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B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

January / February 2025 Semester End Main Examinations

Programme: B.E. **Semester: VII**
Branch: Electronics and Communication Engineering **Duration: 3 hrs.**
Course Code: 22EC7PCWCN **Max Marks: 100**
Course: Wireless Communication and Networks

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

			UNIT - I	*CO*	*PO*	Marks
1	a)		Briefly discuss the evolution of Mobile communication considering the parameters such as Frequency spectrum, Bandwidth, Modulation technique used, Multiple access technology used and throughput.	*CO 1*	-	**6**
	b)		Explain the operation of Mobile IP using schematic diagram	*CO 3*	PO *2*	**7**
	c)		In a GSM system elaborate on the process of inter MSC handover operation	*CO 2*	PO *1*	***7***
			OR			
2	a)		Describe the characteristics of 1G, 2G , 3Gand 4G cellular system. How do 2G cellular system supports more than one user per channel.	*CO 1*	-	**6**
	b)		With the neat architecture of GSM system, explain role of network subsystem and base station sub	*CO 2*	PO 1	**7**
	c)		In a scenario where PSTN(fixed line) subscriber calls GSM subscriber, write the steps of callflow procedure adopted in GSM 2G network.	*CO 3*	PO 2	**7**
			UNIT - II			
3	a)		Highlight the significance of frequency reuse during frequency planning ?	*CO 2*	PO 1	**6**
	b)		If a total of 33 MHz of bandwidth is allocated to a particular FDD cellular telephone system which uses two 25KHz simplex channels to provide full duplex voice and control channels, compute the number of channels available per cell if a system uses a) four-cell reuse b) seven –cell reuse and c) 12-cell resue. If 1 MHz 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.Comment on the result	*CO 2*	PO 1	**7**

		c)	Explain handoff strategies in cellular network	*CO 2*	PO 1	**7**
			OR			
	4	a)	Explain the role of Power control mechanism in interference reduction	*CO 2*	PO 1	**6**
		b)	Assume a system of 16 cells in a system and ,total frequency bandwidth allocated are 343 traffic channels, and a reuse factor of N = 7. how many channels can be assigned per cell, and what is capacity of the system	*CO 2*	PO 1	**7**
		c)	Differentiate between the cell splitting and cell sectoring Cellular network.	*CO 2*	PO 1	**7**
			UNIT - III			
	5	a)	Discuss three basic radio wave propagation mechanisms	*CO 2*	PO 1	**6**
		b)	If a transmitter produces 50W of power ,express the transmit power in units of (a) dbm and b) 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 100 m from the antenna. What is Pr(10 Km) ? Assume unity gain for the receiver antenna. Comment on the result	*CO 2*	PO 1	**7**
		c)	Explain the Okumara Model. List the applications where the Okumura model is applicable.	*CO 2*	PO 1	**7**
			OR			
	6	a)	With a neat Schematic diagram and equation explain the Ground Reflection (Two-Ray) Model. Mention the application where the model is widely used.	*CO 3*	PO 2	**6**
		b)	A base station located at a height of 30 m transmits to a user at the distance of 5km at a frequency of 900Mhz. The height of the receiver is 2m. The transmitter's power is 10mW and the gains of the transmitter and the receiver antennas are 8dB and 3dB respectively. a) find the received power in dBm using free space pathloss model. b) repeat the computation of received power in dBm at 2100 MHz. Comment on the result	*CO 2*	PO 1	**7**
		c)	Explain the Hata Model. List the applications where the Hata model is applicable.	*CO 3*	PO 2	**7**
			UNIT - IV			
	7	a)	Explain the LTE system architecture with neat Block diagram	*CO 2*	PO 1	**6**

		b)	Explain with neat diagram how the resource block structure in LTE accommodates more number of subscribers in LTE network.	*CO 2*	PO 1	**7**
		c)	Explain OFDMA Transmitter using block diagram assuming 8 users	*CO 2*	PO 1	**7**
			OR			
	8	a)	Highlight the Radio Spectrum assigned for LTE	*CO 2*	PO 1	**6**
		b)	Discuss the LTE frame structure with a neat diagram	*CO 2*	PO 1	**7**
		c)	Explain OFDMA Receiver using block diagram assuming 8 users.	*CO 2*	PO 1	**7**
			UNIT - V			
	9	a)	List the 5G enabling technologies.	*CO 1*	-	**4**
		b)	Discuss the 5G spectrum for backward compatible RAT and non Backward compatible RAT	*CO 3*	PO 2	**6**
		c)	Describe 5G service architecture with a neat block diagram	*CO 2*	PO 1	**10**
			OR			
	10	a)	Explain the concept of Device to Device communication in 5G considering any use case	*CO 3*	PO 2	**6**
		b)	With a neat block diagram explain the massive MIMO technology as applied to 5G	*CO 2*	PO 1	**7**
		c)	Present the features of i) Carrier aggregation ii) Small cells	*CO 2*	PO1	**7**

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