| Reg. No | | | | | | | | | | | | | | | | |
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# B.Tech DEGREE EXAMINATION, MAY 2024

Seventh Semester

## 18ECE220T - ADVANCED MOBILE COMMUNICATION SYSTEMS

*(For the candidates admitted during the academic year 2018-2019 to 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. | The time taken to transmit a small internet protocol packet to the edge node of the radio access network is termed as _____.<br>(A) User Plane Latency (B) Round trip latency<br>(C) Control Latency (D) Transit Latency | 1 | 1 | 1 |
| 2. | Select the odd one from the following<br>(A) LTE (B) Wi Max<br>(C) Packet Switching (D) AMPS | 1 | 1 | 1 |
| 3. | _____ are used for channel estimation and tracking<br>(A) data subcarriers (B) channel subcarriers<br>(C) Pilot subcarriers (D) Null subcarriers | 1 | 1 | 1 |
| 4. | In Wi Max architecture _____ provides internet access.<br>(A) System architecture evolution (B) connectivity service network<br>(C) access service network (D) packet core network | 1 | 1 | 1 |
| 5. | Scattering occurs when medium consists of objects with dimensions _____ the wavelength.<br>(A) two times (B) smaller than<br>(C) larger than (D) equal to | 1 | 1 | 2 |
| 6. | Free space propagation is model is to predict _____.<br>(A) transmitter power (B) gain of transmitter<br>(C) received signal strength (D) gain of receiver | 1 | 1 | 2 |
| 7. | Diffraction occurs when radio path between transmitter and receiver is obstructed by _____.<br>(A) surface having sharp irregularities (B) rough surface<br>(C) smooth surface (D) smooth irregularities | 1 | 1 | 2 |
| 8. | If the delay spread is 10 nanoseconds and the symbol time is 1 microseconds the radio channel is considered to be _____.<br>(A) narrow band (B) wide band<br>(C) flat (D) surface | 1 | 1 | 2 |
| 9. | The essential difference between V Blast and D Blast lies in the _____.<br>(A) vector encoding process (B) vector decoding process<br>(C) scalar encoding process (D) scalar decoding process | 1 | 1 | 3 |
| 10. | Capacity C for single input single output is _____.<br>(A) $C = BW \log_2 (1 - SNR)$ (B) $C = BW \log_2 (2 + SNR)$<br>(C) $C = BW \log_2 (2 - SNR)$ (D) $C = BW \log_2 (1 + SNR)$ | 1 | 1 | 3 |

| | | | | |
|---|---|---|---|---|
| 11. | Diversity schemes provides two or more inputs at the receiver such that the fading phenomenon among these inputs are _____.<br>(A) related (B) unrelated<br>(C) correlated (D) uncorrelated | 1 | 1 | 3 |
| 12. | The Alamouti space time code are modulated using _____.<br>(A) ASK Modulation (B) PSK Modulation<br>(C) FSK Modulation (D) M-ary Modulation | 1 | 1 | 3 |
| 13. | Pick out the application that does not use cognitive radio principle.<br>(A) Emergency and public safety communication by utilizing secondary user concept. (B) Application that does not executes dynamic spectrum access<br>(C) System that utilizes spectrum hole (D) Radio and Television broadcast | 1 | 1 | 4 |
| 14. | Which among the following is not a disadvantage of cooperation detection?<br>(A) Overhead traffic (B) receiver uncertainty<br>(C) additional storage (D) Shadowing Uncertainty | 1 | 1 | 4 |
| 15. | Find a valid spectrum sensing technique among the given options.<br>(A) Non Competitive (B) Cooperative<br>(C) Interrupt based (D) Distribution based | 1 | 1 | 4 |
| 16. | In a fully Cognitive radio receiver, Digital Signal Processors are used in _____.<br>(A) RF Section (B) Local Oscillator Section<br>(C) Baseband Section (D) Audio Section | 1 | 1 | 4 |
| 17. | Approximate bandwidth available in millimeter wave communication is ___.<br>(A) 67 MHz (B) 7 GHz<br>(C) 800 kHz (D) 0.1 GHz | 1 | 1 | 5 |
| 18. | At room temperature and for a bandwidth of 1 Hz, the noise power equals to _____.<br>(A) -174 dBm (B) 198 W<br>(C) 3.37 dB (D) 89 kW | 1 | 1 | 5 |
| 19. | Incident wave bumped on a rough surface. It creates _____.<br>(A) reflected wave (B) knife edge wave<br>(C) scattered wave (D) line of sight wave | 1 | 1 | 5 |
| 20. | Direct conversion millimeter wave receivers are otherwise called as _____.<br>(A) Zero - IF approach (B) heterocryptic IF scheme<br>(C) Zero - RF approach (D) Zero baseband scheme | 1 | 1 | 5 |

**PART - B (5 × 4 = 20 Marks)**

Answer **any 5** Questions

| | | Marks | BL | CO |
|---|---|---|---|---|
| 21. | Compare the technology used in first and second generation in cellular systems. | 4 | 1 | 1 |
| 22. | Write short notes on 3GPP Long Term Evolution. | 4 | 1 | 1 |
| 23. | What are the demerits of OFDM?. | 4 | 1 | 2 |
| 24. | Brief about the performance metrics of MIMO system. | 4 | 1 | 3 |
| 25. | Categorize various types of wide band spectrum sensing. | 4 | 1 | 4 |
| 26. | Explain the principle of Interleaving. | 4 | 1 | 4 |
| 27. | Discuss the application of mm wave communication. | 4 | 1 | 5 |

## PART - C (5 × 12 = 60 Marks)

Answer **all** Questions

| | | Marks | BL | CO |
|---|---|---|---|---|
| 28. | (a) Draw and explain the functions of LTE system architecture. | 12 | 1 | 1 |
| | **(OR)** | | | |
| | (b) Discuss on WiMAX frame structure and elaborate on IEEE 802.16 Protocol architecture. | | | |
| 29. | (a) Illustrate the orthogonality principle of OFDM and state its advantages over FDM. | 12 | 1 | 2 |
| | **(OR)** | | | |
| | (b) Discuss on the carrier frequency offset and describe the CFO estimation methods. | | | |
| 30. | (a) Elaborate on the various diversity combining techniques. | 12 | 1 | 3 |
| | **(OR)** | | | |
| | (b) With neat diagram explain the working principle of MIMO transmitter and receiver. | | | |
| 31. | (a) Classify the spectrum sharing techniques and examine each type. | 12 | 1 | 4 |
| | **(OR)** | | | |
| | (b) With neat diagram, discuss the function of Cognitive transceiver architecture. | | | |
| 32. | (a) Discuss the characteristics of mm Wave and state the key benefits. | 12 | 1 | 5 |
| | **(OR)** | | | |
| | (b) With an aid of block diagram, discuss the various PSK modulation schemes for mm wave communication and state the limitations of coherent detection. | | | |

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