lights are, instead of sending every image to a distant data centre.

- (a) Outline why the traffic light system is an example of edge computing. [2]

- (b) Explain **one** benefit to the city of processing the images at the traffic lights rather than in the cloud. [2]

The TCP/IP model describes network communication as a set of layers.

- (a) **HL** State the four layers of the TCP/IP model, in order, beginning with the layer closest to the user's application. **[2]**

- (b) **HL** Describe the function of the transport layer. **[2]**

- (c) **HL** Outline how the layers interact when a message is sent from one computer to another. **[2]**

END OF QUESTIONS