CBCS SCHEME

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18EC81

Eighth Semester B.E. Degree Examination, Dec.2024/Jan.2025
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 two ray ground reflection model and obtain the expression for E-field, path difference, phase difference and time delay. **(10 Marks)**

b. If a transmitter produces 50 W of power, express the transmit power in units : i) dBm ii) dBw. If 50 W is applied to a unity gain antenna with a 900 MHz carrier frequency, find the received power in dBm at a free space distance of 100 m from the antenna. What is P_r(10 km., Assume $G_r = 1$. **(10 Marks)**

OR

2 a. Explain cellular concept and sectoring to improve the capacity of the cell. **(10 Marks)**

b. Explain :
i) Doppler spread and coherence time
ii) Delay spread and coherence bandwidth
iii) Angular spread and coherence distance. **(10 Marks)**

Module-2

3 a. Explain the various logical channel used in GSM. **(10 Marks)**

b. With a neat diagram, explain GSM network and system architecture. **(10 Marks)**

OR

4 a. Define handoff and explain how call handoff is done in GSM technology. **(10 Marks)**

b. List out the ten operations in call setup in GSM system. Explain in detail authentication and ciphering mode operation. **(10 Marks)**

Module-3

5 a. Explain CDMA spread spectrum operations in forward logic channels. **(10 Marks)**

b. Explain the steps involved in call establishment in CDMA technology. **(10 Marks)**

OR

6 a. Explain the different types of soft and hard handoffs supported by CDMA system. **(10 Marks)**

b. Explain the generation of reverse logical channels in CDMA technology. **(10 Marks)**

Module-4

7 a. Explain key enabling technologies and features of LTE system in detail. **(10 Marks)**

b. Explain with a neat diagram, how 3GPP network evolved towards flat LTE-SAE architecture. **(10 Marks)**

OR

8 a. With a neat block diagram, explain OFDM communication system. Also mention the need of timing and frequency synchronization. **(10 Marks)**

b. Discuss the significance of PAR problem in LTE. Briefly explain PAR reduction techniques. **(10 Marks)**

Module-5

9 a. Briefly explain the different multiple access system which can be implemented with FDAM. **(10 Marks)**

b. With a neat diagram, explain SC–FDMA. List out the advantages and disadvantages of SC–FDMA. **(10 Marks)**

OR

10 a. Explain the different logical, transport and physical channels supported in KTE. **(10 Marks)**

b. Explain Uplink SC-FDMA radio resources in LTE system. **(10 Marks)**

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18TE81

Eighth Semester B.E. Degree Examination, Dec.2024/Jan.2025
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 the advantages of OFDM leading to its selection for LTE and explain. **(10 Marks)**

b. Explain the cellular concept. Discuss how interface can be reduced in cellular communication. **(10 Marks)**

OR

2 a. Explain LTE network architecture and describe the new elements provided in it. **(10 Marks)**

b. Discuss delay spread and coherence bandwidth with relevant expressions. **(10 Marks)**

Module-2

3 a. With a neat diagram, explain Orthogonal Frequency Division Multiplexing (OFDM) used in LTE. **(10 Marks)**

b. With the block diagram of receiver diversity, explain the principle of operation. **(10 Marks)**

OR

4 a. Write the block diagram of OFDMA down link transmitter and explain the principle of operation. **(10 Marks)**

b. Explain spatial diversity of multiple antenna technique. **(10 Marks)**

Module-3

5 a. Discuss the broadcast channels and multicast channels. **(10 Marks)**

b. Explain radio interface protocol layers of LTE. **(10 Marks)**

OR

6 a. Discuss downlink transport channel processing. **(10 Marks)**

b. Explain design principles used in LTE specification. **(10 Marks)**

Module-4

7 a. Discuss Random Access procedures used in LTE. **(10 Marks)**

b. Briefly explain up-link reference signals and resource mapping of them. **(10 Marks)**

OR

8 a. Explain uplink control information. **(10 Marks)**

b. Discuss the scheduling and resource allocation in LTE. **(10 Marks)**

Module-5

9 a. Explain the main services and functions of PDCP. **(10 Marks)**

b. Explain the data transfer modes and the main service and functions of the RLC sublayer. **(10 Marks)**

OR

10 a. Discuss mobility management over the SI transfer. **(10 Marks)**

b. Explain RRC states and its functions. **(10 Marks)**

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