Ref. No.: **Ex/IT/T/312/2019**

Jadavpur University
Bachelor of Information Technology
3rd Year 1st Semester Examination 2019
Sub: Wireless Networks

Full Marks: 100 **Time: 3 hours**

Answer any five questions

1. (4+4+6+6)
   a. Comment on the services provided by 1G, 2G, and 3G wireless systems?
   b. What is the main physical reason for the failure of many MAC schemes known from wired networks? What is done in wired networks to avoid this effect?
   c. What do you mean by hidden terminal and exposed terminal problem?
   d. 33 MHz of bandwidth is allocated to a cellular system which uses two 25 KHz simplex channels to provide full duplex voice and control channels, compute the number of channels available per cell if the system uses four cell reuse.

2. (4+6+6+4)
   a. Define the role of HLR and VLR in the wireless wide area network (WWAN) architecture.
   b. List three important entities in GSM architecture and explain their functions.
   c. Develop a flow diagram for intra-MSC handoff in a cellular network.
   d. Suppose in a CDMA system SNR is 30 db, total available bandwidth is 200 MHz, number of users is 100. What amount of bandwidth each user can enjoy?

3. (4+8+8)
   a. When a mobile device crosses cell boundary, a handoff takes place. How does this fact affect TCP performance?
   b. When a mobile device transmits TCP packets, most of the packets are lost due to high wireless loss rate. How does this fact affect TCP performance? Describe a mechanism to improve TCP performance when such loss occurs in the network.
   c. What is the reaction of standard TCP in case of packet loss? In what situation does this reaction make senses and why is it quite often problematic in case of wireless networks? Can the problems using TCP be solved by replacing TCP with UDP? Where could this be useful and why is it quite often dangerous for network stability?

4. Write short notes on: (10+10)
   a. Localization approach to improve TCP performance in wireless environment
   b. Explicit Notification Approach

5. (4+4+4+4+4)
   a. Compare source routing and hop-by-hop routing.
   b. Explain how DSDV avoids count-to-infinity problem.
   c. Compare between DSDV, DSR and AODV.
   d. What are the purposes of promiscuous receive mode in DSR?
   e. Why do you think in a very dynamic environment the performance of DSR will be much better than AODV?

6. (5+5+4+3+3)
   a. Power is a real crisis for wireless and mobile devices. Describe a suitable power management scheme for infrastructure WLAN.
   b. Explain with a diagram how roaming is performed in WLAN.
   c. Describe how collision is avoided using NAV signal in WLAN.
   d. Compare and contrast CSMA/CD with CSMA/CA.
   e. Describe a method for clock synchronization in infrastructure WLAN.

7. (4+3+4+3+6)
   a. What do you mean by neighbor notification and address auto-configuration in MIPv6?
   b. What is the difference between the care-of-address and co-located care-of-address?
   c. What are the functions of home agent and foreign agents in mobile IP protocols?
   d. What do you mean by soft handoff and hard handoff mechanisms?
   e. How the triangular routing problem is solved in MIPv4?