Reg. No															

B.Tech DEGREE EXAMINATION, DECEMBER 2023

Fifth and Seventh Semester

18ECO101T - SHORT - RANGE WIRELESS COMMUNICATION

(For the candidates admitted during the academic year 2020 - 2021 & 2021 - 2022)

Note:

i. **Part - A** should be answered in OMR sheet within first 40 minutes and OMR sheet should be handed over to hall invigilator at the end of 40th minute.

ii. **Part - B** and **Part - C** should be answered in answer booklet.

Time: 3 Hours **Max. Marks: 100**

PART - A (20 × 1 = 20 Marks) — Answer **all** Questions

		Marks	BL	CO
1.	Which organization has authority over interstate and international commerce in communication field in US? (A) ITU-T (B) IEEE (C) FCC (D) ISOC	1	1	1
2.	What is a short-range wireless communication technology called? (A) Internet (B) MAN (C) Bluetooth (D) PS	1	1	1
3.	What is a Frequency used for short-range wireless communication? (A) 2.4 MHz (B) 5 MHz (C) 10GHz (D) 2.4 GHz	1	1	1
4.	What is the frequency range of UWB? (A) 2 GHz (B) 100 MHz (C) 15 GHz (D) 10 GHz	1	1	1
5.	What is the name of 300 MHz of unlicensed spectrum allocated by FCC in ISM band? (A) UNII (B) Unlicensed PCS (C) mm Wave (D) Bluetooth	1	1	2
6.	Which type of antenna is often used for satellite communication due to its high gain and narrow beam width? (A) Loop antenna (B) Dipole antenna (C) Parabolic antenna (D) Log-periodic antenna	1	1	2
7.	What does modulation in communication refer to? (A) The process of encoding digital data into analog signals (B) The process of encrypting data for secure transmission (C) The process of increasing the power of a signal (D) The process of reducing noise in a signal	1	1	2
8.	Which part of the electromagnetic spectrum do RF frequencies primarily occupy? (A) Infrared (B) Microwave (C) Ultraviolet (D) Radio	1	1	2
9.	What is the primary role of the IF (Intermediate Frequency) stage in an RF receiver? (A) To amplify the RF signal (B) To mix the RF signal with a local oscillator frequency (C) To extract the audio signal from the RF signal (D) To filter out noise and selectivity improve signal quality	1	1	3

10. In a direct conversion receiver block diagram, which block is responsible for translating the incoming RF signal to an intermediate frequency (IF) signal? 1 1 3
(A) Mixer (B) Local Oscillator
(C) RF Amplifier (D) IF Amplifier

11. What is the primary function of a repeater in a communication system? 1 1 3
(A) To amplify incoming signals (B) To convert analog signals to digital signals
(C) To extend the range of signals by retransmitting them (D) To extend the range of signals by retransmitting them

12. What does TRF stand for in the context of radio receivers? 1 1 3
(A) Tuned Radio Frequency (B) Transmitted Radio Frequency
(C) Time-Resolved Fluorescence (D) Transmission Rate Factor

13. What is the typical range of a WPAN, as defined by most WPAN standards? 1 1 4
(A) Up to 10 meters (B) Up to 100 meters
(C) Up to 1 kilometer (D) Up to 10 kilometers

14. Which frequency band corresponds to millimeter waves in the electromagnetic spectrum? 1 1 4
(A) UHF (Ultra High Frequency) (B) VHF (Very High Frequency)
(C) EHF (Extremely High Frequency) (D) SHF (Super High Frequency)

15. What is multipath propagation in wireless communication? 1 1 4
(A) The simultaneous transmission of multiple signals on the same frequency (B) The scattering of radio waves due to obstacles, resulting in multiple signal paths
(C) The process of encoding digital data into analog signals (D) The use of multiple antennas to improve signal reception

16. What is OFDM an acronym for in the context of wireless communication? 1 1 4
(A) Orthogonal Frequency Division Modulation (B) Orthogonal Frequency Division Multiplexing
(C) Optical Fiber Data Modulation (D) Overlapping Frequency Domain Multiplexing

17. Which component is responsible for converting electrical signals into optical signals in an optical communication system? 1 1 5
(A) Optical fiber (B) Laser diode
(C) Photodetector (D) Optical amplifier

18. In a photodetector, what is the main source of noise when converting optical signals into electrical signals? 1 1 5
(A) Thermal noise (B) Shot noise
(C) Laser noise (D) Crosstalk noise

19. In VLC, what type of light sources are commonly used for data transmission? 1 1 5
(A) Ultraviolet (UV) LEDs (B) Infrared (IR) LEDs
(C) White LEDs (D) Laser diodes

20. What is the modulation technique typically used in VLC to transmit data? 1 1 5
(A) Amplitude modulation (AM) (B) Frequency modulation (FM)
(C) Phase modulation (PM) (D) Orthogonal Frequency Division Multiplexing (OFDM)

PART - B (5 × 4 = 20 Marks) **Marks BL CO**

Answer **any 5** Questions

21. Draw a simplified wireless communication Transmitter and receiver. 4 1 1

22. What are all the characteristics of short range Radio? 4 1 1

23.	Define Antenna and explain the types of Antennas.	4	1	2
24.	Draw the Radio communication link diagram	4	1	2
25.	Write short notes on repeaters.	4	1	3
26.	What is SAW band pass filter matching?	4	1	4
27.	What is multipath propagation modeling, and why is it important in wireless communication?	4	1	5

PART - C (5 × 12 = 60 Marks)

Answer **all** Questions

		Marks	BL	CO
28.	(a) Draw the block diagram of UWB Transmitter and receiver and explain them in detail.	12	1	1
	(OR)			
	(b) List the terms and definitions related to FCC regulations.			
29.	(a) What is modulation? What are the different types of modulation techniques used in communication systems?	12	1	2
	(OR)			
	(b) What is spread spectrum technology? Explain DSSS with neat block diagram.			
30.	(a) How does the tuning process work in a TRF receiver, and how is selectivity achieved to isolate desired radio signals?	12	1	3
	(OR)			
	(b) How does the superheterodyne receiver perform frequency conversion, and what is the role of the local oscillator in this process?			
31.	(a) Define OFDM, Explain the transmitter and receiver of OFDM with neat diagram	12	1	4
	(OR)			
	(b) What are all the characteristics of mm Waves and also explain Mm Wave for 5G Cellular in PAN.			
32.	(a) How does optical microwave mixing contribute to the transmission of UWB signals over various communication systems, including fiber-optic and wireless networks?	12	1	5
	(OR)			
	(b) What is a mixed wireless-wired UROOF channel, and how does it combine wireless and fiber-optic communication elements?			

* * * * *