UNIT II

MOBILE RADIO PROPAGATION

PART A

1. Compare fast and slow fading.
2. What is meant by multipath propagation?
3. What is meant by flat fading?
4. What is the major advantage of wireless communication?
5. Define coherence time. In what way does this parameter decide the behavior of wireless channel?
6. Give the equation for average large scale-path loss between the transmitter and receiver as a function of distance.
7. What is meant by frequency selective fading?
8. Calculate the Brewster angle for wave impinging on ground wave having a permittivity ε_r = 5.
9. Define coherence bandwidth.
10. Find the far field distance for an antenna with maximum dimension of 2m and operating frequency of 1 GHz.
11. Define coherence time and coherence bandwidth.
12. Define mean excess delay and RMS delay spread.
13. State the difference between small scale and large scale fading.
14. List the different types of propagation mechanisms. (OR) State the propagation effects of mobile radio.
15. What are the basic requirements of wireless services?
16. Interpret link budget equation. (OR) What is link budget calculation?
17. What are the factors influencing small scale fading?
18. What are the three most important effects of small-scale multipath propagation?
19. What is fading and Doppler spread?
20. State the difference between narrowband and wideband systems.
21. Find the far field distance for an antenna with maximum dimension of 1m and operating frequency of 900 MHz.
22. How to avoid fading problem?
23. List the different types of wireless channels.
24. What is the need for propagation models?
25. Define Brewster angle.
26. What are the different types of small scale fading?
27. Define free space propagation model.
28. Define ground reflection model.
29. Define maximum excess delay.
30. Define large scale propagation model.
31. Define small scale propagation model.
32. Explain path loss.

33. What are the factors influencing small scale fading?

PART B

1. What is large scale propagation? Explain in detail the free space propagation model.
2. Derive an expression for a ground reflection model assuming distance between transmitter and receiver antenna is very large compare to heights of the antennas.
3. The received power at a distance of 100 km is 5 nw for a communication link. Determine the received power at a distance 200 km for the same link. Assume free space propagation mechanism.
4. Which are commonly used wireless propagation models? How do they differ?
5. Define and explain mean excess delay, rms delay spread and excess delay spread.
6. Explain coherence time and coherence bandwidth.
7. Explain any one technique of small-scale multipath measurements.
8. Explain
    i) The effects of multipath fading
    ii) Doppler spectrum
    iii) Multipath delay spread
9. Explain the three basic propagation mechanisms which impact the propagation of signal in a mobile environment.
10. Explain free space propagation of radio signal. Establish the relation for the received power in free space. Define path loss in free space. Calculate the received power at a distance of 3 KM from the transmitter if the path loss exponent α is 4.Assume that the transmitting power of 4 W at 1800MHz.,a shadow effect of 10.5 dB, and the path loss at a reference distance (do=100 m) of -32dB.What is the allowable path loss?
11. Give complete classification of small scale fading and summarize the conditions for each type of small scale fading.
12. Explain the following diversity techniques briefly:
    i) Space diversity techniques
    ii) Frequency diversity techniques
13. In a two-ray ground reflection model, assume that phase difference must be kept below 6.261 radians for phase cancellation reasons. Assuming a receiver height of 2 m, and given a requirement that angel of incidence must be less than 5º, what are the minimum allowable values for the Transmitter-Receiver separation distance and the height of the transmitter antenna? Take the carrier frequency as 900 MHz.
14. Describe the concept of Doppler effect with relevant mathematical expressions.