BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: BTECH **SEMESTER : VI**
BRANCH: ECE **SESSION : SP/2025**

SUBJECT: EC373 MOBILE AND CELLULAR COMMUNICATION

TIME: 3 Hours **FULL MARKS: 50**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

			CO	BL
Q.1(a)	Discuss the journey from GPRS to UMTS communication system in terms of technology, Architecture, protocols and performance. Discuss the factors that decides the geometry of the cell in real life. Why a Hexagon is preferred to represent a cell?	[3+1+1]	1	2
Q.1(b)	Explain the requirement of the gap between handoff threshold and the minimum usable signal. Discuss the impact of size of this gap. A cellular system with 100 cell, operating with 4 cells in a cluster is assigned a total of 500 full duplex channels. Find the number of channels per cell and the total number of active links possible.	[2+3]	1	3
Q.2(a)	Explain Smart Antenna System. Discuss in detail how cell splitting is performed and its after effect over different parameters of cellular system.	[3+2]	2	2
Q.2(b)	Explain in detail the Adjacent channel Interference in downlink, its cause and possible remedies. Derive an expression to show relationship between co-channel reuse ratio and cluster size. Find the distance to the nearest co-channel cells if frequency reuse ratio is 4.58 and cell radius is 2 Kms.	[2+2+1]	2	3
Q.3(a)	Explain Small scale fading. Discuss its categorization on the basis of 'signal parameters', (signal bandwidth and symbol period) and 'channel parameters' (coherence time and coherence bandwidth).	[5]	3	2
Q.3(b)	Compare Time dispersive and frequency dispersive channel in terms of coherence time, symbol duration, coherence bandwidth and signal bandwidth. A mobile receiver using isotropic antenna requires minimum -90 dBm power. Assume an antenna transmits 100 milliwatt power in all the directions uniformly. Find radius of the service area at 800 MHz transmission frequency.	[3+2]	3	3
Q.4(a)	Discuss the concept of Diversity. Explain Space diversity in detail.	[5]	4	2
Q.4(b)	With the help of suitable block diagram explain Threshold combiner in detail In five branch diversity, assume each branch receives an independent Rayleigh fading signal, having average SNR of 20 dB. Find the mean SNR and the probability that the SNR will drop below 10 dB.	[3+2]	4	3
Q.5(a)	Explain FDMA/FDD system. Compare FHSS and FDMA schemes.	[5]	5	2
Q.5(b)	Discuss various variants of CSMA. A DSSS system has a spreading code rate of 1.2288Mcps and an information data rate 9.6 Kbps. Find the processing gain	[4+1]	5	3

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