B.Sc. Engg. / HD CSE 5th Semester — 25 February 2020 (Morning)

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

MID SEMESTER EXAMINATION — **WINTER SEMESTER, 2019-2020**

DURATION: 1 Hour 30 Minutes — **FULL MARKS: 75**

CSE 4511: Computer Networks

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) Briefly explain the changes that Standard Ethernet has gone through before moving to the higher data rates. 7

   b) Explain why a minimum frame size is required for Ethernet. Suppose that the distance between two ends of an Ethernet LAN is *d*. Derive a formula to find the minimum frame size needed for an Ethernet packet. 3+5

   c) Derive the maximum achievable throughput of a slotted ALOHA network. Derive the formula to determine the average transfer delay of a slotted ALOHA network. 4+6

2. a) Draw the taxonomy of multiple-access protocols. 4

   d) What is the significance of D (Duration) field in an IEEE 802.11 frame? What does it signify when both the *To DS* and *From DS* flags of the Frame Control (FC) field of IEEE 803.11 frame represent 0? 2+3

   c) Mention the effective length of a one-slot frame and a three-slot frame of Bluetooth? In a Bluetooth frame why does 54-bit header portion contain three identical 18-bit sections? 3+3

   d) Draw the flowchart for CSMA/CA used in wireless LANs those can handle hidden station problem and use P-persistence method as a persistence strategy. What is the significance of inter frame space (IFS) and contention window (CW) in CSMA/CA? 6+4

3. a) With the aid of necessary diagrams demonstrate the major problem of a transparent bridge. 7

   b) Briefly explain the concept of variable length subnet masks (VLSMs) and private IP addresses. 4+4

   c) Mention the major disadvantages of connectionless service of packet switching. Briefly explain the setup phase of the connection-oriented service of packet switching. 3+7

4. a) What is the subnet and broadcast of the host 172.16.88.255/20? A router receives a packet on an interface with the destination address of 172.16.46.191/26. What the router will do with the packet? 2+2

   b) Briefly explain how an ISP uses address aggregation and longest mask matching principle. 4+4

   c) Suppose you are working in a reputed ISP. You are given a class B network address 172.16.0.0 and you are asked to create subnets from the given network using the subnet mask 255.255.255.192. As a network expert answer the following questions:

      i. How many subnets can be there? 2

      ii. How many hosts per subnets? 2

      iii. What are the valid first six and last two subnets? 3

      iv. What are the broadcast addresses for first six and last two subnets? 3

      v. What are the valid hosts in first six and the last two subnets? 3

(116) (102)