Wireless Communication VTU CBCS Question Paper Set 2018

USN | | | | | | | | | | |

10EC81

Eighth Semester B.E. Degree Examination, June/July 2015
Wireless Communication

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***

PART – A

1 a. With a neat diagram, explain the network elements of the SS7 system. **(08 Marks)**

b. Explain the different steps involved in AMPS mobile-terminated call operation with a neat flow diagram. **(08 Marks)**

c. Write a note on basic characteristics of 4G cellular system. **(04 Marks)**

2 a. Explain the common wireless cellular network components with a neat block diagram. **(10 Marks)**

b. With a block diagram, explain the MSC subsystem. **(06 Marks)**

c. Describe hardware view of a cellular network with a suitable diagram. **(04 Marks)**

3 a. Explain the different capacity expansion techniques used in cellular system with relevant figures. **(10 Marks)**

b. Explain the concept of frequency reuse for cellular system. For a mobile system of cluster size of 7, determine the frequency reuse distance if the cell radius is 5km. Repeat the calculation for a cluster size of 4. **(07 Marks)**

c. Write a note on cellular channel assignment strategies. **(03 Marks)**

4 a. Explain the various logical channels used in GSM. **(10 Marks)**

b. Describe GSM protocols and signaling model with a neat diagram. **(10 Marks)**

PART – B

5 a. List different call setup operations. Explain interrogation and radio resource connection operations with a neat flow diagram. **(10 Marks)**

b. Explain GSM inter-BSC handover operation with a neat diagram. **(10 Marks)**

6 a. Explain the basic spectrum spreading operation in CDMA. **(06 Marks)**

b. Describe the generation of the CDMA pilot channel signal with a neat figure. **(08 Marks)**

c. Describe in detail, the process of soft handoff in CDMA. **(06 Marks)**

7 a. Describe the error detection and correction codes used for wireless telecommunication. **(08 Marks)**

b. Write a short note on path loss models for various coverage areas. **(06 Marks)**

c. What is the received power in dBm for a signal in free space with a transmitting power of 1W frequency of 1900 MHz and distance from the receiver of 1000 meters if the transmitting antenna and receiving antenna both use dipole antenna with gains of approximately 1.6? What is the path loss in dB? **(06 Marks)**

8 a. Explain with a neat figure the Bluetooth protocol stack. **(08 Marks)**

b. Describe the typical wireless MAN deployment scenario. **(08 Marks)**

c. Depict the relationship between IEEE802.11 sending and receiving station with a state diagram. **(04 Marks)**

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PART – A

1 a. Explain the various steps in AMPS mobile terminated call. **(10 Marks)**
b. Explain the characteristics of 2G and 3G cellular systems. **(10 Marks)**

2 a. Explain the generation of MSISDN, IMSI and IMEI. **(06 Marks)**
b. Explain the function of HLR and ILR. **(06 Marks)**
c. Explain a mobile originated call in a cellular network with a neat flow diagram. **(08 Marks)**

3 a. A service provider is given license for total bandwidth of 5 MHz and each system subscriber requires 10 kHz bandwidth. Determine the system capacity if the service provider implements a cellular system with 35 transmitter sites and cluster size of 7. **(06 Marks)**
b. Determine frequency reuse distance for a cluster size of 7 and a cell radius of 6 km. **(04 Marks)**
c. Explain mobility management concept. Explain the functions of location management with a figure. **(10 Marks)**

4 a. Explain the GSM signaling model. **(10 Marks)**
b. Explain the steps in call setup in GSM using mobile station roaming number. **(10 Marks)**

PART – B

5 a. List out the ten operations in call setup in GSM system. Explain in detail ciphering mode setting and IMEI check. **(10 Marks)**
b. Explain GSM intra BSC handover operation with a figure. **(10 Marks)**

6 a. Explain the functions of three layers in a network management system. **(10 Marks)**
b. Explain the generation of CDMA paging channel. **(10 Marks)**

7 a. Explain the path loss model for free space propagation. **(05 Marks)**
b. What is the received power in dBm for a signal in free space with a transmitting power of 1 kW, frequency of 1800 MHz and distance from the receiver of 2000 meters if the transmitting antenna and receiving antennas have a gain of 1.6? What is the path loss in dB? **(05 Marks)**
c. Explain frequency hopping and direct sequence spread spectrum techniques. **(10 Marks)**

8 a. Discuss the design issues of IEEE802.11 and explain the working of BSS, DS and ESS network. **(10 Marks)**
b. Explain the details of Bluetooth protocol stack with a figure. **(10 Marks)**

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Eighth Semester B.E. Degree Examination, June/July 2017
Wireless Communications

Time: 3 hrs. Max. Marks:100

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PART – A

1 a. Briefly explain the different generation of cellular system. **(10 Marks)**
b. Explain with a neat flow diagram AMPS mobile originated call. **(10 Marks)**

2 a. Explain with diagram mobile switching centre (MSC). **(10 Marks)**
b. Explain with necessary diagram the formats of cell global identity number, mobile global identity number, IMEI number and local area identity number. **(10 Marks)**

