

**ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)**  
**ORGANISATION OF ISLAMIC COOPERATION (OIC)**

**Department of Computer Science and Engineering (CSE)**

**SEMESTER FINAL EXAMINATION**

**SUMMER SEMESTER, 2018-2019**

**DURATION: 3 Hours**

**FULL MARKS: 150**

**CSE 4839: Internetworking Protocols**

**Programmable calculators are not allowed. Do not write anything on the question paper.**

There are **8 (eight)** questions. Answer any **6 (six)** of them.

Figures in the right margin indicate marks.

1. a) List four access technologies. Classify each one as residential access or enterprise access. 5  
 b) Discuss the 'nodal delay' at any router  $x$  in packet-switched networks. 10  
 c) Consider sending a 2400-byte datagram into a link that has an MTU of 700 bytes. Suppose the original datagram is stamped with the identification number 422. How many fragments are generated? What are the values in the various fields in the IP datagram(s) generated related to fragmentation? 10
2. a) Compare and contrast the connectionless service and connection-oriented service. 7  
 b) Using Figure 1, show the link state update/router link advertisement for router A. 11

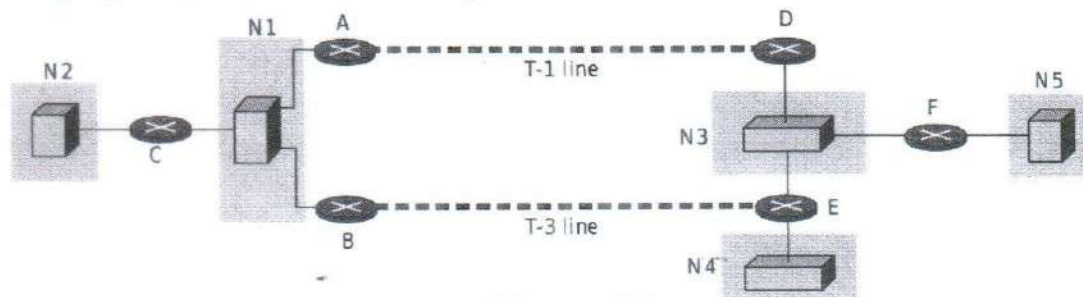


Figure 1: Network for Question 2 (b)

- c) Find the shortest path tree for node G in Figure 2. 7

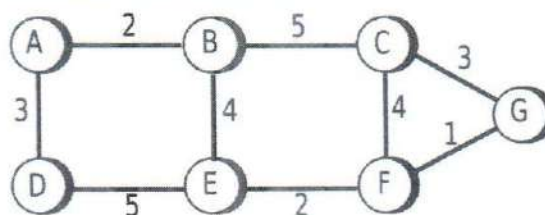


Figure 2: Network for Question 2 (c)

3. a) List the pros and cons of *Routing Information Protocol (RIP)* and *Open Shortest Path First (OSPF)* routing. 7  
 b) How does the different *Link State Update packets* together advertise the complete state of an autonomous system? 12  
 c) Mention the purpose of following messages: 6
  - i. OSPF Database description message
  - ii. BGP Notification message

4. a) Discuss how a hierarchical organization of the Internet has made it possible to scale to millions of users. 8
- b) Consider the *Autonomous Systems* (ASs) depicted in the Figure 3 and draw the stabilized and aggregated routing tables for the router R2 and router R3 using *Path-Vector Routing*. Let, each ASs has already shared their reachability list with each other. 10

