CE2-R3: WIRELESS AND MOBILE NETWORKS

NOTE:

1. **Answer question 1 and any FOUR questions from 2 to 7.**
2. **Parts of the same question should be answered together and in the same sequence.**

Time: 3 Hours **Total Marks: 100**

1.

a) Radio waves are electromagnetic waves occurring on the radio frequency portion of the electromagnetic spectrum. How is it produced and propagated?

b) The increased capacity in a cellular network, compared with a network having single transmitter, comes from the fact that the same radio frequency can be reused in a different area for a completely different transmission. What should be the frequency reuse factor when same frequency is used in the single network? Justify your answer.

c) What is the meaning of multiple accesses with respect to wireless network? List the types of multiple access presently used in communication satellite.

d) Channel, in communications, refers to the medium used to convey information from a sender to a receiver. What are the different forms of it?

e) In telecommunications, direct-sequence spread spectrum (DSSS) is a modulation technique. What are the features and benefits of Direct Sequence Speed Spectrum (DSSS) techniques in telecommunications?

f) What are the reasons that a mobile device provides updated location information to the network? Briefly explain location update procedure.

g) Explain, how Code Division Multiple Access (CDMA) works.

(7x4)

2.

a) The main difference between 1G and 2G mobile telephone system that the first is analog and the second is digital. What are the advantages and disadvantages of using digital systems?

b) Categorize and briefly explain the satellite system based on the orbit type and altitude specification.

c) Define the term UWB (Ultra Wide Band). Explain various applications of it.

(8+6+4)

3.

a) Explain what is piconet and personal area network. How are they used in Bluetooth?

b) What is wireless in local loop (WLL)? What are the different standards of it?

c) The Session Initiation Protocol (SIP) is an application-layer control (signaling) protocol. Define SIP and briefly explain its features.

(8+6+4)

4.

a) Define the term Hand Off in cellular telecommunication and explain what are the reasons for conducting hand off and hand over?

b) Why channel allocation schemes are required in TDMA/FDMA based cellular radio systems and wireless networks? What are the different types of it? Compare dynamic channel allocation scheme with spread spectrum technique.

(8+10)

5.

a) How does an Enhanced Data rate for GSM Evolution (EDGE) or Enhanced GPRS (EGPRS) technology improve data transmission reliability? Explain its architecture, features and applications.

b) What is Frequency-hopping spread spectrum (FHSS) in wireless local area network? What are the advantages offered by spread spectrum transmission over fixed frequency transmission?

(10+8)

6.

a) What is fading? Explain types of fading based on multi path time delay spread and Doppler spread.

b) How does Mobile IP work, when a mobile user moves from one network to another and maintaining a permanent IP address?

(10+8)

7.

a) What is ALOHA and slotted ALOHA? How throughput is calculated in slotted ALOHA? What are the steps to stabilize slotted ALOHA?

b) Bluetooth is a wireless communication protocol. Briefly explain the main layers of Bluetooth protocol stack.

c) What is W-CDMA (Wideband Code Division Multiple Access)? Describe its key features and briefly explain how is it different from other multiple access mechanism?

(8+4+6)