3 a. Explain differences between cell splitting and cell sectoring capacity expansion techniques with neat diagram. **(07 Marks)**
b. For a mobile system of cluster size of 12 determine the frequency reuse distance if the cell radius is 8 km. **(03 Marks)**
c. Name three basic functions performed by the location management and explain cellular location updating with figure. **(10 Marks)**

4 a. Explain with diagram GSM network architecture. **(10 Marks)**
b. Explain in detail GSM channel concepts. **(10 Marks)**

PART – B

5 a. Explain with flow diagram GSM call configuration and call accepted. **(10 Marks)**
b. Explain with diagram GSM intra BSC handover operation. **(10 Marks)**

6 a. Explain reverse traffic channel generation in CDMA. **(10 Marks)**
b. Explain different call hand offs in CDMA system. **(10 Marks)**

7 a. What is the received power dBm for a signal in free space with a transmitting power of 800 mW at a frequency of 980 MHz and distance from the receiver is 6000m, if the transmitting receiving gain is approximately equal to 1. What is the path loss in dB? **(06 Marks)**
b. Explain direct sequence and frequency hopping spread spectrum. **(08 Marks)**
c. Explain RAKE receiver with a diagram. **(06 Marks)**

8 a. List four fundamental ways in which 802.16a (Wimax), 802.11 in (WLAN) and 802.15 (Bluetooth) different from one another. **(04 Marks)**
b. Explain Bluetooth protocol stack with diagram. **(08 Marks)**
c. Explain with suitable diagram independent basic service set networks and distribution system concept supported by IEEE 802.11 architecture. **(08 Marks)**

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Eighth Semester B.E. Degree Examination, Dec.2015/Jan.2016
Wireless Communication

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***

PART – A

1 a. Describe AMPS mobile phone initialization steps, with neat time diagram. **(10 Marks)**

b. Describe AMPS handoff operation, with neat diagram showing the time sequences of events, signals and messages used. **(10 Marks)**

2 a. Draw a neat diagram, showing typical wireless system components and describe each component in brief. **(12 Marks)**

b. Draw and explain the structure of MSISDN, IMSI and IMEI identification numbers. **(08 Marks)**

3 a. Explain with relevant diagrams, how cell splitting and cell sectoring enable capacity expansion. **(10 Marks)**

b. Explain how Radio Resource Management and Power Management are done in Wireless Communication Systems. **(10 Marks)**

4 a. Classify and name GSM logical channels and explain their major functions. **(10 Marks)**

b. Draw and describe the structure of TDMA frame, multiframe, superframe and hyperframe. Specify their time lengths. **(10 Marks)**

PART – B

5 a. Explain Authentication and Ciphering mode setting. Operations in GSM call setup operation with relevant flow diagrams. **(12 Marks)**

b. Explain Intra BSC Handover in GSM, with neat figure. **(08 Marks)**

6 a. Explain Network Nodes in CDMA 2000 wireless system, with neat diagram. **(12 Marks)**

b. Explain spectrum spreading operation in CDMA channels. **(08 Marks)**

7 a. Discuss various coding techniques used in wireless communication. **(12 Marks)**

b. Discuss various path loss models. **(08 Marks)**

8 a. Draw and describe Frame structure for general and management MAC frame format in 802.11. Also explain the 2 byte control field. **(12 Marks)**

b. Draw and explain typical piconet and scatter net in Bluetooth. How one device can act as both master and slave in scatternets? **(08 Marks)**

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Eighth Semester B.E. Degree Examination, Dec.2016/Jan.2017
Wireless Communication

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***

PART – A

1 a. Explain with a neat diagram SS7 signaling system and their function. **(10 Marks)**
b. Explain with a neat flow diagram, AMPS mobile originated call. **(10 Marks)**

2 a. With a neat block diagram, the MSC sub system. **(08 Marks)**
b. Define and explain the generation of IMSI, IMEI and CGI. **(08 Marks)**
c. What is the purpose of visitor location register and interworking location register? **(04 Marks)**

3 a. Explain capacity expansion techniques :
i) Cell splitting
ii) Cell sectoring
iii) Overlaid cells. **(10 Marks)**
b. A service provider wants to provide cellular communication to a particular geographic area. The total bandwidth, the service provider is licensed for 5 MHz and system subscriber requires 10 KHz of bandwidth. Determine the system capacity; If the service provider implements a cellular system with 35 transmitter sites and cluster size of 7, determine the new system capacity. **(06 Marks)**
c. Determine frequency reuse distance for cell radius 5 km and cluster size of 7. **(04 Marks)**

4 a. Explain briefly service provided by GSM. **(06 Marks)**
b. With a neat block diagram, explain different protocols used in GSM signaling model. **(10 Marks)**
c. Draw and explain GSM TDMA frame with logical channel. **(04 Marks)**

PART – B

5 a. Explain GSM intra BSC handover with a neat diagram. **(10 Marks)**
b. Describe GSM chiphering mode setting operation and IMEI check. **(10 Marks)**

