b.	Discuss on the Carrier Frequency Offset (CFO) and the CFO estimation methods.	10	2	2	4
28. a.	Elaborate on the various diversity combining techniques.	10	3	3	4
	(OR)				
b.	Discuss the working principle of MIMO transmitter and receiver and brief about the performance metrices of MIMO system.	10	3	3	12
29. a.	What is spectrum sharing? Classify the spectrum sharing techniques into four type and examine each type.	10	2	4	1
	(OR)				
b.	In cognitive radio systems, discover techniques that can be used to find when the prior knowledge of signal structure is available and not available cases. Analyze atleast one techniques per case.	10	2	4	4
30. a.	Predict the role of the millimeter wave communications in following applications				
	(i) Intelligent transport systems	5	3	5	3
	(ii) Home environment	5	3	5	3
	(OR)				
b.	Construct a receiver which is to be operated in millimeter wave range, containing a mixer and IF section.	10	3	5	4

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Reg. No.														

B.Tech. DEGREE EXAMINATION, NOVEMBER 2022
Sixth and Seventh Semester

18ECE220T – ADVANCED MOBILE COMMUNICATION SYSTEMS
(For the candidates admitted from the academic year 2018-2019 to 2019-2020)

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** should be answered in answer booklet.

Time: 2½ Hours Max. Marks: 75

PART – A (25 × 1 = 25 Marks)
Answer **ALL** Questions

		Marks	BL	CO	PO
1.	_____defined as the time for a handset to transition from various non-active states to active states. (A) Control plane latency (B) User-plane latency (C) Non user plane latency (D) Time plane latency	1	2	1	4
2.	The _____interface is the interface between different BSs. (A) X (B) X1 (C) X2 (D) X3	1	1	1	4
3.	In LTE, each sub frame consists of _____slots, which are each _____long. (A) Three, 1 ms (B) Two, 0.5 ms (C) Two, 1 ms (D) Three, 0.5 ms	1	1	1	12
4.	_____are used for channel estimation and tracking with respect to Multi Carrier Modulation (MCM). (A) Data structure (B) Channel subcarriers (C) Pilot subcarriers (D) Null subcarriers	1	2	1	4
5.	_____performs function related to data integrity and IP header compression. (A) Packet data convergence protocol (B) Packet delivery convergence protocol (C) Packet data control protocol (D) Packet delivery control protocol	1	2	1	2
6.	Scattering occurs when medium consists of objects with dimensions _____compared to the wavelength. (A) Tiny (B) Small (C) Large (D) Very large	1	2	2	4
7.	Free space propagation model is to predict_____ (A) Transmitted power (B) Gain of transmitter (C) Received signal strength (D) Gain of receiver	1	2	2	4

8. Diffraction occurs when a radio path between transmitter and receiver is obstructed by _____ 1 1 2 12
(A) Surface having sharp irregularities (B) Smooth irregularities
(C) Rough surface (D) Smooth surface

9. If the delay spread is 10 ns and the symbol time is 1 μs the radio channel is considered to be _____ 1 2 2 4
(A) Narrow band (B) Wideband
(C) Rayleigh faded (D) Doppler shifted

10. Due to the unknown transmission time or propagation delay of OFDM symbol at receiver the impairment occurred is _____ 1 2 2 12
(A) Carrier frequency offset (B) Symbol timing offset
(C) Phase noise (D) Sampling clock offset

11. The essential difference between V blast and D blast lies in the _____ 1 3 3 4
(A) Vector encoding process (B) Scalar encoding process
(C) Scalar decoding process (D) Vector decoding process

12. Capacity C for single input single output system is _____ 1 3 3 4
(A) $C = BW \log_1(1 - SNR)$ (B) $C = BW \log_2(1 + SNR)$
(C) $C = BW \log_2(2 + SNR)$ (D) $C = BW \log_2(2 - SNR)$

13. Diversity schemes provides two or more inputs at the receiver such that the fading phenomena among these inputs are _____ 1 3 3 4
(A) Related (B) Unrelated
(C) Correlated (D) Uncorrelated

14. The Alamouti space time code are modulated using _____ 1 2 3 12
(A) ASK modulation (B) PSK modulation
(C) M-ary modulation (D) FSK modulation

15. Calculate the theoretical channel capacity. If SNR(dB)=36 and the channel bandwidth is 2 MHz. 1 3 3 4
(A) 24 Mbps (B) 14 Mbps
(C) 12 Mbps (D) 16 Mbps

16. Pick out the application that does not use cognitive radio principle 1 1 4 1
(A) Emergency and public safety communications by utilizing "secondary user" concept (B) Application the executes dynamic spectrum
(C) System that utilizes spectrum hole (D) Radio and television broadcast

17. Which among the following is not a disadvantage of cooperation detection? 1 1 4 1
(A) Overhead traffic (B) Receiver uncertainty
(C) Additional storage (D) Shadowing uncertainty

18. Find a valid spectrum sensing technique among the given options 1 1 4 1
(A) Non-competitive (B) Cooperative
(C) Interrupt based (D) Distribution based

19. A lot of the spectrum assigned to TV transmission is not used. This space is associated with following _____ colour. 1 1 4 1
(A) White (B) Blue
(C) Saffron (D) Brown

20. In a fully cognitive radio receiver, digital signal processors are used in _____ 1 1 4 4
(A) RF section (B) Local oscillators section
(C) Baseband section (D) Audio section

21. At 60 GHz, a clear glass will ofer an attenuation of _____ 1 1 5 1
(A) 896 dB (B) 6.4 dB
(C) 0.003 dB (D) – 34 dB

22. Approximate bandwidth available in millimeter wave communication is _____ 1 1 5 4
(A) 67 MHz (B) 7 GHz
(C) 800 KHz (D) 0.1 GHz

23. At room temperature and for a bandwidth of 1 Hz, the noise power equal to _____ 1 1 5 3
(A) –174 dBm (B) 198 W
(C) 3.37 dB (D) 89 kW

24. Incident wave bumped on a rough surface. It creates _____ 1 1 5 1
(A) Reflected wave (B) Knife edge wave
(C) Scattered wave (D) Line of sight wave

25. Direct conversion millimeter wave receivers are otherwise called as _____ 1 1 5 4
(A) Zero- IF approach (B) Heterocryptic –IF scheme
(C) Zero RF approach (D) Zero baseband scheme

PART – B (5 × 10 = 50 Marks) Marks BL CO PO
Answer **ALL** Questions

26. a. Discuss on evolution of cellular technology and describe briefly on 3GPP evolution. 10 3 1 4

(OR)

b. Draw and explain the functions of LTE system architecture. 10 3 1 4

27. a. Illustrate the orthogonality principle of OFDM and state its advantages over FDM. 10 3 2 4

(OR)