

# CBCS SCHEME

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18EC81

## Eighth Semester B.E. Degree Examination, June/July 2024 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 modal for free space propagation. (06 Marks)  
b. Explain briefly three basic propagation mechanisms. (06 Marks)  
c. If a transmitter produces 50 W of power, express the transmit power in units of (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 unity gain for the receiver antenna? (08 Marks)

OR

- 2 a. Distinguish between delay spread and coherence bandwidth. (06 Marks)  
b. Distinguish between Doppler spread and coherence time. (06 Marks)  
c. Explain the analysis of cellular systems. (08 Marks)

### Module-2

- 3 a. Describe GSM protocols and signaling model with a neat diagram. (10 Marks)  
b. Explain the various logical channels used in GSM. (10 Marks)

OR

- 4 a. List out the ten operations in call set up in GSM system. Explain in detail authentication and ciphering mode operation. (10 Marks)  
b. Explain the intra BSC hand over operation in GSM. (10 Marks)

### Module-3

- 5 a. Explain frequency planning issues for intersystems in CDMA. (08 Marks)  
b. Explain the network nodes found in CDMA 2000 wireless system. (12 Marks)

OR

- 6 a. Explain basic spectrum spreading operation in CDMA. (10 Marks)  
b. Explain the generation of the pilot channel signal. (10 Marks)

### Module-4

- 7 a. List the advantages of OFDM leading to its selection for LTE and explain. (10 Marks)  
b. With a neat block diagram, explain LTE network architecture and describe briefly the new elements provided in it. (10 Marks)

OR

- 8 a. With the help of neat diagrams, explain how the timing and frequency synchronization is performed by the receiver to demodulate an OFDM signal. (12 Marks)  
b. What is PAR problem? Explain the methods used for PAR reduction. (08 Marks)

### Module-5

- 9 a. Explain basic design principles followed in LTE specifications. (10 Marks)  
b. Explain downlink OFDMA radio resources. (10 Marks)

OR

- 10 a. Explain uplink SC-FDMA radio resources. (10 Marks)  
b. Explain the layers of LTE radio interface protocol. (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.

# CBCS SCHEME

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18TE81

## Eighth Semester B.E. Degree Examination, June/July 2024 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 and discuss advantages of OFDM that has led to its selection for LTE. (10 Marks)  
b. With suitable figure, describe evolved packet core LTE architecture. (10 Marks)

OR

- 2 a. Describe fading in broadband wireless channel. (10 Marks)  
b. Compare empirical and statistical mathematical models in wireless communication. (10 Marks)

### Module-2

- 3 a. With block diagram, explain OFDM in LTE. (05 Marks)  
b. Compare OFDM system with SC-FDE system, with neat block diagram. (09 Marks)  
c. Compare OFDM-FDMA and OFDM-CDMA. (06 Marks)

OR

- 4 a. Discuss OFDMA and SC-FDMA in LTE. (06 Marks)  
b. Describe with respect to spatial diversity Array Gain and Increasing the data rate. (06 Marks)  
c. List the key points of single user MIMO system model in special multiplexing. (08 Marks)

### Module-3

- 5 a. Discuss the basic design principles agreed and followed in 3GPP, designing LTE specifications. (10 Marks)  
b. With suitable figure, explain frame structure type 2 in downlink OFDMA radio resources. (10 Marks)

OR

- 6 a. Explain channel coding processing in downlink transport channel with suitable figure. (10 Marks)  
b. Discuss communication process of H-ARQ in the downlink with an example. (10 Marks)

### Module-4

- 7 a. Describe channel coding and modulation processing in uplink transport channel. (10 Marks)  
b. List and explain uplink reference signals in detail. (10 Marks)

OR

- 8 a. Describe precoder for closed loop MIMO operations. (10 Marks)  
b. Discuss random access procedures in LTE. (10 Marks)

### Module-5

- 9 a. Explain PDCP functions for user plane and the control plane. (10 Marks)  
b. What are the responsibilities of RRC? Explain its states and functions. (10 Marks)

OR

- 10 a. With data flow figure, explain mobility management over the X2 interface. (10 Marks)  
b. Discuss RAN procedures and paging in LTE mobility management. (10 Marks)

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# CBBCS SCHEME

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18EC823

## Eighth Semester B.E. Degree Examination, June/July 2024 Radar Engineering

Time: 3 hrs.

Max. Marks: 100

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

### Module-1

- 1 a. Explain block diagram of a Radar with a neat diagram and explain each block. (10 Marks)  
b. Derive simple form of Radar range equation. Deduce the equation to other forms also. (10 Marks)

OR

- 2 a. Briefly describe the major areas of Radar applications. (10 Marks)  
b. Explain maximum unambiguous range of a Radar with equation and graph. (10 Marks)

### Module-2

- 3 a. Define noise figure of receiver and prove that  $R_{\max}^4 = \frac{P_t G A_e \sigma}{(4\pi)^2 K T_0 B F_n \left(\frac{S}{N}\right)_{\min}}$ . (10 Marks)  
b. Discuss briefly the following types of system losses in Radar :  
(i) Microwave plumbing losses.  
(ii) Antenna losses.  
(iii) Signal processing losses. (10 Marks)

OR

- 4 a. Discuss with equation and graphs the probability of false alarm and the probability of detection using a envelope detector. (10 Marks)  
b. Explain the Radar cross section of sphere and cone sphere targets. (10 Marks)

### Module-3

- 5 a. With necessary equations and graphs explain a CW Doppler Radar and Pulse dopler Radar with neat block diagrams. (10 Marks)  
b. Explain the working of digital Moving Target Indicator (MTI) Doppler signal processor with neat diagram. (10 Marks)

OR

- 6 a. With neat block diagram, explain the original Moving Target Detector (MTD) signal processor. (10 Marks)  
b. Derive the equations for clutter attenuation and MTI improvement factor. (10 Marks)

### Module-4

- 7 a. Define monopulse tracker. Using block diagram, explain amplitude comparison monopulse tracking Radar for a single angular coordinate. (10 Marks)  
b. What are the different types of tracking Radar Systems? Explain with diagrams, how angle tracking is done. (10 Marks)

OR

- 8 a. With neat block diagram, explain conical scan tracking Radar. (10 Marks)  
b. Discuss on tracking in range of a tracking Radar with suitable waveforms and equations. (10 Marks)

Module-5

- 9 a. List the different functions served by Radar antenna. (10 Marks)  
b. Write short note on : Superheterodyne receiver. (10 Marks)

OR

- 10 a. Explain different types of Radar display system. (10 Marks)  
b. Discuss on Electronically steered phased array antennas. (10 Marks)

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