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Reg. No.

Question Paper Code

11857

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL/MAY 2023

Sixth Semester

Electronics and Communication Engineering  
20ECPC603 - WIRELESS COMMUNICATION

(Regulations 2020)

Duration: 3 Hours

Max. Marks: 100

**PART - A (10 × 2 = 20 Marks)**

Answer ALL Questions

- |   | <i>Marks,<br/>K-Level,CO</i> |
|---|------------------------------|
| 1. Compare small and large scale fading.  | 2,K1,CO1                     |
| 2. Name some of the outdoor propagation models.   | 2,K1,CO1                     |
| 3. What is a handoff? List its types  | 2,K1,CO3                     |
| 4. Define co-channel reuse ratio.   | 2,K1,CO3                     |
| 5. Define some merits of MSK.   | 2,K1,CO4                     |
| 6. What is PAPR? Give its reduction techniques.   | 2,K1,CO4                     |
| 7. Why nonlinear equalizers are preferred? List out the nonlinear equalization methods. | 2,K1, CO5                    |
| 8. Compare macro and micro diversity.   | 2,K2,CO5                     |
| 9. Define Transmitter diversity.  | 2,K1,CO6                     |
| 10. Outline the drawbacks of MIMO.  | 2,K1,CO6                     |

**PART - B (5 × 13 = 65 Marks)**

Answer ALL Questions

- |  |           |
|--|-----------|
| 11. a) Explain fading due to Doppler spread and coherence time.  | 13,K2,CO1 |
| <b>OR</b>  |           |
| b) Explain in detail two path model propagation mechanisms.  | 13,K2,CO1 |
| 12. a) Explain about co-channel interference and adjacent channel interference. Describe the techniques to avoid interference. | 13,K2,CO3 |
| <b>OR</b>  |           |
| b) Identify and explain the method for increasing the capacity of wireless cellular network.                                   | 13,K2,CO3 |
| 13. a) (i) State the difference between MSK and GMSK.  | 8,K2,CO4  |
| (ii) Explain QPSK Constellation with diagrams.   | 5,K2,CO4  |

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create

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**OR**

- b) Discuss about the performance of digital modulation in frequency selective fading channels. *13,K2,CO4*

14. a) Explain the detail of maximum likelihood sequence estimation (MLSE) of Nonlinear equalizer. *13,K2,CO5*

**OR**

- b) With block diagram, explain the operation of a RAKE receiver. *13,K2,CO5*

15. a) Define Beamforming and briefly explain MIMO diversity gain. *13,K2,CO6*

**OR**

- b) Discuss the capacity of time-varying frequency-selective fading channels with respect to time invariant channels and time-varying channels. *13,K2,CO6*

**PART - C (1 × 15 = 15 Marks)**

16. a) If GSM uses a frame structure where each frame consists of 8 time slots, and each time slot contains 156.25 bits, and a data is transmitted at 270.833 kbps in the channel, find (a) the time duration of a channel (b) the time duration of a slot (c) the time duration of a frame, and (d) how long must a user occupying a single time slot wait between two successive transmission? Assume the normal time slot consists of 6 trailing bits, 8.25 guard bits, 26 training bits and two traffic bursts of 58 bits of data, find (e) the frame efficiency.. *15,K3,CO2*

**OR**

- b) (i) The GSM TDMA system uses a 270.833 kbps data rate to support 8 users per frame. (a) What is the raw data rate provided for each user? (b) If guard time, ramp-up time, and synchronization bits occupy 10.1 kbps, determine the traffic efficiency for each user. *6,K2,CO2*

- (ii) The Pacific Digital Cellular (PDC) TDMA system uses a 42.0 kbps data rate to support 3 users per frame. Each user occupies 2 of the 6 time slots per frame. (a) What is the raw data rate provided for each user? (b) If the frame efficiency is 80% and the frame duration is 6.667 ms, determine the number of information bits sent to each user per frame. (c) If half-rate speech coding is used, 6 users per frame are accommodated. Determine the number of information bits provided for each user per frame. (d) What is the information data rate per user in half-rate PDC? *9,K2,CO2*