

GUJARAT TECHNOLOGICAL UNIVERSITY
ME – SEMESTER– I – EXAMINATION – SUMMER 2013

Subject Code: 710206N**Date: 24-06-2014****Subject Name: Wireless Computer Networks****Time: 02:30 pm - 05:00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Imagine a wireless network in a transmission environment where multi path fading can neither be avoided nor ignored. For such an environment, suggest a suitable radio propagation model in order to calculating the power of received signal at a distance d from the source of radio signal. Also state how the variation of the received signal is computed in the model. **07**
- (b) Why does a person feel a difference of sound of the horn of a car passing nearby him? Give a scientific reasoning in terms of change in pitch of the sound. Let us assume a person is waiting near the railway track. A train is moving nearby him at a speed of 2×10^8 m/s. If the monochromatic sound of the horn the train emits sound at a wavelength of 250 nanometers, then calculate the wavelength of the sound observed by the person at any instant of time. Assume speed of light $c = 3 \times 10^8$ m/s. **07**
- Q.2** (a) Describe some suitable wireless communication networks where Ultra Wide Band (UWB) transmission may be used. How UWB transmission is different from conventional radio transmissions. **07**
- (b) Explain the Gaussian Minimum Shift Keying (GMSK) technique for carrier modulation. **07**
- OR**
- (b) Briefly describe Frequency Shift Keying (FSK) mechanism for modulation of signal. **07**
- Q.3** (a) Consider a wireless communication environment with an available bandwidth of 25MHz and per user bandwidth requirement of 30KHz. If 20 low power antennas are deployed in such a way that 4 cells are grouped into a cluster, then compute the total number of users supported by the region. How many users could be accommodated if single antenna is deployed to cover the entire region. **07**
- (b) With the help of an architectural block diagram describe the mobility management in IP based network. **07**
- OR**
- Q.3** (a) What is co-channel interference? Briefly describe the relationship among co-channel cell, cluster size and cell radius in cellular network. **07**
- (b) With the help of architectural block diagram describe mobility management in GSM network. **07**

- Q.4 (a)** Consider 4 stations A, B, C and D where station A and B are generating bit 0, station C is idle and station D generating bit 1. If the chips assigned to A is $(+1, +1, +1, +1)$, B is $(+1, -1, +1, -1)$, C is $(+1, +1, +1, +1)$ and D is $(+1, +1, +1, +1)$, show multiplexing steps of the input string using Code Division Multiple Access (CDMA). Assume that 0 is encoded as -1 and 1 is encoded as $+1$. **07**
- (b)** Explain with the help of architectural diagram the working of SMS over GSM network. **07**
- OR**
- Q.4 (a)** Describe various logical channels of GPRS. **07**
- (b)** What is wireless application protocol? Explain its programming architecture. **07**
- Q.5 (a)** Describe challenges of designing routing protocols for AdHoc network. **07**
- (b)** What is Network Allocation Vector (NAV) in IEEE 802.11 network? Explain briefly the use of NAV in avoiding Hidden Station problem. **07**
- OR**
- Q.5 (a)** a. Can RTS/CTS signal solve the hidden station problem in IEEE 802.11 network? Justify your answer. **07**
- (b)** b. Explain various Scheduling services of IEEE 802.16 (WIMAX) network. **07**
