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Question Paper Code : 40453

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2021.

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. What is Small Scale fading?
2. Write the significance of link budget.
3. Define frequency reuse.
4. What is the trade off that exists between system capacity and coverage?
5. How PAPR issue can be addressed?
6. Why GMSK is better than QPSK?
7. How equalization is achieved through Zero Forcing Algorithm?
8. How error probability is computed for fading channel in SISO system?
9. Define Pre-coding.
10. How beam forming can improve performance of 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.

Or

- (b) (i) Find the Fraunhofer distance for an antenna with maximum dimension of 1 m and operating frequency of 60 GHz. If antennas have unity gain, calculate the path loss. (3)
- (ii) If a transmitter produces 50W of power, express the transmit power in units of dBm, 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 100m from the antenna. What is Pr (10 Km)? Assume unity gain for the receiver antenna. (10)

12. (a) With neat sketch, illustrate the first tier co-channel interference caused in a cluster size of 7. Also derive the expression that relates the system capacity in terms of co-channel reuse ratio.

Or

- (b) How many users can be supported for 0.5% blocking probability for following the trunked channels in a blocked calls cleared systems? 1,5,10, 20, 100. Assume each user generates 0.1 Erlangs of traffic.

13. (a) Compare and contrast QPSK, p/4 QPSK, MSK and GMSK.

Or

- (b) Explain the working principal of OFDM, also the significance of cyclic prefix and windowing.

14. (a) Explain the working mechanism of Equalizer with a simplified communication system that uses adaptive equalizer at the receiver.

Or

- (b) Write short note on

(i) Rake receiver (4)

(ii) Space Diversity and (4)

(iii) Frequency diversity (5)

15. (a) Discuss about the Space Time Block codes and Derive Alamouti Block Codes for a 2×1 MIMO system.

Or

- (b) Compare the error performance of digital modulation techniques for AWGN channel, wireless fading channels and discuss the impact made by diversity techniques in the performance.

PART C — (1 × 15 = 15 marks)

16. (a) Given a foot print by the service provider, prepare and illustrate the frequency planning addressing all practical limitations that can be envisaged. (Hint: N=7).

Or

- (b) Design a cellular network in a hilly terrain using knife edge Diffraction geometry.