B.Sc. Engg. / HD CSE 5th Semester 4 March 2019 (Afternoon)

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

MID SEMESTER EXAMINATION WINTER SEMESTER, 2018-2019
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) Neatly sketch the *IEEE 802.3* MAC frame. An Ethernet destination address is 3+2+2
   05:01:02:03:04:05, what is the type of the address? How does the address appear on the
   line in binary?

   b) Suppose that you would like to increase the link speed of your Ethernet cable, how would 3+5
   this upgrade affect the minimum required packet sizes? If you upgrade your cable to a
   higher speed and realize that you cannot change packet size, what else can you do to
   maintain correct operation?

   c) Draw the send and receive window for *'Go-Back-N ARQ'* protocol. With necessary 4+6
   example, prove that the send window size for *'Selective Repeat ARQ'* protocol can be at
   best 2^{m-1}, where m is the size of sequence number.

2. a) Derive the maximum achievable throughput of a slotted ALOHA network. A slotted 6+2
   ALOHA network transmits 1000-bit frames using a shared channel with a 1000-kbps
   bandwidth. Find the throughput if the system produces 1000 frames per second.

   b) Draw the flowchart of the medium access procedure of a pure ALOHA network. 4+8
   Determine the average transfer delay of a pure ALOHA network.

   c) Briefly explain the p- Persistent method used in CSMA protocol. 5

3. a) How does the Distributed Coordination Function (DCF) differ from the Point Coordination 5
   Function (PCF) as a MAC sublayer for *IEEE 802.11*?

   b) What is CDMA? With an example, show how data can be encoded and decoded between a 2+4+4
   sender and a receiver in a three-station environment. Generate the chip codes for 16
   stations using the Walsh table.

   c) How does a bridge differ from a repeater? Briefly explain the learning procedure of a 3+7
   transparent bridge with suitable example.

4. a) Suppose you are working in a reputed ISP. You are given a class C network address 2+2+3
   200.0.0.0 and you are asked to create subnets from the given network using the subnet
   mask 255.255.255.248. Now, answer the following questions:
   i. How many subnets can be there?
   ii. How many hosts per subnets?
   iii. What are the valid subnets?

b) What are the main motivations for *subnetting*? How can we find the sub-network address 3+2+3 if one of the address in that sub-network is given? If the IPv4 address of a host is 10.1.0.65/19 then what is the subnet address and the broadcast address of the subnet?

c) Write short notes on any **two** of the followings: 2×5
    i.   Hidden station problem of IEEE 802.11
    ii. Cheapernet
    iii. VLAN