EC2401- WIRELESS COMMUNICATION

QUESTION BANK

IV ECE

UNIT I : SERVICES AND TECHNICAL CHALLENGES

Part-A

1. Give any four examples of wireless communication systems.
2. What is a base station?
3. List any four advantages of third generation (3G) mobile networks.
4. Define co channel cells.
5. What are the reasons for choosing Hexagonal cells?
6. Define footprint
7. Define Frequency Reuse
8. What are the advantages of micro cell zone concept?
9. Define cluster.
10. Write the objectives of channel assignment strategies.
11. Differentiate Fixed and Dynamic channel assignment strategies.
12. What is borrowing strategy in channel assignment?
13. Define handoff?
14. What happens if the Handoff threshold is high?
15. Define Dwell time.
16. Define cell dragging.
17. Define MAHO.
18. Write the formula for co-channel reuse ratio.
19. What is cell splitting?
20. List the methods to improve coverage and capacity in cellular systems.
21. What is intersystem handoff?
22. Define Co-channel Interference
23. Define Adjacent-channel Interference
24. Define near-far effect

Part-B

1. Explain the cellular system architecture in detail.
2. Explain frequency reuse in detail.
3. Discuss different techniques used for improving coverage and capacity in cellular systems.
4. Explain the various types of Handoff processes available
5. Compare Between FDMA, TDMA, CDMA, SDMA.
6. What do you mean by Duplexing? Explain the types of Duplexing.
7. Explain TDMA & FDMA
8. Explain the operations of CDMA

UNIT- II

WIRELESS PROPAGATION CHANNELS

Part-A (2 Marks)

1. What are all the three basic propagation mechanisms in mobile communication system?
2. What is scattering?
3. What is diffraction?
4. Mention any four Indoor propagation models
5. Define Brewster angle?
6. Calculate the Brewster angle for a wave impinging on ground having a permittivity $\varepsilon_r = 2$.
7. List out any three small-scale fading effects of multipath in the radio channel.
8. What is Doppler shift?
9. What are Fresnel Zones?
10. List out the types of small-scale multipath measurements techniques

11. Consider a transmitter, which radiates a sinusoidal carrier frequency of 1850MHZ. For a vehicle moving 60mph, compute the received carrier frequency if the mobile is moving directly away from the transmitter.
12. Define Doppler spread and Write the relationship between Doppler spread and Coherence time.
13. 14. What is meant by Coherence bandwidth?
14. Differentiate Fast fading and slow fading in Small Scale fading
15. What are the Time Dispersion Parameters of Multipath channels?

Part-B

1. With neat diagrams explain the Free Space Propagation Model?
2. Derive the equation of the Path loss using Two-Ray Model with neat diagrams.
3. Explain knife Edge Diffraction Model
4. Derive the Impulse response model of a Multipath channel.
5. What is small scale fading? What are the factors influencing small scale fading?
6. Explain the various methods for small scale measurement
7. Explain detail about type of small scale fading?
8. Explain Clarke's model for flat fading?

UNIT III

WIRELESS TRANSCEIVERS

Part-A (2 Marks)

1. What is the function of channel encoder?
2. Define BFSK
3. Briefly explain about coherent detection
4. Define baud rate
5. What is the relation of bit rate and baud rate in QPSK
6. What is the function of a carrier recovery circuit?
7. What are the disadvantages of QPSK?

8. In π/4 QPSK the maximum phase change is limited to _____
9. What is the main advantage of O-QPSK.
10. What are the advantages of Minimum Shift Keying
11. Write the important properties of MSK
12. List the advantages of GMSK.
13. Define frequency hopping
14. Define Forward Error Correction
15. What are piconets?

Part-B

1. Explain the various blocks of a wireless communication link
2. With neat diagram explain BFSK.
3. With neat diagram explain QPSK.
4. With neat diagram explain O-QPSK
5. With neat diagram explain π/4-QPSK
6. Explain MFSK and describe its frequency spectrum.
7. With neat diagram explain GMSK.

UNIT IV

SIGNAL PROCESSING IN WIRELESS SYSTEMS

Part-A (2Marks)

1. Define diversity
2. List the types of diversity techniques available
3. Define Interleaving
4. Define Equalization.
5. Define adaptive Equalization.
6. List the types of Equalization techniques available
7. What is meant by decision feedback equalization?
8. Mention two advantages and disadvantages of LMS algorithm
9. Define vocoders

10. Which one is the most popular vocoding system? Why?
11. What are the approaches available in LPC excitation methods?
12. What are error detection and error detection codes?
13. Write Shannon's formula
14. Define Forward Error Correction Codes.
15. What is distance of a code?
16. What is Weight of a code?
17. Define hamming distance
18. Describe Generator matrix and Parity Check Matrix
19. What are the processing blocks of GSM codec?
20. Describe Logarithmic Area Ratio (LAR)

Part-B

1. What is Non-linear equalization? Explain the two methods used in 2G and 3G system
2. Explain LMS and Recursive Least Square algorithm.
3. Explain adaptive equalization algorithm.
4. Explain all the diversity techniques.
5. With neat diagram explain RAKE receiver.
6. With an example describe the steps involved in channel encoding and decoding process.
7. A) With a generator polynomial $g(x) = 1+x^2+x^3$ find the Codeword of the message m= [0100] for a (7, 4) code and verify the authenticity of the codeword
8. Draw the block diagram of a LPC coding system & explain the different types of LPC used for wireless systems.
9. With neat diagram explain the operations of GSM Speech Encoder/decoder.

UNIT – V ADVANCED TRANSCEIVER SCHEMES

Part-A (2Marks)

1. What are the spread spectrum techniques available?
2. Describe Direct Sequence Spread Spectrum.
3. List the types of Frequency Hopping.
4. Enumerate the various interfaces used in GSM?
5. What is the purpose of SIM?
6. What are the benefits of WLL?
7. What is frequency specification of Bluetooth?
8. List out the three types of dedicated control channels in GSM
9. Write the frequency and channel specifications of IS-95 standard.
10. Enumerate the different types of common control channels.

Part-B

1. Discuss the features and services of GSM
2. Explain the GSM system architecture with neat sketch.
3. Explain the GSM system channel types.
4. Draw and Explain the Frame structure for GSM
5. Explain the Signal processing in GSM
6. Explain the operation of CDMA Digital cellular standard
7. Explain Orthogonal Frequency Division Multiplexing (OFDM).
8. With neat diagram explain Bluetooth
9. Breifly explain the 3 G standards available.