
CHAPTER 17

Cellular Telephone and Satellite Networks

Review Questions

1. A mobile switching center coordinates communications between a base station and a telephone central office.
2. A mobile switching center connects cells, records call information, and is responsible for billing.
3. A high reuse factor is better because the cells that use the same set of frequencies are farther apart (separated by more cells).
4. In a hard handoff, a mobile station communicates with only one base station. In a soft handoff, a mobile station communicates with two base stations at the same time.
5. AMPS is an analog cellular phone system using FDMA.
6. D-AMPS is a digital cellular phone system that is backward compatible with AMPS.
7. GSM is a European standard that provides a common second-generation technology for all of Europe.
8. The CDMA multiplexer multiplexes one Walsh 64 X 64 row chip for each traffic channel.
9. The three orbit types are equatorial, inclined, and polar.
10. A GEO satellite has an equatorial orbit since the satellite needs to remain fixed at a certain spot above the earth.
11. A footprint is the area on earth at which the satellite aims its signal.
12. A satellite orbiting in a Van Allen belt would be destroyed by the charged particles. Therefore, satellites need to orbit either above or below these belts.
13. Transmission from the earth to the satellite is called the uplink. Transmission from the satellite to the earth is called the downlink.
14. GPS is a satellite system that provides land and sea navigation data for vehicles and ships.

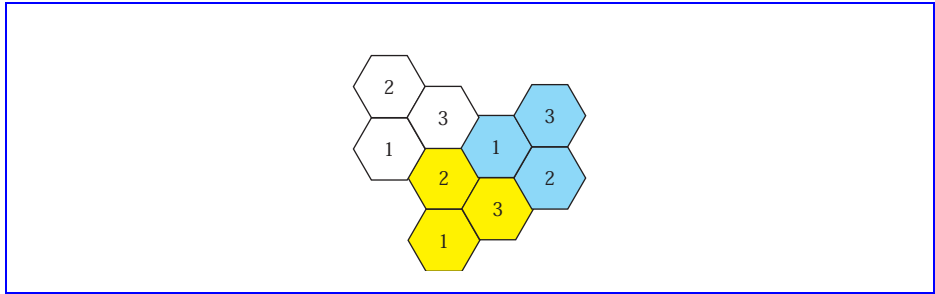
15. The main difference between Iridium and Globalstar is the relaying mechanism. Iridium requires relaying between satellites. Globalstar requires relaying between relaying between satellites and earth stations.

Multiple-Choice Questions

- 16. b
- 17. b
- 18. a
- 19. d
- 20. d
- 21. c
- 22. c
- 23. d
- 24. d
- 25. d
- 26. d
- 27. a
- 28. c
- 29. a
- 30. b
- 31. a
- 32. b
- 33. d
- 34. c
- 35. d
- 36. c
- 37. d
- 38. b
- 39. a
- 40. c

17.1 EXERCISES

- 41. See Figure 17.1.
- 42. Almost 56
- 43. Almost 169
- 44. Almost 330
- 45. 1320
- 46. 2.24 callers per MHz

Figure 17.1 Exercise 41

47. 6.76 callers per MHz
48. 13.2 callers per MHz
49. 52.8 callers per MHz
50. A 3KHz voice signal is modulated using FM to create a 30 KHz analog signal (see Chapter 5).
51. 150 slots/second for the system
50 slots/second for each user
52. GSM uses Regular Pulse Excited -- Linear Predictive Coder (RPE--LPC) with a Long Term Predictor loop to get 13 Kbps. The voice signal is divided into 20 millisecond samples, each of which is encoded as 260 bits, giving a total bit rate of 13 kbps. This known as Full-Rate speech coding. Recently, an Enhanced Full-Rate (EFR) speech coding algorithm has been implemented by some North American GSM1900 operators to improve speech quality using the existing 13 Kbps bit rate.
53. 1536
54. If the distance is increased, then the period also increases and the satellite is no longer stationary with respect to the earth.
55. 10.8 hours
56. 1.67 hours
57. 1.91 hours

