B.Sc. Engg. CSE 8th Semester (45) 181 7 August 2015 (Afternoon)

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

MID SEMESTER EXAMINATION **SUMMER SEMESTER, 2014-2015**

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

CSE 4805: Wireless 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) Wireless channel poses few challenges in protocol design of wireless communication. Briefly explain those challenges. 5
   b) Describe the necessity of internet standards in developing an effective internet. 4
   c) Define the Access Networks with a hierarchical classification of different access networks. 9
   d) Hidden station problem in wireless networks can be resolved by employing RTS and CTS frames. Justify the statement by means of an appropriate time line diagram. 7

2. a) A wireless LAN with three stations (A, B, C) follows IEEE 802.11E standard to ensure quality of service data delivery. However, each of the stations contends for shared medium in a distributed manner and uses binary exponential back-off mechanism for collision resolution. Moreover, each of them maintains two access categories, one for handling audio data and another for video data. Now, draw a diagram showing the transmission and reception of the frames which depicts the following. 17
      i. One successful transmission of MSDU containing audio data from node A to node B.
      ii. Two transmission attempts for MSDU with equal back-off value within node C.

      However, the diagram should include the back-off process of all the back-off entities which includes the back-off slots, DIFS period and the SIFS period. Note that, the x-axis of the diagram shows time and y-axis shows one horizontal line for each containing back-off entities. The transmission and reception of the frames of any containing back-off entity should represent as a void rectangle and darkened rectangle respectively on the horizontal line.
   b) Describe the Bluetooth architecture in brief. 8

3. a) IEEE 802.16 defines three different modulation schemes, depending on how far the subscriber station is from the base station. Let, an 802.16 network has a channel width of 70 MHz. Then, how many bits/sec can be sent to a subscriber station which is far away from the base station? 5
   b) How the IEEE 802.16 MAC Sublayer Protocol allocates the shared medium to the upstream traffic considering the quality-of service issue. 7
   c) Lifetime is crucial in Wireless Sensor Networks (WSNs). Hence, there exist many approaches to maximize the WSNs lifetime. Describe those approaches in brief. 8
   d) "Post back-off can reduce the delivery delay in lightly loaded systems" justify this statement. 5

4. a) WMAN (Wireless Metropolitan Area Network) requires a new standard to facilitate the wireless broadband internet facility. Why not just it use IEEE 802.11 standard? 8
   b) How different IFSs (Inter-Frame Spaces) can ensure prioritized channel access? 6
   c) Mention three potential WSNs applications which could be beneficial for any disaster affected area. 5
   d) How physical CCA and virtual CCA provides clear channel assessment of radio channel? 6