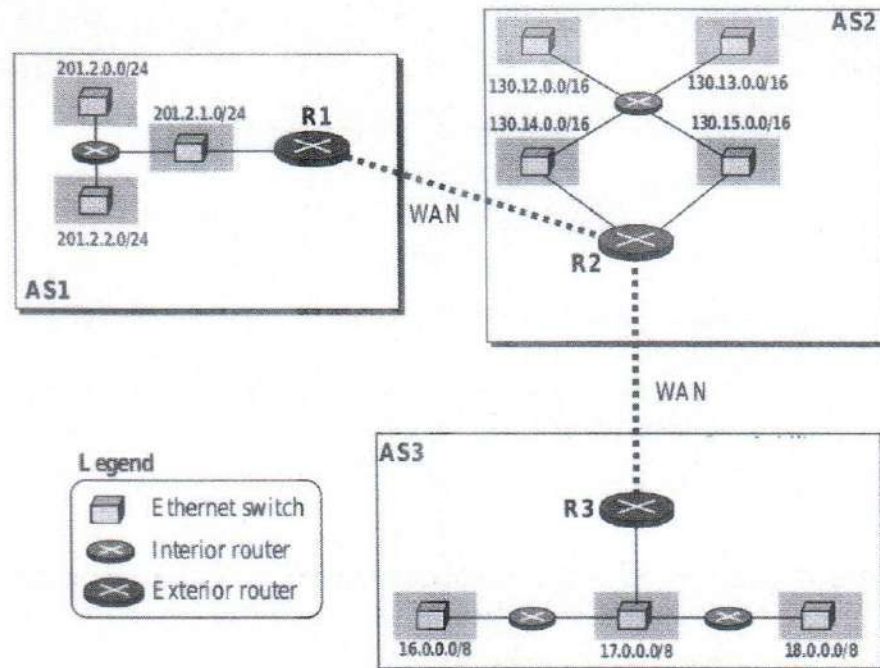


Figure 3: Network for Question 4 (b)

- c) Draw a diagram to show the position of *IGMP*, *ICMP*, *ARP* and *IP* protocols in *OSI model*. 7
5. a) What is the structure of *Uniform Resource Locator* (URL)? 5
- b) Does *reverse-path forwarding* (RPF) actually create a shortest path tree? 4
- c) In Figure 4, find the multicast routing tables for routers R3 and R4. 8

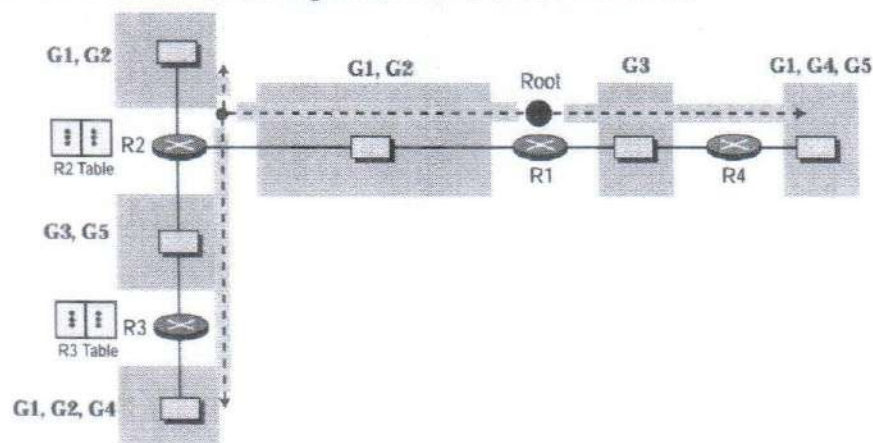


Figure 4: Network for Question 5 (c)

- d) What is *Virtual Private Network* (VPN)? Mention the role of '*IPSec protocol*' in '*VPN*'. 8
6. a) Briefly discuss the role of *Session initiation Protocol* (SIP) and *H.323* protocol in *Voice over IP* (VoIP). 6
- b) Define the *Flow characteristics* and *Quality of Service* (QoS) issues. 7
- c) List the four common techniques to improve QoS. 4
- d) The '*Token Bucket*' traffic shaping algorithm allows idle hosts to accumulate credit for the future in the form of tokens. Justify the claim. 8

7. a) Compare and contrast the *Stream Control Transmission Protocol* (SCTP) and *User Datagram Protocol* (UDP). List the services offered by SCTP. 10
- b) A leaky bucket used to control the liquid flow has an input burst of 100 gallon/minute for first 12 seconds, and there is no input for next 48 seconds. How many gallons of liquid are left in the bucket if the output rate is 5 gallon/minute? 7
- c) When do we need to use NAT? 4
- d) Why do you need a DHCP server? 4
8. a) Mention the inefficiency in mobile IP. 7
- b) How does a mobile host communicate with a remote host? Show the idea with the aid of appropriate diagram(s). Mention the role of '*proxy ARP*' in this process. 12
- c) We have the following information shown below. Fill the i) *source IP address* and ii) *destination IP address* fields of the *IP datagram header* sent from the remote host to the home agent. 6
- Mobile host home address: 130.45.6.7/16
- Mobile host care-of address: 14.56.8.9/8
- Remote host address: 200.4.7.14/24
- Home agent address: 130.45.10.20/16
- Foreign agent address: 14.67.34.6/8