Code No: R203204B **R20** SET -1

III B. Tech II Semester Regular Examinations, July -2023
MOBILE & CELLULAR COMMUNICATION
(Electronics and Communication Engineering)

Time: 3 hours Max. Marks: 70

Answer any **FIVE** Questions **ONE** Question from **Each unit**
All Questions Carry Equal Marks
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UNIT-I

1.	a)	Mention the various components of a cellular mobile system and describe them briefly.	[7M]
	b)	Determine the distance from the nearest co-channel cell for a cell having a radius of 0.6 km and a co-channel reuse factor of 12.	[7M]
		(OR)	
2.	a)	Draw the frequency reuse pattern for a cluster size of N = 7.	[7M]
	b)	Mention the various techniques used to expand the capacity of a cellular system.	[7M]

UNIT-II

3.	a)	Explain the co-channel interference factor and derive the general formula for C/I.	[7M]
	b)	Explain the different types of non-Co-Channel-Interference.	[7M]
		(OR)	
4.	a)	Derive the C/I in worst-case scenario with an omnidirectional antenna.	[7M]
	b)	What is adjacent –channel interference? How can it be minimized?	[7M]

UNIT-III

5.	a)	Explain propagation over water or flat open area.	[7M]
	b)	What is the need of set-up channels? Classify them.	[7M]
		(OR)	
6.	a)	Explain about foliage loss in detail.	[7M]
	b)	How is voice channels assigned for establishment of voice calls?	[7M]

UNIT-IV

7.	a)	What are the differences between intra-cell handoff and inter-cell handoff methods?	[7M]
	b)	What is forced handoff? Explain.	[7M]
		(OR)	
8.	a)	What are difference categories of handoff procedures in GSM?	[7M]
	b)	Explain the LOS handoff and non-LOS handoff procedures in a microcellular system.	[7M]

UNIT-V

9.	a)	Explain in detail the GSM architecture.	[7M]
	b)	Describe the salient features of 4G systems.	[7M]
		(OR)	
10.	a)	What is OFDM? and describe how is it useful in an air interface system in the 4G.	[7M]
	b)	Explain about the traffic channels in GSM.	[7M]

Code No: R203204B **R20** SET -2

III B. Tech II Semester Regular Examinations, July -2023
MOBILE & CELLULAR COMMUNICATION
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Time: 3 hours Max. Marks: 70

Answer any **FIVE** Questions **ONE** Question from **Each unit**
All Questions Carry Equal Marks
*****

UNIT-I

1. a) Why does the mobile phone cell- the basic geographic unit of cellular system- have hexagonal shape? Explain it. [7M]
   b) Determine the number of cells in clusters for the following values of the shift parameters i and j in a regular hexagonal geometry pattern: [7M]
   (i) i = 2 and j = 4 (ii) i = 3 and j = 3

(OR)

2. a) What is the need for frequency reuse? Prove that for a hexagonal geometry, the co-channel reuse ratio is given by Q =$\sqrt{3N}$, where N= i^2+ij+j^2. [7M]
   b) Define cell splitting. How does cell splitting affect the system design? [7M]

UNIT-II

3. a) Explain the co-channel interference reduction factor and derive the general formula for C/I. [7M]
   b) Explain the diversity receiver in detail. [7M]

(OR)

4. a) Establish the relation between D/R and S/I for several numbers of tires of interference and deduce the result for the geographical model with six interference. [7M]
   b) Discuss the diversity schemes for interference reductions in both mobile unit and cell site. [7M]

UNIT-III

5. a) Explain the effect of propagation of mobile signals over water. [7M]
   b) Explain how set-up channels act as control channels in a cellular system. [7M]

(OR)

6. a) Discuss the merits of point-to-point model. [7M]
   b) Discuss the concept of frequency management concern to the numbering the channels and grouping into the subset. [7M]

UNIT-IV

7. a) Derive the blocking probabilities for handoff calls and the blocking probability of originating calls. [7M]
   b) Define the dropped call rate. How dropped calls are considered? [7M]

(OR)

