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An international organization has offices located across several countries. For some of its activities, for example human resource management, it has been decided to adopt a “Software-as-a-Service” (SaaS) solution in order to keep the running costs low.

- (a) Describe the features of SaaS. [3]
- (b) Discuss the limitations of SaaS in relation to security. [6]

Each office makes some data available to external customers through the use of an extranet and allows employees to work from home through a VPN.

- (c) Define the term extranet. [2]
- (d) Distinguish between a VPN and an extranet. [4]

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3. Outline one example of the use of a virtual private network (VPN).

6. Describe how a GPS system can identify the position of a person. [3]

7. Describe one way that the operating system of a networked workstation hides the complexity of the network from the user. [3]

10. Six lawyers and one secretary work together in the same building and are connected via a LAN to a central server. Each has their own workstation.

(a) Outline the concept of the Open Systems Interconnection (OSI) model in communication across a network. [3]

(b) Outline, with an example, the function of protocols. [3]

The secretary deals with booking appointments for clients. New clients are given the first available appointment with any lawyer and returning clients are given the first available appointment with their usual lawyer.

A new customized computer package is bought to deal with appointment making.

(c) Identify the data that needs to be input by the secretary when someone asks for an appointment. [2]

The data on appointments is held as one page for each day.

(d) Describe a suitable data structure to hold the data for one day. [3]

(e) Using the data structure you suggested in (d), outline the steps in a procedure to create an appointment for a client. [5]

May 2016 P1 #12

A college has a high-speed network. The network is accessible to all students and staff through their personal accounts. The network may be accessed by using desktop computers available in the college. When in the college, users can also use personal laptops to connect wirelessly or dock with an Ethernet cable. When not in the college, users can connect via a virtual private network (VPN) over the internet.

- (a) In the given context, distinguish between Ethernet and wireless in terms of reliability of transmission. [4]
- (b) Describe two features of a VPN that make it secure. [4]
- (c) State one technology that is necessary for a VPN. [1]

The college is devising a policy for the use of its IT resources and services. They are considering prohibiting the use of external services such as cloud storage and blogs.

- (d) In relation to the specific activities that may be carried out by students, discuss two advantages and two disadvantages of the use of external services. [6]

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Nov 2017 HL P1 #11

A wireless local area network (WLAN) is used to extend access to a school's wired local area network.

- (a) Identify one hardware component of the WLAN, other than computers. [1]  
The advantages of this WLAN are user-mobility and economical access points.
- (b) Outline two disadvantages of this WLAN. [4]
- (c) Identify three ways in which the network administrator can reduce the risk of unauthorized access to confidential data. [3]

The concept of packet data transmission is used within this network. Figure 1 shows the simplified structure of a data packet.

**Figure 1: The structure of a data packet**

| Header (12 bytes)                                                                                                                                            | Data (112 bytes)                        | Trailer / Footer (4 bytes)                                                                                                               |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"><li>• address of sender</li><li>• address of receiver</li><li>• protocol</li><li>• sequence number</li><li>• ...</li></ul> | Actual data to be transmitted (payload) | <ul style="list-style-type: none"><li>• transmission codes</li><li>• error checking codes</li><li>• control bits</li><li>• ...</li></ul> |

- (d) Define the term protocol. [1]
- (e) With reference to Figure 1, explain how data is transferred by packet switching. [6]