

University of Ruhuna - Faculty of Technology

Bachelor of Information and Communication Technology

Level 2 (Semester 2) Examination - April 2019

Course Unit: ICT2223 Computer Networks (Theory)

Answer all four (04) questions

Time: 2 hours

1.

- a)
 - I. State two (02) reasons for using a layered architecture in network protocol design.
 - II. List the seven (07) layers of the OSI model in the correct order.
 - III. Briefly describe the functions of each layer.
- b)
 - I. Change the following IPV4 address from binary notation to dotted decimal notation.
11000001 00001001 00001011 11101111
 - II. Change the following IPV4 address from dotted decimal notation to binary notation.
193.129.27.252
 - III. Write the shortest form of the following IPV6 address.
2340: 0000: 0000: 2222: 0000: 1192: 0063: 0000
- c) Briefly explain the difference between broadcast and the point to point link.
- d) Explain two (02) advantages and two (02) disadvantages of the ring topology.

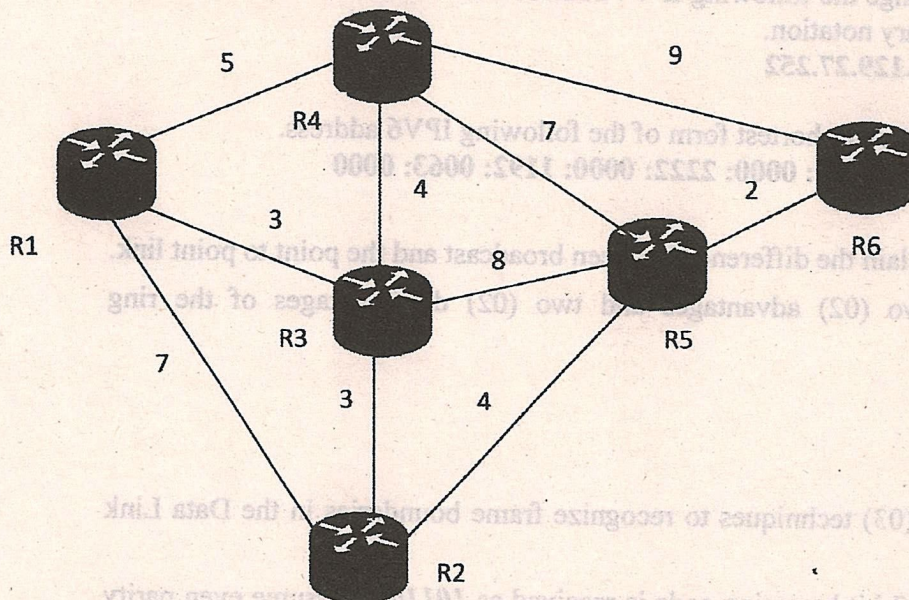
2.

- a) List three (03) techniques to recognize frame boundaries in the Data Link layer.
- b) Suppose a 7-bit hamming code is received as **1011011**. Assume even parity and state whether the received code is correct or incorrect. If it is incorrect locate the bit in error.
- c) Briefly explain the following protocols in the data link layer.
 - I. Unrestricted Simplex Protocol
 - II. Simplex Protocol for Noisy Channel

- d) Define two (02) types of satellites and briefly explain them.
- e) I. Briefly describe two (02) functionalities of the Domain Name Services (DNS)
- II. List two (02) protocols for each of the following layers in TCP/IP model
- Network layer
 - Transport layer
 - Application layer

3.

- a) Explain **FDM** and **TDM** multiplexing schemes using suitable diagrams.
- b) Briefly explain the following protocols in MAC sublayer.
- I. Random Access Protocol
 - II. Controlled Access Protocol
- c) Describe the two (02) advantages of *static routing* over *dynamic routing*.
- d) Explain two (02) main functions of the router.
- e) Consider the following topology with distances and find the shortest path between router 1(R1) to router 5(R5) by using *link state routing algorithm*. Give your steps in a table.



4.

- a) I. Match each IP address with the appropriate term.

Term	IP Address
CIDR notation	255.255.255.0
Subnet Mask	192.138.1.0
Network Address	192.138.1.255
Broadcast Address	/24

- II. A block of addresses is granted to a small organization and one of the addresses is *202.16.37.39/28*
What is the first and last address of the block?
- b) An organization is granted the block *192.168.1.0/24*. The administrator wants to create four (04) equal size subnets.
- I. Find the subnet mask.
II. Find the first and last address of subnet 1.
III. Find the first and last address of subnet 4.
- c) You asked to subnet the *193.168.2.0/24* IP address block to the following subnets.

Subnet	Number of hosts
Subnet One	16
Subnet Two	46
Subnet Three	2
Subnet Four	10

Write down each subnet in CIDR form and each subnet first and broadcast IP that can be assigned to hosts.

- d) Briefly describe the difference between connection-oriented and connection-less services.

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