8. a) Classify different handoff mechanisms and explain each technique. [7M]
   b) What are the different methods of delaying the handoff? Explain briefly. [7M]

UNIT-V

9. a) Compare the 3G and 4G systems. [7M]
   b) Give the limitations and specifications of the GPRS system. [7M]

(OR)

10. a) Explain the different types of interfaces used to connect the units of base station subsystem in GSM. [7M]
    b) With a neat block diagram explain the OFDMA system. [7M]

Code No: R203204B **R20** SET -3

III B. Tech II Semester Regular Examinations, July -2023
MOBILE & CELLULAR COMMUNICATION
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Time: 3 hours Max. Marks: 70

Answer any **FIVE** Questions **ONE** Question from **Each unit**
All Questions Carry Equal Marks
*****

UNIT-I

1.		Explain the evaluation of the analogue and digital cellular mobile systems.	[14M]
		(OR)	
2.		Describe the microzone and picozone concepts in a cellular system.	[14M]

UNIT-II

3.	a)	Distinguish between signal and co-channel interference received by the mobile unit and cell site.	[7M]
	b)	Discuss the antenna parameters and their effects.	[7M]
		(OR)	
4.	a)	Discuss the need for co-channel interference models.	[7M]
	b)	Explain the reduction of co-channel interference using an adaptive antenna.	[7M]

UNIT-III

5.	a)	Explain about Propagation over water and flat open area.	[7M]
	b)	Discuss the concept of phase difference between direct and reflected paths.	[7M]
		(OR)	
6.		Explain the various channel assignments to the cell sites and mobile units.	[14M]

UNIT-IV

7.	a)	Describe the classification of handoff process.	[7M]
	b)	Differentiate the soft, softer and hard handoffs.	[7M]
		(OR)	
8.	a)	Explain the necessity of power difference handoff. Also explain conditions based on the power difference handoff?	[7M]
	b)	Explain how handoff is initiated and delayed.	[7M]

UNIT-V

9.	a)	What are the difference between GSM and CDMA mobile phone?	[7M]
	b)	Describe the WCDMA architecture.	[7M]
		(OR)	
10.	a)	Compare the 3G cellular air interface technologies WCDMA and CDMA2000.	[7M]
	b)	Explain the limitations of 4G.	[7M]

Code No: R203204B **R20** SET -4

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Time: 3 hours Max. Marks: 70

Answer any **FIVE** Questions **ONE** Question from **Each unit**
All Questions Carry Equal Marks
*****

UNIT-I

1.			Introduce cellular mobile system and Explain the operation of a cellular system in detail.	[14M]
			(OR)	
2.			Explain cell splitting and cell sectoring in detail and mention the various advantages of cell spitting concept.	[14M]
			UNIT-II	
3.	a)		Explain about estimation of co-channel interference level.	[7M]
	b)		Discuss the design of antenna system and antenna parameters.	[7M]
			(OR)	
4.	a)		How do you compute the C/I ratio for cellular system?	[7M]
	b)		Consider the advanced mobile phone system in which an S/I ratio of 18 dB is required for the accepted voice quality. What should be the reuse factor for the system? Assume path loss exponent n = 4. What will be the reuse factor of the global system of mobile (GSM) system in which 12 dB is required?	[7M]
			UNIT-III	
5.			Discuss the concept of frequency management concern to the numbering the channels and grouping into the subset.	[14M]
			(OR)	
6.			Discuss in detail point-to-point path loss prediction model. Discuss the factors that affect the accuracy of prediction.	[14M]
			UNIT-IV	
7.	a)		Explain the concept of delayed handoff and forced handoff.	[7M]
	b)		Discuss the method of queuing of handoffs.	[7M]
			(OR)	
8.	a)		How can handoff be implemented based on signal strength? Explain.	[7M]
	b)		What is meant by a dropped call? And what are the factors that influence the dropped call rate?	[7M]
			UNIT-V	
9.			Explain the GSM operation call from mobile phone to PSTN and call from PSTN to mobile phone.	[14M]
			(OR)	
10.			Explain the advantages of 4G network technology over 3G and application of 4G.	[14M]