CBCS SCHEME

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

18EC81

Eighth Semester B.E. Degree Examination, Jan./Feb. 2023
Wireless and Cellular Communication

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Explain path loss model for free space propagation with equations. (08 Marks)

b. Explain Doppler Spread and Coherence time. (06 Marks)

c. Find a Fraunhofer distance for an antenna with maximum dimension of 1 meter and operating frequency of 900 MHz. If antennas have unity gain, calculate path loss. (06 Marks)

OR

2 a. Explain two ray models of ground reflections with necessary equations. (08 Marks)

b. Explain cell splitting and cell sectoring. (06 Marks)

c. Explain statical channel models. (06 Marks)

Module-2

3 a. Explain the various logical channels used in GSM. (08 Marks)

b. List out ten operations in a call set up in GSM system. Explain in detail authentication and Ciphering mode operations. (12 Marks)

OR

4 a. Describe GSM protocols and signaling model with neat diagram. (06 Marks)

b. Explain the TDMA heperframe structure with diagram in detail. (07 Marks)

c. Explain steps involved during Intra-BSC handover. (07 Marks)

Module-3

5 a. Explain the basic spectrum spreading operation. (07 Marks)

b. Explain the generation of CDMA paging channels. (06 Marks)

c. Explain network nodes found in CDMA2000 wireless system. (07 Marks)

OR

6 a. Explain with block diagram the generation of CDMA forward traffic control with power control for 14.4 kbps traffic. (12 Marks)

b. Explain typical components of cdmaOne network. (08 Marks)

Module-4

7 a. Explain the advantages of OFDM leading to its selection of LTE. (06 Marks)

b. Explain OFDM baseband and passband transmitter with block diagram. (07 Marks)

c. Compare OFDM and SCFDE. (07 Marks)

OR

8 a. Explain with block diagram, flat LTE SAE architecture. (06 Marks)
b. Explain peak to Average Power Ratio (PAR). (07 Marks)
c. Explain SC-FDE system description. (07 Marks)

Module-5

9 a. Explain SCFDMA uplink transmitter and receiver with neat block diagrams. (12 Marks)
b. Explain Hierarchical channel structure of LTE. (08 Marks)

OR

10 a. Explain OFDMA downlink and uplink transmitter with diagram. (12 Marks)
b. Explain frame structure used in LTE. (08 Marks)

* * * * *

CBCS SCHEME

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

18TE81

Eighth Semester B.E. Degree Examination, Jan./Feb. 2023
Advanced Cellular Communication

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. List any six features of OFDM, which led to its selection for LTE standard. Explain them briefly. **(06 Marks)**

b. Explain IP based Flat LTE Network Architecture with relevant diagrams. **(06 Marks)**

c. Write short notes on the following:
(i) Delay Spread and Coherence Bandwidth
(ii) Doppler Spread and Coherence Time **(08 Marks)**

OR

2 a. Discuss the effects of path loss and shadowing in broad band wireless channels. **(08 Marks)**

b. Consider a user in the downlink of a cellular system, where the desired base station is at a distance of 500 meters and there are numerous nearby interfering base stations transmitting at the same power level. If there are 3 interfacing base stations at a distance of 1 km, 3 at a distance of 2 km and 10 at a distance of 4 km, find the Signal-to-Interference Ratio (SIR) where $\alpha = 3$ and when $\alpha = 5$. **(04 Marks)**

c. Explain briefly Rayleigh Fading and Ricean distribution channel models. **(08 Marks)**

Module-2

3 a. Explain the multicarrier concept with necessary diagrams. **(06 Marks)**

b. With a neat block diagram, explain the OFDM Communication System. **(06 Marks)**

c. Explain the following techniques:
(i) SVD pre-coding and post coding
(ii) Linear pre-coding and post coding **(08 Marks)**

OR

4 a. What is Peak-to-Average Ratio? Explain its effect on OFDM and discuss about the PAR reduction techniques. **(08 Marks)**

b. With relevant block diagrams, explain OFDMA Downlink used transmitters and receivers. **(07 Marks)**

c. Explain selection combining technique, briefly. **(05 Marks)**

Module-3

5 a. Explain with a neat diagram the radio interface protocol architecture and the service access points between different layers. **(04 Marks)**

b. Explain different types of physical channels with channel mapping details. **(08 Marks)**

c. Briefly explain downlink control channels with DCI formats. **(08 Marks)**

OR

6 a. Explain the structure of the downlink resource grid with relevant diagram. **(10 Marks)**

b. Explain the Tail-Biting Convolutional and Convolution Turbo coding techniques in detail. **(10 Marks)**

Module-4

7 a. Explain the modulation processing for the generation of SC-FDMA baseband signals with relevant diagram. **(08 Marks)**

b. Explain the functions of H-ARQ feedback in Downlink and Uplink transmissions. **(12 Marks)**

OR

8 a. Explain in detail the types of Uplink Reference Signals. **(10 Marks)**

b. Describe briefly the Random Access Procedures in LTE. **(10 Marks)**

Module-5

9 a. Explain briefly the MAC and RLC sublayers with their PDU Formats. **(10 Marks)**

b. Describe the Mobility Management in LTE over S1 and X2 interface. **(10 Marks)**

OR

10 a. Explain the functions of PDCP along with the details of PDCP data PDU and PDCP control PDU (Protocol Data Unit). **(10 Marks)**

b. Describe briefly the following:
(i) RAN procedures for mobility
(ii) Paging in LTE network **(10 Marks)**

* * * * *