Semester:7 ECE	Department of ECE	AY: 2026-27
Course Code:BEC703	Course Name:Wireless Communication Systems	

Question Bank

Q.	Module-01	M	L	C
1	Define wireless communication system. Explain Rayleigh fading in wireless channels.	10	L2	CO1
2	Explain the basics of wireless channel modelling.	10	L2	CO1
3	Explain the Doppler impact and Doppler fading on a wireless channel.	10	L2	CO1
4	Write a note on coherence time and coherence bandwidth.	10	L2	CO1
5	Explain the concept of large-scale and small-scale fading in a wireless channel.	10	L2	CO1
6	Explain the concept of path loss and shadowing in wireless signal propagation.	10	L2	CO1
7	In the wireless Rayleigh fading channel consider a transmit power Pt (dB) = 20 dB. What is the probability that the power at the receiver is greater than Pr(dB) = 10 dB?	10	L2	CO1
8	Explain the modeling of wireless systems with proper equations.	10	L2	CO1
9	Give the mathematical equations for RMS Delay Based on Average Power Profile.	10	L2	CO1
10	Write a note on Coherence time	10	L2	CO1
	Module 2			
11	Explain the CDMA mechanism with a neat diagram.	10	L2	CO2
12	Explain the fundamentals of CDMA codes and spreading codes based on PN sequences.	10	L2	CO2
13	Explain the correlation properties of random CDMA spreading sequences.	10	L2	CO2
14	Explain the motivation for multicarrier transmission and the basics of OFDM, with a suitable example.	10	L2	CO2
15	Explain MIMO-OFDM system with a neat block diagram.	10	L2	CO2

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16	Write a note on OFDM Peak-to-Average Power Ratio (PAPR) and SC-FDMA.	10	L2	CO2
17	Explain the Properties of PN sequences.	10	L2	CO2
18	Explin an toe afrestagis o CDMA	10	L2	CO2
19	Illustrate OFDM with an example	10	L2	CO2
20	With neat schematic explain MIMO-OFDM Transmitter.	10	L2	CO2
	Module-03			
21.	Explain the first generation cellular system.	10	L2	CO2
22.	Explain the 2G digital cellular system - GSM - and its evolution, with a neat architecture diagram.	10	L2	CO2
23.	Write a note on the 3G broadband wireless system.	10	L1	CO2
24	Explain the key enabling technologies and features of LTE.	10	L2	CO2
25	With a neat diagram, explain the LTE network architecture.	10	L2	CO2
26	Explain Orthogonal Frequency Division Multiple Access (OFDMA) and Single Carrier FDMA (SC-FDMA) used for multiple access in OFDM systems.	10	L2	CO2
27	Explain GSM Network Architecture.	10	L2	CO3
28	Explain IP-Based Flat Network Architecture.	10	L2	CO3
29	Explain Multi Antenna techniques.	10	L2	CO3
30	Explain LTE Network Architecture with necessary diagram.	10	L2	CO3
	Module-04			
31	Give an introduction to MIMO wireless communications and explain the MIMO system model.	10	L2	CO4
32	Explain the working of the MIMO Zero-Forcing (ZF) receiver.	10	L2	CO4
33	Explain the MIMO MMSE receiver.	10	L2	CO4
34	Explain the Singular Value Decomposition (SVD) of a MIMO channel and its relation to MIMO capacity.	10	L2	CO4

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35	Explain the Alamouti code and Space-Time codes used in MIMO systems.	10	L2	CO4
36	Explain the V-BLAST nonlinear MIMO receiver and the concept of MIMO beamforming.	10	L2	CO4
37	Explain MIMO System Model.	10	L2	CO4
38	Derive Expression for MIMO Zero-Forcing (ZF) Receiver.	10	L2	CO4
39	Compute the MIMO zero-forcing receiver for the channel matrix H given H=[2 3 1 3 1 2]	10	L2	CO4
40	Derive expression for MIMO MMSE Receiver	10	L2	CO4
	Module-05			
41	Explain the LTE radio interface architecture and its design principles.	10	L2	CO3
42	With a neat diagram, explain the E-UTRAN and EPC network architecture of LTE.	10	L2	CO3
43	Explain the radio interface protocols of LTE (PHY, MAC, RLC, PDCP and RRC layers).	10	L2	CO3
44	Explain the hierarchical structure of LTE - logical channels, transport channels and physical channels - along with channel mapping.	10	L2	CO3
45	Explain the downlink OFDMA radio resources and physical resource blocks in LTE.	10	L2	CO3
46	Explain the uplink SC-FDMA radio resources in LTE.	10	L2	CO3
47	With neat diagram, explain design principles of LTE Network	10	L2	CO3
48	Explain the Hierarchical Channel Structure of LTE.	10	L2	CO3
49	Explain the time domain frame structures of OFDM.	10	L2	CO3
50	Explain Uplink SC-FDMA Radio Resources	10	L2	CO3

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Faculty Signature

***Note:**

1. All modules should contain a minimum of **10** questions each and the total number of questions must be **50**.
2. Questions can carry marks of 06, 07, 08, 09, 10 and for problems: 04 or 05.
3. Follow the RBTL as per the keywords used to frame the questions.
4. Maintain the Course Outcomes (COs) as per the syllabus.
5. M: Marks, L: RBTL, C:COs.

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