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

MID SEMESTER EXAMINATION   SUMMER SEMESTER, 2015-2016
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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a) What is an *Access Network*? | 3

b) How does *Frequency Domain Backoff* resolve the channel access contention among the contending nodes? | 6

c) Recreating the Backoff operation in the *Frequency Domain* rather than *Time Domain* causes significantly increased network throughput and channel usages in WiFi networks.'-justify the statement with proper arguments. | 5

d) *Receiver Initiated Multiple Access with Dual Purpose Polling* (RIMA-DP) protocol uses RTR (ready-to-receive packet) and NTR (no-transmission-request) to successfully exchange data packets. Explain its *collision avoidance strategy* in different possible scenarios by illustrating necessary figures. | 11

a) A wireless LAN with three stations (A, B, C) follows the *Distributed Coordinate Function* (DCF) defined by IEEE 802.11 standard. Each station uses binary exponential backoff mechanism for collision resolution where the minimum contention window size is 8. Draw a time line diagram showing one successful retransmission from station A to station C in its second attempt.
The diagram should show transmission and reception of all the frames and the backoff process of all stations which includes the appropriate backoff 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 station. The transmission and reception of the frames of any station should represent as void and darken rectangles respectively on the horizontal line. | 19

b) An IEEE 802.16 network has a channel width of 120 MHz. How many bits/sec can be sent to a subscriber station which is far away from the base station? | 6

a) IEEE 802.11 specifies the exchange of two special frames as an option made to resolve *Hidden Terminal Problem* in wireless networks.
Consider a sample network and clarify the resolution process by drawing a time line diagram. However, the spatial position of each stations in the sample network should be depicted in a separate figure. | 13

b) 'CSMA/CD performs poor in wireless networks'-Justify the claim. | 6

c) What is *Delay Tolerant Networking (DTN)*? Draw a data flow diagram to represent its networking concept. | 6

a) How is the *QoS (Quality of Service)* assured in IEEE 802.11 DCF? Answer should include appropriate example in clarifying the approach. | 12

b) Discuss the *collision domain* of a station in multi-hop wireless networks. | 6

c) How does the *802.16 MAC sublayer* manage channel access among competing subscribers in the upstream channel? | 7