



# CBCS SCHEME

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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

- List any six features of OFDM, which led to its selection for LTE standard. Explain them briefly. (06 Marks)
  - Explain IP based Flat LTE Network Architecture with relevant diagrams. (06 Marks)
  - Write short notes on the following:
    - Delay Spread and Coherence Bandwidth
    - Doppler Spread and Coherence Time (08 Marks)

OR

- Discuss the effects of path loss and shadowing in broad band wireless channels. (08 Marks)
  - 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)
  - Explain briefly Rayleigh Fading and Ricean distribution channel models. (08 Marks)

### Module-2

- Explain the multicarrier concept with necessary diagrams. (06 Marks)
  - With a neat block diagram, explain the OFDM Communication System. (06 Marks)
  - Explain the following techniques:
    - SVD pre-coding and post coding
    - Linear pre-coding and post coding (08 Marks)

OR

- What is Peak-to-Average Ratio? Explain its effect on OFDM and discuss about the PAR reduction techniques. (08 Marks)
  - With relevant block diagrams, explain OFDMA Downlink used transmitters and receivers. (07 Marks)
  - Explain selection combining technique, briefly. (05 Marks)

### Module-3

- Explain with a neat diagram the radio interface protocol architecture and the service access points between different layers. (04 Marks)
  - Explain different types of physical channels with channel mapping details. (08 Marks)
  - Briefly explain downlink control channels with DCI formats. (08 Marks)

OR

- Explain the structure of the downlink resource grid with relevant diagram. (10 Marks)
  - Explain the Tail-Biting Convolutional and Convolution Turbo coding techniques in detail. (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

**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)

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