Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 20479

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2022.

Sixth Semester

Electronics and Communication Engineering

EC 8652 – WIRELESS COMMUNICATION

(Common to : Computer and Communication Engineering/Electronics and Telecommunication Engineering)

(Regulations 2017)

Time : Three hours | Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. State the drawback of free space model.
2. Differentiate flat fading from frequency selective fading.
3. How capacity of TDMA system is computed?
4. How does keeping uncharged cell radius increase cellular capacity?
5. How PAPR issue is addressed in an OFDM system?
6. Why MSK is better than QPSK?
7. Write the significance of Zero Forcing Algorithm?
8. State the difference between micro and macro diversity.
9. What is spatial multiplexing?
10. Define beam forming in wireless communication system.

PART B — (5 × 13 = 65 marks)

11. (a) Derive the two -ray ground model expressing the relationship between received power and path loss component and compare its performance with free space propagation model.

Or

(b) (i) Find the Fraunhofer distance for an antenna with maximum dimension of 1 m and operating frequency of 40 GHz. If antennas have unity gain, calculate the path loss. (3)

(ii) If a transmitter produces 40W of power, express the transmit power in units of dBm, dBW. If 40 W is applied to a unity gain antenna with a 800 MHz carrier frequency, find the received power in dBm at a free space distance of 100m from the antenna. What is Pr (8 Km)? Assume unity gain for the receiver antenna. (10)

12. (a) With neat sketch, illustrate the Handoff mechanism adopted in cellular communication.

Or

(b) How many users can be supported for 0.6% blocking probability for following the trunked channels in a blocked calls cleared systems? 1, 10, 20, 100. Assume each user generates 0.1 Erlangs of traffic.

13. (a) Compare and contrast GMSK with other fundamental PSK modulation techniques.

Or

(b) Using IFFT and FFT architecture, explain the working principal of OFDM.

14. (a) Explain the working mechanism of adaptive Equalizer. Also list out the significance of LMS algorithm.

Or

(b) Derive the improvement that are realized using Selection diversity technique. Also compare its performance with maximal ratio combining technique.

15. (a) Derive Alamouti Block Codes for a 2 × 1 MIMO system. Also discuss about the Spatial multiplexing.

Or

(b) Can the knowledge of channel state information improve the capacity of a system under fading environment – discuss your understanding with necessary supportive mathematical models.

PART C — (1 × 15 = 15 marks)

16. (a) The network service provider wish to establish a promising cellular network in your city, prepare and illustrate the frequency planning addressing all practical limitations that can be envisaged. (Hint : N = 7).

Or

(b) Discuss about the types of interference experienced in cellular communication. Derive the mechanism to mitigate them.
