Faculty of Computing and Technology

Department of Computing

Bachelor of Information Technology

End - Semester Examination

Year 2024, Semester 03 – Batch 04

BIT 2101 - Data Communication and Computer Networks

Duration: 03 Hours

Instructions to the candidates:

1. **Answer ALL questions.**

2. Illustrate your answers with clear diagrams wherever applied.

3. The paper is marked out of 100 Marks.

4. Follow the General Guidelines given by the Department of Examination.

Question 01

A. Define the term 'network'.

[2 marks]

B. Describe three main types of data transmission.

[3 marks]

C. Illustrate Data Communication System Components with suitable diagram.

[5 marks]

D. Examine the difference between POTS and new telephone service.

[10 marks]

[Total = 20 marks]

Question 02

A. State four network topologies.

[4 marks]

B. Explain peer-to-peer architecture and client/server architecture using suitable diagram.

[4 marks]

C. Demonstrate CSMA/CD with steps.

[5 marks]

D. Investigate the difference between **Switch** and **Hub**.

[7 marks]

[Total = 20 marks]

Question 03

A. State three (3) Transmission Problems in networking.

[3 marks]

B. VLAN plays a crucial role in networking alongside various protocols. The following two questions are centered around VLAN, accompanied by the utilization of two key networking protocols.

    i.   Define what is ICMP and ARP.

[2 marks]

    ii.   Describe how VLAN supports in data communication

[2 marks]

C. Imaging you are the network manager in Saegis Campus. You suppose to create new computer laboratory with five (5) computers. All computers need to access the internet with high security. Illustrate the diagram with relevant connections by mentioning all the devices you need.

[6 marks]

D. Explain the advantages and disadvantages of using fiber optic cables with its side view sketch.

[7 marks]

[Total = 20 marks]

Question 04

A. State two (2) IP classes with their first octet decimal range.

[2 marks]

B. Describe what is Subnetting.

[3 marks]

C. Illustrate how to convert 192.168.1.45 IP address to binary.

[3 marks]

D. IP addresses are fundamental components of networking. The following two
questions focus on IP addressing as a central theme.

    i.   Examine the given IP address 192.168.15.45 with a subnet mask of /25
to determine the number of networks it can be divided into, the IP
address range within each network, and the maximum number of hosts
allowed in each network. After that mention the Broadcast IP and
Network IP in each network.

[6 marks]

    ii.   Investigate below networks into single network.
- 192.168.0.0/24
- 192.168.1.0/24
- 192.168.2.0/24
- 192.168.3.0/24
- 192.168.4.0/24
- 192.168.5.0/24

[6 marks]

[Total = 20 marks]

Question 05

A. List down seven (7) OSI layers.

[3 marks]

B. Describe the difference between UDP and TCP

[4 marks]

C. Illustrate NZR-I encoding for 0101011001 bit pattern.

[5 marks]

D. Explain three (3) main Key Functions in Data Link Layer.

[8 marks]

[Total = 20 marks]

************** END OF THE PAPER ******************