KUMARAGURU college of technology
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Register Number:……

M.E DEGREE EXAMINATIONS: JUNE 2015

(Regulation 2014)

Second Semester

APPLIED ELECTRONICS

P14AETE43: Cellular and Mobile Communication

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

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. The following are the steps in Durkin's model**.** [K_1]

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.

The correct sequence of steps are

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

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

2. The following are the steps in Longley rice model. [K_2]

1.When a detailed terrain profile is available the path specific parameters can be easily determined and the prediction is called a point to point mode prediction.

2.For a given transmission path the program take as its input the transmission frequency, path loss, Polarization, antenna heights etc.

3.It is available as a computer program to calculate large scale median transmission loss relative to free space loss.

4.If the terrain path profile is not available it provides techniques to estimate the path specific parameters called area mode prediction the sequence to be followed .

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

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

3. Match list I with list II and select the correct answer using the codes given below. [K_1]

List I	**List II**
A. Center excited cells	i. Sectored directional antennas
B. Corner excited cells	ii. Average duration of a typical call
C. Request rate	iii. Omnidirectional antennas
D. Holding time	iv. The average number of call requests per unit time.

	A	B	C	D
a)	iii	i	iv	ii
b)	iv	iii	ii	i
c)	i	iv	iii	ii
d)	ii	iii	iv	i

4. Match list I with list II and select the correct answer using the codes given below. [K_1]

List I	List II
A. High speed vehicles	i. Foot print
B. One cellular system to another	ii. nearest neighbor cells use different radio channels
C. f1/f2 cell planning	iii. Intersystem handoff
D. actual radio coverage	iv. Umbrella cell approach

	A	B	C	D
a)	i	iii	ii	iv
b)	iv	iii	ii	i
c)	i	iv	iii	ii
d)	ii	iii	iv	i

5. The following items consists of two statements, one labeled as the "Assertion (A)" and 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: [K_2]

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.

a) a b) b
c) c d) d

6. The following items consists of two statements, one labeled as the "Assertion (A)" and 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: [K_2]

Assertion (A) : Transfer of information in the public switched telephone network takes place over land line trunked lines called trunks.

Reason (R) : Number in PSTN changes every time depends on the coverage region.

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.

a) a b) b

c) c d) d

7. ---------- mobile wireless service supports only fixed users**.** [K_2]

a) Satellite systems b) Paging system
c) WLL d) Cellular system

8. A mobile station which operates in a service area other than from which service has been subscribed is called as ---------- [K_2]

a) Subscriber b) Transceiver

c) Roamer d) Pager

9. Consider the following statements [K_1]
   1. A linear transversal filter is made up of tapped delay lines with the tapping's spaced a symbol period T_s apart in equalization.
   2. A linear equalizer can be implemented as a FIR filter called as lattice filter.
   3. Frequency diversity is implemented by transmitting information on one corner frequency.
   4. Space diversity also known as antenna diversity.

   Which of these statements are correct?

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

10. Consider the following statements [K_1]

   1. Turbo codes are not incorporated in 3G wireless standards.
   2. Convolutional codes are fundamentally different from block codes.
   3. Time diversity does not repeatedly transmits information at time spacings.
   4. The term equalization can be used to describe any signal processing operation that minimizes ISI.

   Which of these statements are correct?

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

PART B (10 x 2 = 20 Marks)

11. Show any one example system for simulcast. [K_2]
12. Identify and write the multiple access technology needed for GSM. [K_3]
13. Summarize the purpose of using frequency reusing concept in cellular system. [K_2]
14. Outline a technique in which number of handoff is minimized for high speed users. [K_2]
15. Relate reflection with diffraction [K_2]
16. Calculate the Brewster angle for a wave impinging on poor ground having a permittivity of $\varepsilon_r = 4$ at the frequency of 100 M HZ [K_2]
17. What is search window in RAKE receiver? [K_1]
18. Show the code which enable a limited number of errors to be detected and corrected with out retransmission. [K_2]
19. Write the multiple access technique which uses signals that have a transmission bandwidth which is greater than minimum required RF bandwidth. [K_1]
20. Name the technique that provides wireless link improvement at relatively low cost. [K_1]

PART C (6 x 5 = 30 Marks)

21. Outline satellite systems in detail. [K_2]
22. Classify and explain various handoffs. [K_4]
23. Choose and explain the outdoor propagation model for urban areas. [K_3]
24. Categorize various types of analog and digital modulation techniques. [K_4]
25. Draw SS7 protocol architecture and explain layer 3. [K_1]
26. Compare TDMA system with FDMA. [K_3]

PART D (4 x 10 = 40 Marks)

27. Compare 2G, 2.5G and 3G in cellular networks. [K_4]

28. A spectrum of 30 MHZ is allocated to a wireless FDD cellular system which uses two 25 kHZ simplex channels to provide full duplex voice and control channels. Compute the number of channels available per cell if the system uses a) four cell reuse b) seven cell reuse c)12 cell reuse. If 1MHZ of the allocated spectrum is dedicated to control channels, determine an equitable distribution of control channels and voice channels in each cell for each of the three systems. [K_3]

29. Analyze the parameters of mobile multipath channels. [K_4]

30 Interpret the various algorithms for adaptive equalization [K_4]

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