B.Sc. Engg. / HD CSE 6th Semester — 20 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 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) Draw the OSI Internet model and mention two major functionalities of each of the layers. 7

   b) Neatly sketch the frame structure of IEEE 802.3 MAC protocol. An Ethernet MAC sublayer receives 1540 bytes of data from the upper layer. Can the data be encapsulated in one frame? If not, how many frames need to be sent? What would be the size of each frame? 3+5

   c) Draw the send and receive window for *'Go-Back-N ARQ'* protocol. How does *'Selective Repeat ARQ'* protocol differ from *'Go-Back-N ARQ'* protocol? 5+5

2. a) "The vulnerable time in ALOHA depends on the frame transmission time, whereas it depends on the propagation delay in CSMA" -Justify the statement in your own words. 9

   b) Write short notes on any two of the followings: 2×5

      i. P- Persistence method
      ii. Virtual LAN (VLAN)
      iii. Thicknet

   c) What is the role of contention window (CW) in CSMA/CA? Assume that the initial value of the contention window (CW_{min}) is 32. If a station requires 3 transmission attempts to successfully transmit a frame, what would be the back-off counter value for those transmission attempts? 3+3

3. a) Why wireless LAN (IEEE 802.11) cannot implement CSMA/CD as a MAC protocol? 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 1? 4+3

   b) Write short notes on any two of the followings: 4×2

      i. Hidden station problem
      ii. Network Allocation Vector
      iii. Bluetooth

   c) With the aid of necessary diagrams, briefly explain the learning process of a transparent bridge. Demonstrate the major problem of a transparent bridge. 5+5

4. a) Suppose you are working in a reputed ISP. You are given a class C network address 192.168.10.0 and you are asked to create subnets from the given network using the subnet mask 255.255.255.240 (which equivalent is to /28 in CIDR). Now as a network expert answer the following questions: 10

   i. How many subnets can be there?
   ii. How many hosts per subnets?
   iii. What are the valid subnets?
   iv. What are the broadcast addresses for each subnet?
   v. What are the valid hosts in each subnet?

b) What is the purpose of a private IP address? How are private IP addresses handled on the Internet? 3+3

c) What are the differences between classful addressing and classless addressing in IPv4? Find the class and default mask of the following IPv4 address. Mention the number of possible IP addresses in each IP class. 3+6

   i. 11000001.00000010.11111110.00000000
   ii. 25.23.12.25
   iii. 172.32.25.14