KUMARAGURU
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M.E. DEGREE EXAMINATIONS: JUNE 2016

(Regulation 2015)

Second Semester

APPLIED ELECTRONICS

P15AETE23: Cellular and Mobile Communication

COURSE OUTCOMES

CO1:   Summarize the various mobile communication techniques.

CO2:   Demonstrate the cellular radio concepts.

CO3:   Assess the various mobile radio propagation models.

CO4:   Analyze the performance of different modulation, diversity and coding techniques

CO5:   Compare the different multiple access techniques in mobile communication.

CO6:   Identify design issues for wireless networks.

Time: Three Hours   **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1.   Radio channel used for the transmission of information from base station to the mobile   CO1   [K$_2$]
      is

a)	Reverse channel	b)	Forward channel
c)	Half duplex channel	d)	Full duplex channel

2.   Effective isotropic radiated power is given by   CO3   [K$_2$]

a)	$EIRP = P_t/G_t$	b)	$EIRP = P_t.G_t$
c)	$EIRP = P_t - G_t$	d)	$EIRP = G_t/P_t$

3.   Consider the following steps in Durkin's model   CO3   [K$_2$]

   1. Compute the difference between height of the line joining the transmitter
       and receiver antennas from the height of the ground profile.

   2. Access a topographic database of a proposed area.

   3. In this way, ground profile will be reconstructed.

   4. Interpolation methods are used to determine the intermediate heights.

   Find the correct sequence of steps

a)	1,2,3,4	b)	4,3,2,1
c)	2,4,3,1	d)	3,4,1,2

4. Match the following   CO2   [K2]

List I	List II
A. Doppler shift	1. Multipath Channel Parameter
B. Mean Excess delay	2. Shift due to motion
C. Brewster angle	3. Area mode prediction
D. Longly rice model	4. No reflection

Codes:

	A	B	C	D
(a)	1	3	2	4
(b)	4	3	2	1
(c)	1	4	3	2
(d)	2	1	4	3

5. Match the following   CO1   [K2]

List I	List II
A. Center excited cell	1. Sectored directional antennas
B. Corner excited cell	2. Average duration of a typical call
C. Request time	3. Omnidirectional antennas
D. Holding time	4. The average number of call requests per unit time.

Codes:

	A	B	C	D
(a)	3	1	4	2
(b)	4	3	2	1
(c)	1	4	3	2
(d)	2	3	4	1

6. Measure of the ability of the user to access the trunked system during the busiest hour   CO1   [K2] is known as

a)   Grade of Service   b)   Erlang

c)   Traffic intensity   d)   EIRP

7. The following items consists of two statements, one labeled as the "Assertion (A)" and   CO5   [K2] the other as "Reason (R). You are to examine those two statements carefully and select the answers to these items using the codes given below:

Codes:

    a. both A and R are individually true and R is the correct explanation of A

    b. both A and R are individually true but R is not the correct explanation of A

    c. A is true but R is false

    d. A is false but R is true.

Assertion (A): TDMA systems divide the radio spectrum into time slots

Reason (R): In TDMA each user is allocated a unique frequency band or channel.

8.   Consider the following statements.   CO4   [K_2]

    1. DPSK is a non-coherent type of PSK.

    2. DPSK needs coherent reference signal.

    3. DPSK is easy to build.

    4. In DPSK binary signal is encoded using binary sequence and modulated using BPSK.

    a)   2,3,4   b) 1,2,3,4

    c)   1,2,3   d) 1,3,4

9.   In GMSK, -------------filter is used before the modulator to reduce the transmitted bandwidth of the signal.   CO4   [K_2]

    a)   Gaussian   b) Laplacian

    c)   LPF   d) HPF

10.   Consider the following wireless networking standards.   CO6   [K_2]

    1. GSM

    2. DECT

    3. AMPS

    4. B-ISDN

Find the second generation wireless networking standards

    a)   1,2,3   b) 1,2

    c)   3,4   d) 2,3,4

PART B (10 x 2 = 20 Marks)

11.   Identify the multiple access technique needed for GSM.   CO1   [K_2]

12.   Summarize the purpose of using frequency reuse concept in cellular system.   CO2   [K_2]

13.   What is the maximum Doppler spread and the baseband spectral bandwidth of the Doppler caused random FM noise for a 900 MHz mobile radio system, if the environment is relatively stationary and the mobile transmitter is traveling at 80 km/h.   CO3   [K_3]

14. Discuss the importance of channel coding   CO4   [K_2]

15. List the disadvantages of FDMA.   CO5   [K_2]

16. Identify the design issues in personal wireless systems.   CO6   [K_4]

17. Discuss the advantages of digital modulation techniques.   CO4   [K_2]

18. Define coherence bandwidth.   CO3   [K_1]

19. What is the need for Mobile Switching Center?   CO1   [K_2]

20. Outline the cordless telephone system.   CO2   [K_2]

PART C (6 x 5 = 30 Marks)

21. Describe the satellite system used for mobile communication with block diagram.   CO1   [K_2]

22. Consider a cellular system with total bandwidth of 40MHz which uses 25KHz simplex channel to provide full duplex voice and control channels. Assume that the system uses a nine cell reuse pattern and 1MHz of the total bandwidth allocated for control channels. A) Calculate the total available channels. B) Determine the number of control channels. C) determine the number of voice channels per cell.   CO1   [K_3]

23. Discuss the handoff strategies used in cellular system design   CO2   [K_2]

24. Explain the function of MSK receiver with neat diagram.   CO4   [K_2]

25. Describe the impulse response model of a multipath channel.   CO3   [K_2]

26. Discuss the various interferences occur in mobile radio system.   CO2   [K_2]

Answer any FOUR Questions
PART D (4 x 10 = 40 Marks)

27. Draw and explain the overall architecture of GSM**.**   CO1   [K_2]

28. Discuss about the basic propagation models with example.   CO3   [K_2]

29. Classify different adaptive equalization algorithms. Explain any two algorithms in detail.   CO4   [K_2]

30. (i) Compare various multiple access methods used in mobile communication. (5)   CO5   [K_2]

    (ii) Describe CDMA system in detail. (5)

31. Explain Space Diversity and polarization diversity with example.   CO4   [K_2]

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