

Code No: B0608, B5510

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.TECH II SEMESTER EXAMINATIONS, APRIL/MAY-2012
WIRELESS COMMUNICATIONS AND NETWORKS
(COMMON TO DIGITAL SYSTEMS & COMPUTER ELECTRONICS, EMBEDDED SYSTEMS)

Time: 3hours

Max.Marks:60

Answer any five questions
All questions carry equal marks

- - -

- 1.a) How a cellular telephone call is made? Explain it with suitable sketches for uplink and downlink cases.
- b) A hexagonal cell within a four-cell system has a radius of 1.387 km. A total of 60 channels are used within the entire system. If the load per user is 0.029 Erlangs, and average rate of call requests $\lambda = 1.0$ call/hour, compute the following for an Erlang 'C' system that has a 5% probability of a delayed call:
 - (i) How many users per square kilometer will this system support?
 - (ii) What is the probability that a delayed call will have to wait for more than 10 seconds?
 - (iii) What is the probability that a call will be delayed for more than 10 seconds? Assume that for a number of channels per cell $C = 15$, the traffic intensity in Erlang 'C' system would be 9.0 Erlangs.
- 2.a) Discuss about different multiple access techniques used in cellular system.
- b) In a single cell, single sector CDMA cellular system, $E_b/N_0 = 20$ dB is required for each user. If 100 users, each with a base band data rate of 13 kbps, are to be accommodated, determine the minimum channel bit rate of the spread spectrum chip sequence. Ignore voice activity considerations.
- 3.a) List out the differences between circuit switching and packet switching in mobile communication networks.
- b) Briefly discuss about second and third generation wireless networks.
- c) Give the hierarchy of X.25 protocol in OSI model.
- 4.a) With the help of suitable diagram, explain about second generation data service (CDPD) in wireless networking.
- b) Describe how the common channel signaling provides simultaneous transmission of user data in wireless communications.
- 5.a) Explain the capabilities 'Registration' and 'Tunneling' of Mobile IP in detail.
- b) Describe the architecture and overview of WAP.
- 6.a) List and briefly discuss about IEEE 802.11 services.
- b) What characteristics of a wireless LAN present unique security challenges not found in wired LANs?
- c) What do you mean by MAC layer? Explain its functionality.
- 7.a) List out the radio and base band specifications of Bluetooth standard.
- b) State and explain L2CAP logical channels.
8. Write the following:
 - (a) GPRS
 - (b) Short Message Service (SMS) using GSM.