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504208

May 2024

M.Tech. (CSE/CE) - II SEMESTER

Advanced Wireless and Mobile Networks

(MCS–18–212)

Time : 3 Hours] [Max. Marks : 75

Instructions :

1. *It is compulsory to answer all the questions (1.5 marks each) of Part-A in short.*
2. *Answer any four questions from Part-B in detail.*
3. *Different sub-parts of a question are to be attempted adjacent to each other.*

PART–A

1. (a) Define CDMA, FDMA, and TDMA in the context of wireless communication. (1.5)

(b) Explain the concept of frequency reuse in wireless networks. (1.5)

(c) What are the key differences between infrastructure and ad-hoc modes in IEEE 802.11 WLANs? (1.5)

(d) Describe the hidden terminal problem in wireless LANS and suggest a solution. (1.5)

(e) Briefly explain fading effects in indoor and outdoor WLANs. (1.5)

(f) Define handoff strategies in cellular networks and explain their importance. (1.5)

(g) What are the key features of WiMAX technology? (1.5)

(h) Explain the concept of power management in wireless sensor networks. (1.5)

(i) Discuss the security vulnerabilities in Wi-Fi networks and suggest countermeasures. (1.5)

(j) What is Adjacent channel interference? (1.5)

PART–B

2. (a) What do you mean by Cell splitting and Sectoring? Why these are used in mobile communication? (10)

(b) A digital cellular system is designed to accept an S/I value of 15 dB in best case. Find the optimum value of cluster size N for :

(i) Omni directional antenna design.

(ii) 60 degree sectoring with directional antenna design.

(iii) 120 degree sectoring with directional antenna design. (5)

3. (a) Explain the GSM system architecture and describe the functions if its elements. Which types of different services does GSM offer? (8)

(b) Describe the 802.11 MAC frame format with the explanation of each field. (7)

4. (a) Derive the formula for co-channel signal to interference ratio (S/I) for a hexagon cell in best and worst case. (8)

(b) What are the functions of Link manager protocol (LMP) in Bluetooth? Explain. (7)

5. (a) Describe the architecture and layers of Wireless Sensor Networks (WSN). (10)

(b) Discuss the concept and applications of Vehicular Ad Hoc Networks (VANETs). (5)

6. (a) Describe following access method with advantages and disadvantages of each :

(i) Packet reservation multiple access (PRMA).

(ii) Multiple access with collision avoidance. (10)

(b) Compare WEP, WPA and WPA2. (5)

7. Write short notes on the following :

(i) Spread spectrum.

(ii) Mobile Traffic calculation and Grade of Service (GOS).

(iii) Denial of Service (DoS) in wireless communication. (3×5=15)