

**Sixth Semester B. E. (Computer Science and Engineering)
Examination**

INTRODUCTION TO WIRELESS COMMUNICATION SYSTEM

Time : 3 Hours]

[Max. Marks : 60

Instructions to Candidates :—

- (1) All questions carry marks as indicated against them.
- (2) Due credit will be given to neatness and adequate dimensions.
- (3) Assume suitable data and illustrate answers with neat sketches wherever necessary.

1. (a) Define the following :—

- (1) Control Channel.
- (2) Mobile Switching Center.
- (3) Page.
- (4) Subscriber.

4 (CO 2)

(b) Roaming charges are more as compared to Local charges. **Justify** the given Statement by explaining the detailed procedure with all required registers.
4 (CO 2)

(c) Compute the propagation time and the transmission time for a 5 – Mbyte message if the bandwidth of the network is 1.5 Mbps ? Assume that the distance is 15,000 km and that light travels at 2.4×10^8 m/s.
2 (CO 1)

2. (a) Choose the correct answer with **justification** from given multiple choices. State whether True or False.

- (i) There is zero inter – channel interference in CDMA.
(A) True
(B) False

(ii) Which of the following is/are the main part(s) of basic cellular system ?

(A) A mobile Unit.

(B) A cell Site.

(C) A mobile Telephone Switching Office.

(D) All of the above. 2 (CO 2)

Solve any **Two** :—

(b) Distinguish between LMDS and MMDS. 4 (CO 2)

(c) Differentiate between cdmaOne, GSM, IS-136, PDC with respect to following :—

(1) Multiple access Technology.

(2) Modulation Technique.

(3) Carrier Spectrum.

(4) Voice channels per carrier. 4 (CO 2)

(d) Explain Fresnel Zone.

The distance between two transceivers is 10 Km. and the carrier frequency is 2.4 GHz. Calculate The radius of the first Fresnel zone at midpoint between the two transceivers. 4 (CO 2)

3. Solve any **Two** :—

(a) Recall foot Print with respect to cellular systems.

Prove that for a hexagonal geometry, the co-channel reuse ratio is given by $Q = \sqrt{3} N$, where $N = i^2 + ij + j^2$. 5 (CO 2)

(b) A cellular service provider decides to use a digital TDMA scheme which can tolerate a signal-to-interference ratio of 15 dB in the worst case. Find the optimal value of N for

(a) omnidirectional antennas,

(b) 120° sectoring, and

(c) 60° sectoring.

Should sectoring be used ? If so, which case (60° or 120°) should be used ? (Assume a path loss exponent of $n=3$ and consider trunking efficiency.) 5 (CO 2)

- (c) Explain how cell splitting helps to improve coverage and capacity in cellular systems with its advantages and disadvantages. 5 (CO 2)

4. Solve any **Two** :—

- (a) Four channels, two with a bit rate of 400 kbps and two with a bit rate of 250 kbps, are to be multiplexed using multiple slot TDM with no synchronization bits. Draw the multiplexing diagram.

Answer the following questions by **analyzing** the given inputs :

(a) What is the size of a frame in bits ?

(b) What is the frame rate ?

(c) What is the duration of a frame ?

(d) What is the data rate ? 5 (CO 3)

- (b) List and Explain different Packet Radio Protocols with neat sketch.

5 (CO 3)

- (c) Differentiate between SDMA, TDMA, FDMA and CDMA. Write at least two differences. Draw Multiplexing diagram. 5 (CO 3)

5. Solve any **Two** :—

- (a) Briefly discuss the CDPD network with the help of neat sketch and List Link Layer Characteristics of CDPD. 5 (CO 4)

- (b) List different Channel types of CCH, TCH and BCH used in GSM. Explain why each of these is used. 5 (CO 4)

- (c) Differentiate between 1G, 2G and 3G Wireless Networks. (at least three differences) 5 (CO 4)

6. Solve any **Two** :—

- (a) Illustrate with neat sketch WTLS handshake Protocol. Explain detailed Procedure of handshaking. 5 (CO 5)

- (b) Develop a WML Script to draw a table shown below. Each table entry is a hyperlink of another page.

Sr. No.	Link
1	<u>Page 1</u>
2	<u>Page 2</u>
3	<u>Page 3</u>

5 (CO 5)

- (c) Draw and Explain Frequency Hopping (FH) with respect to transmission in Multislot Packets.

5 (CO 5)