**Tutorial 10: Application Layer**

Q1. The functionality of the application layer in X model fits roughly into the top three layers of the OSI model. Draw the Table 1 and answer the item (1) to item (4) in your answer booklet. (201605 TAR UC, resit) (2 marks)

| OSI model | (4) \_\_\_\_\_\_X model\_\_\_\_\_\_\_\_ |
| --- | --- |
| (1) **Application Layer** | Application layer |
| (2) **Presentation Layer** |
| (3) **Session Layer** |

Table 1: Networking Model

Q2. XYZ Company plans to implement a new application in its network that is able to connect the local mail server for sending and receiving daily emails to their clients. What are the TWO (2) types of protocols and their respective port numbers that are essential in developing the new application? (201603 TAR UC, resit) (4 marks)

* SMTP in TCP Port 25
* POP2 in UDP Port 110

Q3. Describe how the DNS works by using the destination address: www.cisco.com. (201603 TAR UC, resit) (8 marks)

* First, a domain name or URL (www.cisco.com) is entered in the address field of the browser. The browser passes the name to the resolver.
* Secondly, the resolver sends the DNS request to the DNS server.
* Thirdly, the server then searches its records and resolves the name with a corresponding IP address
* Lastly, the DNS server then sends the IP address back to the client that made the request. The IP address will be used in the encapsulation process as the destination address for packets going to www.cisco.com.

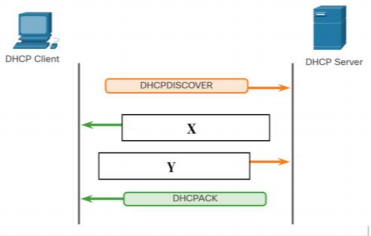
Q4. Based on the diagram illustrated in Figure 3, answer the following questions. 

Figure 3: DHCP Operation

a) Name and explain the X and Y operation. (6 marks)

* **X**: DHCPOFFER - A DHCP Server replies with a DHCPOFFER message
* **Y**: DHCPREQUEST - The client will send a DHCPREQUEST message to the server it wants to use (in case of multiple offers)

b) Hosts can run multiple network applications such as email, games, word processor and video call simultaneously, but messages still get to the right application. For example, email messages do not display in the middle of your video call conversation. Discuss why messages can reach the right application. (4 marks)

* Transport layer will identify the application by ensuring that even multiple applications such as email, games, word processor and video call run simultaneously on a device, all applications can receive the correct data.

c) **HTTP** and **SMTP** are the two protocols used in computer networks.

(i) In which layer would you find them? (1 mark)

* Application Layer

(ii) Differentiate between them. (4 marks)

| **SMTP** | **HTTP** |
| --- | --- |
| - By default, SMTP uses port 25 | - By default, HTTP uses port 80 |
| - It is a **push protocol**, i.e., the sending mail server pushes the data onto the receiving mail server by initiating a TCP connection.​ | - It is a **pull protocol**, i.e., a client pulls the information available on a server by initiating a TCP connection. |

(iii) Will you use HTTP protocol on websites for online selling? Justify your reasons. (5 marks)

* No. This is because HTTP protocol is insecure
* HTTP data is not being encrypted which means that these data can be easily intercepted by third parties to gather data between two systems.
* Customer’s sensitive financial information such as bank account password when processing payment in the online website might be hacked by the hacker if using HTTP protocol
* We should use authentication and encryption to secure data by using HTTPs