Q.2 a. Explain FDMA, TDMA and CDMA multiple access schemes with suitable diagrams. (10)

Answer:

Section 1.3, Figures 1.7 to 1.13, Pages 13 to 15, Text book 1

Figures → 06 M
Explanation → 04 M

b. If a total of 33 MHz of bandwidth is allocated to a particular cellular telephone system that uses two 25 KHz simplex channels to provide full duplex voice channels, compute the number of simultaneous calls that can be supported per cell if a system uses
(i) FDMA
(ii) TDMA with 8way time multiplexing (6)

Answer:

(i) FDMA; (25 x 2) kHz is needed to provide full duplex voice channels.

No. of Duplex channels = $\frac{33 \times 10^6}{(25 \times 2) \times 10^3} = 660$ → 02 M

660 simultaneous calls can be supported with FDMA scheme. → 01 M

(ii) TDMA; Each simplex channel of 25 kHz wide has 8 time slots, one for each user.

No. of simultaneous calls that can be supported = $\left(\frac{33 \times 10^6}{2 \times 25 \times 10^3}\right) 8 = 5280$ → 3M

Q.3 a. What is inter symbol interference (ISI)? Discuss with suitable illustrations. (6)

Answer:

Section 3.11, figure 3.16, Page 75, Text book 1

Figure → 3M
Explanation → 3M

b. Discuss the effect of reflection, diffraction and scattering on radio wave propagation with the help of a neat figure. (6)

Answer:

Section 3.3, figure 3.2, Pages 60, 61, Textbook 1
Figure → 3M
Explanation → 3M

c. **Write a note on Doppler effect.** **(4)**

Answer:

Section 3.9, figures 3.13, 3.14, Pages 72,73, Text book 1
Figures → 2M
Explanation → 2M

Q.4 a. With suitable diagram, explain the concept of frequency reuse in cellular systems. **(6)**

Answer:

Section 5.5, figure 5.7, Pages 108,109, Text book 1.
Figure → 3M
Explanation → 3M

b. **Explain the concept of CSMA / CA with ACK.** **(6)**

Answer:

Section 6.3.5, figures 6.12, 6.13, Pages 132, 133, Text book 1.
Figures → 4M
Explanation → 2M

c. **With respect to mobile cellular communication, explain the following terms.**
(i) Cell sectoring
(ii) Cell splitting **(4)**

Answer:

Sections 5.8, 5.9, Text book 1.
(i) → 2M
(ii) → 2M

Q.5 a. What is the difference between guard band and guard Time and why are they important in cellular system? Explain clearly. **(8)**

Answer:

Page No. 166

difference — 3 marks.
Importance — 3 mark
explanation — 2 mark

b. **How many bits can be transmitted in one second using 16 QAM to transmit a binary sequence if the baud rate is 2400 Hz.** **(4)**

Answer:

Baud rate = 2400Hz.
16 QAM has 16 different values each encoding 4 bits. ($2^4 = 16$) → 2M

Bit rate = (Baud rate) (No. of bits)
= (2400) 4
= 9600 bps → 2M.

c. Explain reuse partitioning based allocation strategy with a diagram. (4)

Answer:

Section 8.6.2, Figure 8.4, Page 172, Text book 1.
Figure → 2M
Explanation → 2M

Q.6 a. With respect to a satellite system explain:
(i) Orbits
(ii) Footprint
(iii) Inclination (8)

Answer:

Section 11.2, figures 11.1, 11.3, 11.4, Pages 255 to 257 Text book 1.
Figures with explanation (i) 03M
(ii) 03M
(iii) 02M

b. What is meant by bidirectional tunneling. Why do you need HA-FA in addition to the HLR –VLR pair? Explain in detail. (8)

Answer:

Page No. 200

bidirectional Tunneling – 3 marks
need – 2 marks
explanation – 3 marks.

Q.7 a. With respect to GSM explain:
(i) Frequency band and channels
(ii) Frames in GSM (8)

Answer:

Sections 10.4.1, 10.4.2, Figures 10.9, 10.10, Pages 225 to 227 Textbook 1.
Figures → 04M } (i) (2+2)
Explanation → 04M } (ii) (2+2)

b. Discuss the function of various logical channels in IS-95. (8)

Answer:

Section 10.6, Figure 10.24, Pages 238-240, Text book 1
Block diagram → 04M
Explanation → 04M

Q.8 a. List the characteristics of ad-hoc networks. (4)

Answer:

Section 13.2, Pages 298, 299, Text book 1.
4 chs → 04M

b. What are the differences between cellular and adhoc networks? (4)

Answer:

Sections 13.1, 1.16, 1.17 Pages 17, 297, 298, Text Book 1.
Cellular N/W → 02M
Adhoc N/W → 02M

c. What is a wireless sensor network? Explain hierarchical routing in sensor networks with an example. (8)

Answer:

Section 13.8.4, Figure 1310, Pages 331 to 333, T.Book 1
Wireless sensor N/Ws are a new class of adhoc N/Ws and are data centric. → 01M
Figure → 04M
Explanation → 03M

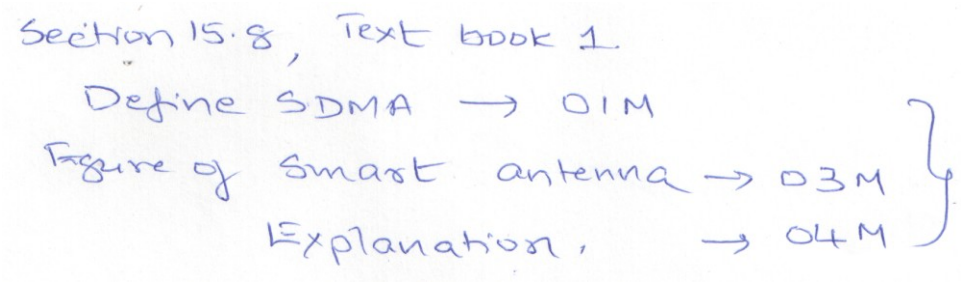
Q.9 a. Discuss the salient features of WLAN with more stress on IEEE 802.11 standard. (8)

Answer:

Section 14.1, figures 14.1, 14.2, Pages 345 to 351, Text book 1.
Figures → 04M
Explanation → 04M

b. What is SDMA? Explain the basic functions of smart antenna with a diagram. (8)

Answer:



TEXT BOOK

I. Introduction to Wireless and Mobile Systems, Second Edition (2007), Dharma Prakash Agrawal and Qing-An Zeng, Thomson India Edition