

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
B.Tech S8 (R,S) / S6 (PT) (R, S) Exam April 2025 (2019 Scheme)

Course Code: ECT402

Course Name: WIRELESS COMMUNICATION

Max. Marks: 100

Duration: 3 Hours

PART A

Answer all questions, each carries 3 marks.

- | | | Marks |
|----|--|-------|
| 1 | Draw the architecture of WiMAX. | (3) |
| 2 | If a total of 33 MHz of bandwidth is allocated to particular FDD cellular telephone system which uses two 25kHz simplex channels to provide full duplex voice and control channels, compute the number of channels available per cell if a system uses (a) 4-cell reuse, (b) 7 cell reuse. | (3) |
| 3 | What is frequency selective fading? Explain. | (3) |
| 4 | What is Fraunhofer distance? What is its significance? | (3) |
| 5 | Write the advantage and applications of BPSK. | (3) |
| 6 | Draw the structure of multicarrier modulation system. | (3) |
| 7 | Compare linear and non-linear equalizer. | (3) |
| 8 | Define Outage Probability of wireless channel. | (3) |
| 9 | Which mode of propagation is used by radio waves of frequency above 300MHz? Explain. | (3) |
| 10 | Explain the mechanism of wave bending in ionosphere with suitable diagram. | (3) |

PART B

Answer any one full question from each module, each carries 14 marks.

Module I

- | | | |
|----|---|-----|
| 11 | a) How is co-channel signal to interference ratio, cluster size and system capacity are related to one another in cellular system? Explain with necessary equation. | (7) |
| | b) With necessary diagram explain WLAN Architecture | (7) |
| OR | | |
| 12 | a) Explain with diagram cell sectoring and cell splitting. How does it improve the system performance? | (7) |
| | b) Enumerate the different features of 2G, 3G and 4G mobile communication | (7) |

system.

Module II

- 13 a) With necessary equation and diagram explain capacity of flat fading channel. (10)
b) Calculate the coherence time of a channel, if doppler shift is produced due to the movement of a mobile with a velocity of 50m/sec and operating at 1900MHz. (4)

OR

- 14 a) What is the importance of Two Ray model? Derive the expression for path loss in a two-ray ground reflection model. (10)
b) Explain fading effect due to delay spread. (4)

Module III

- 15 a) Explain diversity and different diversity techniques. (9)
b) Explain the technique employed to reduce PAPR in OFDM. (5)

OR

- 16 a) With the help of neat block diagram explain multicarrier modulation in OFDM transmitter and receiver section. (7)
b) Derive the expression for average SNR per bit of BPSK. (7)

Module IV

- 17 a) Explain with block diagram Adaptive equalizer. (7)
b) With necessary equation and diagram TDMA, FDMA and CDMA. (7)

OR

- 18 a) Derive expression for received SNR of transmitter diversity with 2x2 Alamouti scheme. (7)
b) Describe the working principle of a Zero Forcing equalizer with the help of neat diagram. (7)

Module V

- 19 a) Effect of earth magnetic field on radio wave propagation. (8)
b) Derive LOS distance between transmitter and receiver antenna. (6)

OR

- 20 a) Derive the expression for critical frequency and MUF and skip distance. (8)
b) When the maximum electron density of the ionosphere layer corresponds to refractive index of 0.92 at the frequency of 10MHz, find the range if the frequency is MUF itself. The height of the ray reflection point on the ionospheric layer is 400km. Assume flat earth and negligible effect of earth's magnetic field. (6)
