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

Autonomous Institute Affiliated to VTU

April 2025 Semester End Make-Up 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.

			UNIT - I	CO	PO	Marks
1	a)		Differentiate between Bluetooth and Wi-Fi networks. In a scenario where short-range communication between devices like smartphones and smartwatches is to be used, mention which would be the suitable wireless network	CO2	PO1	8
	b)		Indicate limitations of traditional IP and explain how the process of encapsulation and tunneling in mobile IP helps user in travelling to a different network	CO2	PO1	8
	c)		Outline the function of Operations and Maintenance subsystem in GSM	CO1	-	4
			OR			
2	a)		Differentiate between adhoc and infrastructure WLANs. In a scenario where, wireless connectivity is to be provided for a group of participants with a laptop in a conference only for the duration of the meeting. Which wireless topology is preferable?	CO2	PO1	8
	b)		In a scenario, a user A of the public phone network-PSTN calls a GSM mobile subscriber B. Identify the call flow steps for establishing connection between A and B	CO2	PO1	8
	c)		Outline the features of Authentication center in GSM	CO1	-	4
			UNIT - II			
3	a)		In a scenario of urban heavily populated congested cell, explain how the system capacity can be improved by cell splitting and cell sectoring.	CO2	PO1	8
	b)		Explain the mechanisms that are employed to overcome the interference in cellular system	CO3	PO2	8
	c)		If the area of each cell in a GSM system is 6.65 square Kms, compute reuse distance for a)cluster size of 7, b) cluster size of 12. Assume cell shape to be hexagon	CO2	PO1	4

			OR			
4	a)		Discuss various channel assignment strategies used in cellular network.	*CO2*	*PO1*	**8**
	b)		Explain with diagram the a) umbrella cell approach b) micro cell zoning and scenario where they are used.	*CO3*	*PO2*	**8**
	c)		Assume 32 cells are provided in cellular system with each cell area of 5 square Kms, what would be the total service area. If there are 336 channels and cluster size is 7, compute the channels allocated to each cell. Assume hexagonal cell shape	*CO2*	*PO1*	**4**
			UNIT - III			
5	a)		Explain the suitability of Knife Edge Diffraction model in a scenario where there is obstruction between base station and user, using relevant diagram	*CO3*	*PO2*	**8**
	b)		A base station transmitter has a output power of 10W at 250MHz. The transmitter is connected by 20meter RF cable that has loss of 0.6dB meters for given length. The transmitter antenna gain is 9dB and receiving antenna at 25Km away has gain of 4dB. At receiver there is impedance mismatch loss of 0.2dB. Compute the power delivered at receiver assuming free space model. State the need for link budget in predicting coverage of the cell.	*CO3*	*PO2*	**8**
	c)		Compute the far field distance for a base station antenna with largest antenna dimension D=0.5m if frequency of operation is GSM 1800MHz.	*CO2*	*PO1*	**4**
			OR			
6	a)		With a neat diagram explain the Ground Reflection (Two-Ray) Model, indicate where this model is used.	*CO3*	*PO2*	**8**
	b)		Determine the propagation pathloss(dB) for a radio signal at 800MHz with transmitting antenna height 30meters, receiving antenna height 2 meters which is at distance of 10Kms from transmitter, using two ray model. Compare it with free space model and comment. Assume gains of antenna as 1dB	*CO3*	*PO2*	**8**
	c)		In the following cases indicate if two ray model is applicable ht=35m, hr =3m, d=259 m ht=30m, hr=1.5m, d=450m	*CO2*	*PO1*	**4**
			UNIT - IV			
7	a)		Present the details of resource block in 4G with neat	*CO*	*PO1*	**8**

			structure. Compute number of resource blocks and bits per subcarrier and maximum bit rate for each of the case given below a) Bandwidth is 20 MHz b) Bandwidth is 15MHz. Assume 10% guard band and 64 QAM modulation, normal CP	*2*		
		b)	In LTE, explain uplink data transmission and reception with three main steps in procedure diagram	*CO3*	*PO2*	**8**
		c)	List any three functions of eNodeB	*CO 2*	*PO1*	**4**
			OR			
	8	a)	Present the LTE frame structure indicating slot duration, minimum time per symbol and number of symbols/slots. Also compute number of subcarriers for i) 5MHz bandwidth, ii)10MHz bandwidth. Assume 10% guard band, normal CP and 64QAM modulation	*CO 2*	*PO1*	**8**
		b)	In LTE, explain OFDMA reception procedure for 8 users with block diagram	*CO3*	*PO2*	**8**
		c)	List any two functions of MME	*CO 2*	*PO1*	**4**
			UNIT - V			
	9	a)	Summarize the main system concepts which has been defined for three main application areas for the enhanced capabilities of 5G.	*CO3*	*PO2*	**10**
		b)	Discuss the new features i)Multi RAT ii) massive MIMO in 5G	*CO3*	*PO2*	**10**
			OR			
	10	a)	Summarize the requirements and key performance indicators of 5G on which applications are based.	*CO3*	*PO2*	**10**
		b)	Discuss the features of i) D2D communications ii) M2M communications	*CO 2*	*PO1*	**10**

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