B.Sc. TE (1-Yr) 1st Semester
B.Sc. TE (2-Yr) 3rd Semester

L88

19 March 2018 (Afternoon)

ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)
ORGANISATION OF ISLAMIC COOPERATION (OIC)
Department of Computer Science and Engineering (CSE)

MID SEMESTER EXAMINATION — **WINTER SEMESTER, 2017-2018**
DURATION: 1 Hour 30 Minutes — **FULL MARKS: 75**

CSE 4773: Internetworking Protocols

Programmable calculators are not allowed. Do not write anything on the question paper.
There are **4 (four)** questions. Answer any **3 (three)** of them.
Figures in the right margin indicate marks.

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1. a. What advantage does a circuit-switched network have over a packet-switched network? What advantages does ***TDM*** have over ***FDM*** in a circuit-switched network? 4+2

   b. What is the difference between nodal delay and end-to-end delay? Derive a formula for the end-to-end delay of sending one packet of length, L over N links, each having a transmission rate of R. Generalize this formula for sending P such packets back-to-back over N links. 3+2+4
   [Consider the queuing, processing and propagation delays as negligible]

   c. Consider two hosts, A and B, connected by a single link of rate R bps. Suppose the two hosts are separated by m meters and suppose the propagation speed along the link is s meters/sec. Host A is to send a packet of size L bits to host B. 5×2
      i. Determine the transmission time of the packet, d_{trans}, in terms of L and R.
      ii. Suppose host A begins to transmit the packet at time, t=0. At time, $t = d_{trans}$, where is the last bit of the packet?
      iii. Suppose d_{prop} is less than d_{trans}. At time $t = d_{trans}$, where is the first bit of the packet?
      iv. Suppose $s = 2.5 \times 10^8, L = 120\ bits$ and $r = 56\ kbps$. Find the distance m so that d_{prop} equals d_{trans}.
      v. Suppose d_{prop} is greater than d_{trans}. At time $t = d_{trans}$, where is the first bit of the packet?

2. a. Write down the taxonomy of common multicast routing protocols. Give a comparative analysis between multicasting and multiple unicasting with proper diagram. 4+5

   b. Multicast distance vector routing uses source-based trees, but the router never actually makes a routing table. When a router receives a multicast packet, it forwards the packet as though it is consulting a routing table. We can say that the shortest path tree is evanescent. After a packet is forwarded the table is destroyed. To accomplish this, the multicast distance vector algorithm uses a process based on four decision-making strategies. Each strategy is built on its predecessor. Briefly explain each of the strategy and show how each strategy can improve the shortcomings of the previous one. 12

   c. Mention at least two differences between ***DVMRP*** and ***CBT***. 4

3. a. What is meant by Congestion Control? Explain how TCP handles network congestion with proper example and figure. 2+9

   b. A network transmits **300** ***bit*** frames on a shared channel of **300** ***kbps***. Compare the throughput of pure ALOHA and slotted ALOHA in percentage, if the system (all stations together) produces **1500** ***frames per second***. What should be the maximum number of frames per frame transmission time, in order to get maximum throughput in pure ALOHA. 3+3

   c. Consider you have four stations A, B, C and D; which transmit the data using a shared channel. If the data sent by stations A, B, C in the channel are respectively **0, 0, 1** and the station D remains silent. Then with the help of CDMA find out the orthogonal sequence 4+3+1

of data on the channel. Also show how station ***D***, which is listening to station ***B***, will extract the data sent by ***B*** from the data in the channel. Depict the scenario with proper diagram and values.

4. a. How can the problem of counting to infinity be solved in case of two node instability in Distance Vector Routing Protocol? 4

   b. Compare among ***RIPv1***, ***RIPv2*** and ***IGRP***. Explain the timers in ***IGRP***. 3+4

   c. Explain how ***EIGRP*** calculates alternate backup route using ***DUAL*** Finite State Machines. 6

   d. 8

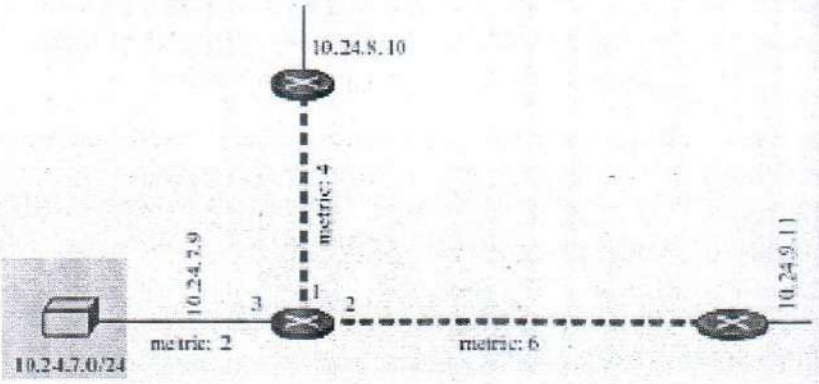

Figure - 1

Using the network topology in Figure - **1**, generate the router link LSA sent by the router 10.24.7.9.