

# CBCS SCHEME

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15EC81

## Eighth Semester B.E. Degree Examination, Jan./Feb. 2023 Wireless Cellular and LTE 4G Broadband

Time: 3 hrs.

Max. Marks: 80

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

### Module-1

- 1 a. Explain briefly EPS architecture. (08 Marks)  
b. List the advantages of OFDM leading to its selection for LTE. (08 Marks)

OR

- 2 a. Explain the cellular concept briefly. Discuss how interference can be reduced in cellular communication. (08 Marks)  
b. Explain Delay Spread and Coherence Bandwidth. (08 Marks)

### Module-2

- 3 a. Explain the basic multicarrier transmitter and receiver with neat block diagram. (08 Marks)  
b. What is PAR Problem? Explain the methods used for PAR reduction. (08 Marks)

OR

- 4 a. With a neat diagram, explain SC-FDMA. List out the advantages and disadvantages of SC-FDM. (08 Marks)  
b. Explain  $2 \times 2$  SFBC approach in open-loop transmit diversity. (08 Marks)

### Module-3

- 5 a. Explain frame structure used in LTE. (08 Marks)  
b. Discuss the Radio Interface Protocol layers of LTE. (08 Marks)

OR

- 6 a. Briefly explain downlink transport channel processing. (08 Marks)  
b. Discuss the broadcast channels and multicast channels. (08 Marks)

### Module-4

- 7 a. Explain in brief : (i) Frequency hopping (ii) Multi antenna transmission (08 Marks)  
b. Discuss the random access procedures in detail. (08 Marks)

OR

- 8 a. Explain Channel Quality Indicator (CQI) feedback. (08 Marks)  
b. Discuss the power control schemes used in LTE. (08 Marks)

### Module-5

- 9 a. Explain the function and services of RLC and MAC layers. (08 Marks)  
b. Describe the various phases of S1 mobility with neat diagram. (08 Marks)

OR

- 10 a. Explain RAN procedure for mobility. (08 Marks)  
b. Explain the basic approaches for uplink ICI mitigation. (08 Marks)

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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.

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## Eighth Semester B.E. Degree Examination, Jan./Feb. 2023 Fiber Optics and Networks

Time: 3 hrs.

Max. Marks: 80

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

### Module-1

- 1 a. Explain Optical Fiber Communication System, with suitable block diagram. (08 Marks)  
b. Describe what is implied by the term Photonic Crystal fiber and explain Index guiding Photonic Crystal fiber with a suitable diagram. (08 Marks)

OR

- 2 a. Explain briefly about Fiber Materials used in Optical communication. (06 Marks)  
b. What are the advantages of Optical Fiber Communication? (04 Marks)  
c. A silica optical fiber with a core diameter large enough to be considered by ray theory analysis has a core refractive index of 1.50 and a cladding refractive index of 1.47. Determine i) The critical angle at the core cladding interface ii) The NA for the fiber iii) The acceptance angle in air for the fiber. (06 Marks)

### Module-2

- 3 a. Explain Linear and Non Linear Scattering losses in Optical fibers. (08 Marks)  
b. What are the different types of Splicing and explain the techniques for tube splicing of Optical fibers. (08 Marks)

OR

- 4 a. With a neat diagram, explain different types of Bending losses in fiber. (06 Marks)  
b. Explain the different types of Mechanical Misalignment between two fibers. (05 Marks)  
c. What are the principal requirement of a Good Connector design. (05 Marks)

### Module-3

- 5 a. Explain Electron Recombination and Associated Photon Emission for Direct and Indirect band gap material. (06 Marks)  
b. Explain Reach – through avalanche photodiode, with a neat diagram. (05 Marks)  
c. Explain the Three key transition process involved in laser action. (05 Marks)

OR

- 6 a. With the help of a neat diagram, explain High – Radiance Surface Emitting LED. (06 Marks)  
b. With schematic, explain Reverse biased pin photodiode. (05 Marks)  
c. With a neat diagram, briefly discuss the possible sources of noise in optical fiber receiver. (05 Marks)

### Module-4

- 7 a. Explain the Operational principles and implementation of WDM Network with diagram. (08 Marks)  
b. Explain the Amplification mechanism in EDFA amplifier, with the help of energy level diagram. (08 Marks)

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**OR**

- 8 a. Describe the principles of working of Isolators and Circulators with a neat diagram. (08 Marks)
- b. With a neat diagram, explain the principle of operation of Optical Add / Drop Multiplexers in an Optical network. (04 Marks)
- c. Briefly explain the basic operation of a Generic optical amplifier, with a neat diagram. (04 Marks)

**Module-5**

- 9 a. Explain Optical Fiber Network Evolution, with a neat diagram. (06 Marks)
- b. Explain an Optical packet switched network packet format, with a neat diagram. (05 Marks)
- c. Briefly explain Wavelength routing and the selection of a path in a WDM Network. (05 Marks)

**OR**

- 10 a. Explain the different types of Optical Networking Node Elements with a suitable diagram. (08 Marks)
- b. Explain the concept of Optical Burst Switching Networks. (08 Marks)

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