United International **University** (**UIU**)

Dept. of Computer Science and Engineering (CSE)

Final Assessment Year: **2022** Semester: **Summer**

Course: **CSE 323/CSE 3711/EEE 4413** Title: **Computer Networks**

Marks: **40** Time: **2 Hours**

[Any examinee found adopting unfair means will be expelled from the trimester/program as per UIU disciplinary rules.]

There are **3 (Three)** questions. Answer **all 3 (Three)** questions. All questions are of values indicated on the right-hand margin.

Q1. a) In case of TCP, what is the difference between flow control and congestion control? **[2]**

b) In case of a TCP connection, the sender sends three segments of data with sequence number 90, 100 and 110 where each segment size is 10 bytes. The sender receives, three ACKs with 100 ("***triple duplicate ACK***"). Explain the action taken by the sender with a sequence diagram. **[3]**

c) In case of TCP congestion control, explain additive increase and multiplicative decrease with a simple diagram. **[3]**

d) Suppose, Host **A** sends packets to **Host B** using **Go-back-N** protocol, where window size, **N = 3**. Now, in the middle of transmission **PKT2**, **PKT4** and **PKT6** got lost. Show the sequence diagram for the entire scenario of sender and receiver until the 8th packet is received successfully by the receiver. **[3]**

Q2. a) How does logically centralized control plane (i.e., SDN approach) reduce the tasks of the routers? Explain briefly with a diagram. **[3]**

b) A datagram of **4,500 bytes** arrives at a router that should be forwarded to a link with an **MTU** of **1,300 bytes**. Suppose the original datagram is stamped with an **identification number** of **559**. Assume that the size of the **IP header** is **20 bytes**. With a diagram show different fragments including the length, ID, fragflag and offset values. **[3]**

c) i. How does DHCP client discover the DHCP server inside a network? **[3]**

ii. DHCP runs over which one: TCP or UDP? justify your answer briefly. **[2]**

d) A compressed **IPv6** address, after omitting leading zeros and with double colon is written like this: **2001:db8:0:1111::200**. What would be its full preferred form? **[2]**

e) Given a network diagram (Fig. 1.) as a graph $G = (N, E)$, where ***N*** is the set of routers and ***E*** is the set of links, use **Dijkstra's link-state routing algorithm** to compute the **least cost path** from **node B** to all other nodes and show the **resulting least-cost-path tree** from **B**. Show all calculations to get full credit. **[4]**

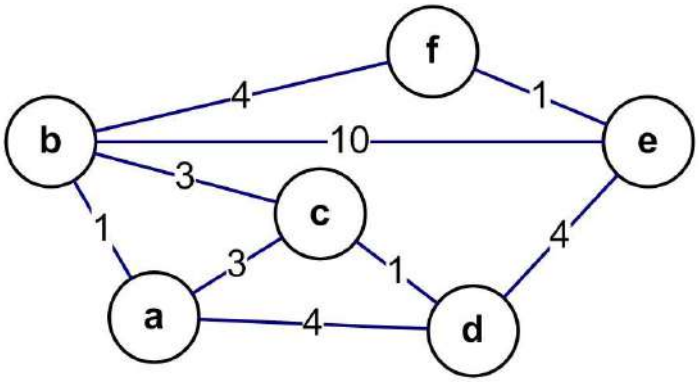

Fig. 1.

Q3. a) Briefly describe CSMA/CD protocol's working mechanism? **[3]**

b) What are the three broad classes of MAC protocols? Briefly describe each one. [*Hint: writing the basic working mechanisms would suffice*]. **[3]**

c) What are the link layer services? Describe. **[3]**

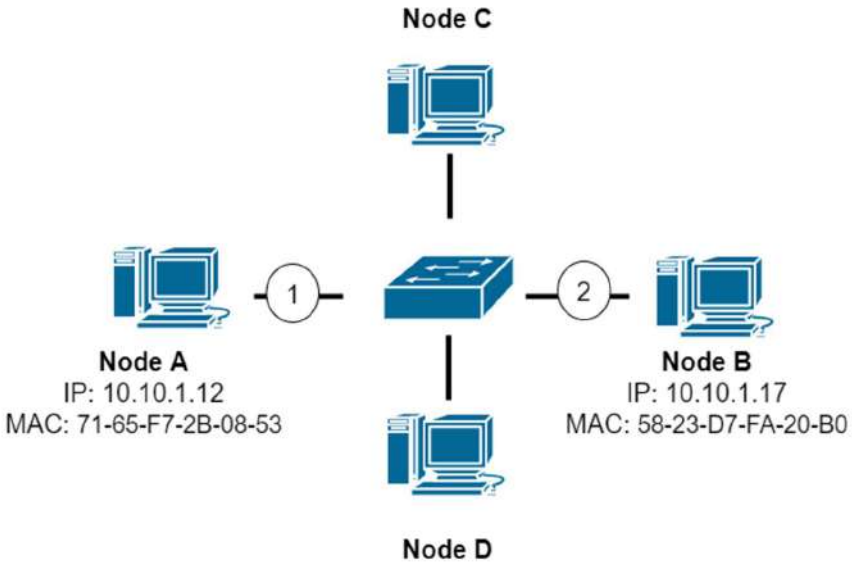

Fig. 2.

d) Referring to the above figure (Fig. 2.), consider that **node A** wants to send datagrams to **node B**. Describe the produces to show how **node A** is going to determine the **MAC address** of **node B** using **ARP** protocol, if **node A** knows **node B's IP address** only. **[3]**

---------- **END of Question** ----------