TAITA TAVETA UNIVERSITY

SCHOOL: BUSINESS ECONOMICS AND SOCIAL SCIENCES

DEPARTMENT: BUSINESS MANAGEMENT AND SCIENCES

COURSE: BPSM 4

TASK: C.A.T (20 marks)

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REG.NO:TU01-BE211-0165/2016

a. Compare the OSI model and the TCP/IP model

The OSI Model stands for Open System Interconnection and refers to a logical and conceptual model that defines network communication used by systems open to interconnection and communication with other systems.

TCP/IP model on the other hand stands for Transmission Control Protocol/INternet Protocol and its purpose is to define how a specific computer should be connected to the internet and how to transmit data between them. It helps in creation of a virtual network when multiple networks are interconnected together.

The main difference between the OSI model and the TCP/IP model is that the TCP/IP model is a protocol-oriented standard whereas the OSI model is based upon functionalities of each layer.

b. Define the five (5) layers involved in planning a traditional network.

The layers involved in planning a traditional network include:

1. Business planning - This layer determines the planning that the operator must perform to ensure that the network will perform as required for its intended life span.
2. Long-term and medium-term network planning
3. Short-term network planning

   This whole planning process (Long-term, medium-term network planning and short-term network planning) involves the acquisition of external information. This information includes forecasts on how the network being planned for will operate, economic information concerning cost implication and the technical details of the network capabilities.

   This layer involves three major steps:

   (i) Topological design - This stage involves determining where to place the components and how to connect them.

   (ii) Network-synthesis: This stage involves determining the size of the components used, subject to performance criteria such as the Grade of Service (GoS).

(iii) Network realization: This stage involves determining how to meet capacity requirements, and ensure reliability within the network.

4. IT asset sourcing - This stage involves determining all the necessary materials needed in the network will be acquired from either for quality purposes or to save cost..

5. Operations and Maintenance - This layer examines how the network will run on a daily basis

c. Describe advantages of bus topology.

1. It is easy to understand bus topology since it consists of a single cable with a terminator at each end. All present nodes are connected to this single cable.

2. Bus topology is easy to expand just by connecting nodes. There is no limit of the number of nodes that can be attached to this network.

3. Bus topology is cheap since the cable costs less expensive compared to other network topologies.

4. Bus topology is reliable. Incase of a network failure there will be no effect on other devices or even the network.

d. Define data link layer stating its functions.

A data link layer can be found in the OSI model (second layer) and it is responsible for the conversion of data stream to signals bit by bit and sending of the converted data stream to the underlying layer. At the receiving end, the Data link layer picks up data from hardware which are in the form of electrical signals, assembles them in a recognizable frame format, and hands it over to the upper layer.

Functions of the data link layer:

(i) Access control - When two or more devices are connected to the same link, data link layer protocols are necessary to determine which device has control over the link at any given time.

(ii) Physical Addressing - If frames are to be distributed to different systems on the network, the data link layer adds a header to the frame to define the sender and/or receiver of the frame.

(iii) Framing - The data link layer divides the stream of bits received from the network layer into manageable data units called frames.

 (iv) Flow Control - The data rate must be constant on both sides else the data may get corrupted. This is made possible by the data link layer.

(v) Error control - The data link layer handles errors by adding a trailer to the end of the frame to detect and retransmit damaged or lost frames.