6 a. Explain with block diagram the generation of CDMA forward traffic control with power control channel for 14.4 kbps traffic. **(10 Marks)**
b. Draw and explain CDMA synchronization channel signal. **(10 Marks)**

7 a. Explain convolutional and turbo encoders. **(06 Marks)**
b. Discuss path loss model. **(04 Marks)**
c. Explain with a neat block diagram RAKE receiver. **(10 Marks)**

8 a. Discuss the design issues of IEEE 802.11. **(04 Marks)**
b. Explain the working of BDS, DS and ESS network with a neat diagram. **(08 Marks)**
c. Describe the Bluetooth protocol stack with relevant figures. **(08 Marks)**

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Eighth Semester B.E. Degree Examination, Dec.2017/Jan.2018
Wireless Communication

Time: 3 hrs. Max. Marks:100

Note: ***Answer FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. Compare 1G and 2G cellular system. **(04 Marks)**

b. Explain the different steps involved in AMPS-Mobile originated call. **(08 Marks)**

c. With a neat diagram, explain the network elements of the SS7 system. **(08 Marks)**

2 a. With a block diagram, explain the MSC subsystem. **(06 Marks)**

b. Explain the functions of HLR, VLR and MSC. **(06 Marks)**

c. Explain with necessary diagrams the formats of MSISDN number, IMSI number, IMEI number and LAI number. **(08 Marks)**

3 a. Explain capacity expansion techniques,
(i) Cell splitting (ii) Cell sectoring **(06 Marks)**

b. Explain the different power saving schemes. **(06 Marks)**

c. For a particular radio transmission technology, a minimum S/I ratio of 15 dB is needed for proper operation. What is the minimum required cluster size? If the path loss exponent is $\alpha = 4$? Assume that there are six-co-channel cells in the first tier and all of them are at the same distance from the mobile. **(05 Marks)**

c. Determine the frequency reuse distance for a cell radius of two kilometers and a cluster size of 4. **(03 Marks)**

4 a. Explain the various logical channels used in GSM. **(10 Marks)**

b. Describe GSM protocols and signalling model with a neat diagram. **(10 Marks)**

PART – B

5 a. List out the ten operations in call setup in GSM system. Explain in detail authentication and ciphering mode operation. **(12 Marks)**

b. Explain the intra-BSC-handover operation in GSM. **(08 Marks)**

6 a. Explain the basic spread spreading operation in CDMA. **(06 Marks)**

b. Explain the different types of soft and hard handoffs supported by CDMA system. **(06 Marks)**

c. Explain the generation of CDMA paging channels. **(08 Marks)**

7 a. Explain the path loss model for free space propagation. **(06 Marks)**

b. With a neat block diagram, explain the RAKE receiver. **(06 Marks)**

c. What is the received power in dBm for a signal in free space with a transmitting power of 50 W, frequency of 900 MHz and distance from the receiver of 100 meters if the transmitting antenna and receiving antennas have a gain of 1? What is P_r at 10 km? **(08 Marks)**

8 a. Explain with a neat figure the Bluetooth protocol stack. **(08 Marks)**

b. Discuss the design issues of IEEE 802.11 and also provide the working of BSS, DS and ESS networks. **(08 Marks)**

c. Describe the basic wireless MAN. **(04 Marks)**

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10EC81

Eighth Semester B.E. Degree Examination, June/July 2014

Wireless Communication

Time: 3 hrs. Max. Marks:100

Note: ***Answer FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. With an appropriate diagram, explain the OSI model. How does it relate to communication network? **(10 Marks)**

b. Describe the characteristics of 1G, 2G and 3G cellular system. How do 2G cellular system support more than one user per channel? **(10 Marks)**

2 a. Draw the neat block diagram of common cellular system and explain the base station system (BSS) components. **(10 Marks)**

b. With neat flow diagram, explain the mobile terminated call operation. **(10 Marks)**

3 a. Explain the following capacity expansion techniques:
i) Cell splitting
ii) Cell sectoring
iii) Overlaid cells **(10 Marks)**

b. Explain the power control and power saving schemes in cellular system. **(10 Marks)**

4 a. With a neat GSM network architecture, explain the network switching system (NSS). **(10 Marks)**

b. With suitable diagram, explain the GSM channel concept. **(10 Marks)**

PART – B

5 a. List the different call setup operations and with flow diagram explain interrogation phase and IMEI check operation. **(10 Marks)**

b. With neat flow diagram, explain GSM inter BSC handover operation. **(10 Marks)**

6 a. With a neat block diagram, explain the generation of CDMA forward traffic channel. **(10 Marks)**

b. Explain the CDMA mobile originated timeline. **(10 Marks)**

7 a. With neat diagram, explain 4-psk modulation technique. **(10 Marks)**

b. Explain the following:
i) Path loss model
ii) Block interleaving **(10 Marks)**

8 a. What are the IEEE 802.11 extensions? **(06 Marks)**

b. With suitable diagram, explain the Bluetooth piconet architecture. **(07 Marks)**

c. With suitable diagram explain the Bluetooth system components. **(07 Marks)**

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