

2. (a) (i) **Define the term *IP address*.** [2 marks]

*Award [1 mark] for any of the points below up to a maximum [2 marks].*

- *Internet Protocol address*
- *A unique number that identifies a resource on a network*
- *would be written as 36.134.200.5 for example.*
- *consists of 4 octets*
- *each octet consists of 8 bits / 1 byte*
- *each octet contains a number from 0–255*
- *octets are separated by dots*

(ii) **Describe the relationship between the server and a client in a network.** [2 marks]

- *Client-server identifies the relationship between two different network components/computers, i.e. the client program on the computer requests services, and the server program provides those services.*

*Award [1 mark] for a statement that correctly identifies both of the network components i.e. client machine and server machine, and award [1 mark] for correctly identifying the relationship between the two different network components/computers. For example, the client requests services and the server provides them. Award a maximum of [2 marks] for the response.*

(iii) **Identify *two* steps a DNS server takes to help a user locate a particular web page.** [2 marks]

*Answers may include the following steps:*

- *DNS server stores IP addresses and equivalent domain names*
- *user enters (easy to remember) domain name/URL in their browser*
- *DNS server looks up IP address*
- *DNS server substitutes IP address for the domain name.*

*Award [1 mark] for each correct step identified up to a maximum of [2 marks].*

**(b) (i) Explain *one* reason why a user may use more than one web browser. [2 marks]**

*Answers may include the following reasons. Specific examples need to be included in the explanation.*

- web browsers differ in facilities/capabilities offered (specific facility/capability required in the response)
- users need to access company websites using the recommended web browser
- some web browsers have better security
- some web browsers have useful/different add-ons
- some web browsers are open source and can be modified.

*Award [1 mark] for each type of appropriate reason identified, and [1 mark] for the explanation of that reason up to a maximum of [2 marks].*

**(ii) Explain *two* reasons why the illegal copying of music on a P2P network is more difficult to prosecute than that on client-server networks. [4 marks]**

*Answers may include the following reasons:*

- no single location for the illegal files, therefore cannot identify single IP address
- source may be different each time user accesses resource so difficult to know who to pursue
- users may be online only for a short time so it cannot be determined if they are guilty
- more legitimate traffic on users' computers so more difficult to identify illicit material.

*Award [1 mark] for each appropriate reason identified up to a maximum of [2 marks], and [1 mark] for an appropriate explanation of each reason up to a maximum of [2 marks]. Award a maximum of [4 marks] for the answer.*

- (c) A company is based at various geographical locations. The senior managing team is considering the use of web-based P2P networking in order to make business-related files available to its staff. To what extent would this be an effective way to share its business data?

[8 marks]

*Answers may include:*

**Advantages**

- In a pure P2P architecture there is no single point of failure; that means, if one peer breaks down, the rest of the peers are still able to communicate.
- P2P provides the opportunity to take advantage of unused resources such as processing power for computations and storage capacity. In client-server architectures, the centralized system bears the majority of the cost of the system. In P2P, all peers help spread the cost.
- P2P can prevent bottlenecks such as traffic overload using a central server architecture, because P2P can distribute data and balance request across the net without using a central server.
- There is better scalability due to a lack of centralized control and because most peers interact with each other.

**Disadvantages**

- Today, many applications need a high security standard, which is not satisfied by current P2P solutions.
- The connections between the peers are normally not designed for high throughput rates, even if the coverage of ADSL and cable modem connections is increasing.
- A centralized system or a client-server system will work as long as the service provider keeps it up and running. If peers start to abandon a P2P system, services will not be available to anyone.
- Most search engines work best when they can search a central database rather than launch a meta search of peers.
- Most networks using client-server architecture will have a network manager assigned to the maintenance of the network. A P2P network may be managed on an ad-hoc basis.
- Many business-related files need to be updated by a variety of employees. If copies of files are allowed to proliferate with a loss of control over updating, then serious problems will ensue.

*In part (c) of this question it is expected there will be a balance in the ITGS terminology between IT technical terminology and the terminology related to social and ethical impacts.*

*Please see generic markband information sheet on page 18.*