

THEME A: CONCEPTS · A2.3

Data transmissions

Original practice questions · 34 marks · about 50 minutes · covers A2.3.1–A2.3.4

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 household has one address supplied by its internet service provider. Inside the house, the router gives each laptop, phone and console its own address.

(a) State the number of bits used in an IPv4 address. [1]

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(b) Outline **one** reason why IPv6 was introduced. [2]

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(c) Distinguish between a public IP address and a private IP address. [3]

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2**Total: 6 marks**

The household's devices all reach the internet through the single address supplied by the provider.

(a) Distinguish between a static IP address and a dynamic IP address. [2]

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(b) Describe how network address translation (NAT) allows all of the household's devices to share one public address. [4]

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A university is connecting two buildings that stand 800 metres apart. Inside each building, staff and students connect to the network without cables.

- (a) Identify the most suitable transmission medium for the link between the two buildings. [1]

- (b) Justify your answer to part (a), referring to **two** factors. [4]

- (c) Outline **one** disadvantage of the wireless connections used inside the buildings, compared with a wired connection. [2]

A student uploads a large video file from a laptop to a server in another country.

- (a) Describe the structure of a data packet. [2]

- (b) Explain how the complete video file is rebuilt correctly at the server, even though its packets may travel by different routes and arrive out of order. [4]

5

Total: 4 marks

Switches and routers both forward data, but they do different jobs.

Distinguish between the role of a switch and the role of a router in packet switching. [4]

6

Total: 5 marks

A company begins with a small local area network in one office, in which an administrator enters every route by hand. Over two years the company grows to eleven offices.

(a) **HL** Describe the process of static routing. [2]

(b) **HL** Explain why dynamic routing becomes more suitable than static routing as the company grows. [3]

END OF QUESTIONS