GENERAL SIR JOHN KOTELAWALA DEFENCE UNIVERSITY
Faculty of Engineering
Department of Electrical, Electronic and Telecommunication Engineering

B.Sc. in Electronic and Telecommunication Engineering Degree

End Semester Examination – May 2022
Intake 37

COMMUNICATION NETWORKS
(ET 3102)

Time allowed: 2 hours

04th May 2022

ADDITIONAL MATERIAL PROVIDED

Nil

INSTRUCTIONS TO CANDIDATES

This paper contains 4 questions on 5 pages.

Answer ALL questions.

This is a closed book examination.

This examination accounts for 70% of the module assessment. A total maximum mark obtainable is 100. The marks assigned for each question and parts thereof are indicated in square brackets.

If you have any doubt as to the interpretation of the wordings of a question, make your own decision, but clearly state it on the script.

Assume any reasonable values for any data neither given in nor provided with the question paper, clearly make such assumptions made in the script.
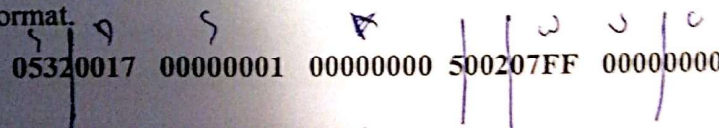
All examinations are conducted under the rules and regulations of the KDU.

Question 01

1. Explain the key benefits of the layered network. [4 marks]

2. Analyze each of the following networks and compare the consequences if a connection fails.

   a. Six devices arranged in bus topology.

   b. Four devcies arranged in ring topology.

   c. Five devices arranged in mesh topology. [6 marks]

3. Discuss the concequences would happen to data if these functions are different at the destination host from those set at the source host. [5 marks]

4. Why error checking is required aat transport level and justify your answer with an example. [5 marks]

5. Defend the requirment of link layer switch to connect between two isolated hosts for the communication. [5 marks]

Question 02

1. Sketch TCP Header format. [4 marks]

2. Determine the following with reference to the given dump of a TCP header in Hexadecimal format.

   05320017 00000001 00000000 500207FF 00000000

   a. Source Port Number.

   b. Destintion Port Number.

   c. Acknowledgement Number.

   d. Length of Header.

   e. Type of Segment. [5 marks]

3. Suppose Host A sends two TCP segments back to back to Host B over a TCP connection. The first segment has sequence nuber 700; the second has sequence number 850 with 200

bytes of data, The MSS is 512. The last acknowledgement number received by Host A was 500 with window size 2000. Until another ACK is received: [12 marks]

a. Find the new value of sendbase.

b. How much data is in the first segment ?

c. What is the last byte number that can be sent by Host A so that Host B's buffer will not overflow?

d. How many bytes can be sent after the last segment sent by Host A to Host B which will not result in buffer overflow?

4. Briefly expalin what is silly window syndrom. [4 marks]

Question 03

1. Briefly explain classfull and classless IP addressing. [4 marks]

2. An organization is granted the block 125.238.0.0/16. The administrator wants to create 512 sub nets. [6 marks]

   a. Determine the subnet mask required.

   b. Calculate the number of addresses in each subnet.

   c. Identify the first and last allocatable address in subnet 1.

   d. Identify the first and last allocatable address in subnet 14.

3. Ipv4 address exhaustion is the depletion of the pool of unallocated Ipv4 addresses. If you have been assigned in to the role of network administrator, plan your solution to enable 1000 employees to be connected to the Internet for a company with Class C address. [5 marks]

4. Given the IPV6 address 3001:acd:5230::/48, apply subnetting in order to create the network given in figure Q3 with the host requirements shown. [10 marks]
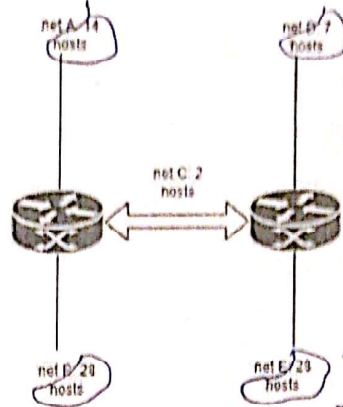
3001.acd.5230.0.0.0.0.0.0/48

3001.acd.5230.0.0.0.0.0/48

Figure Q3

Question 04

1. Compare the fatures of Distance Vector and Link State routing protocols. [5 marks]

2. Design a routing table for the DSL router that connects a Class C home network with ID 192.168.25.0 to the Internet. [5 marks]

3. Summerize the OSPF implementention in IP network with suitable example. [5 marks]

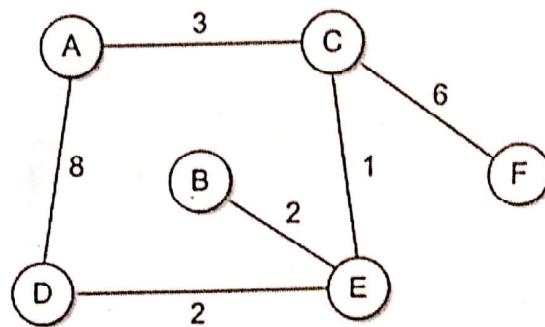4. For the network given in the following figure Q4, construct the datagram forwarding table for each node. Note that links are labeled with relative costs. [10 marks]

Figure Q4

- End of Question Paper -