

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech. IV Year I Semester Regular & Supplementary Examinations October/November-2025
WIRELESS COMMUNICATIONS
(Electronics & Communications Engineering)

Time: 3 Hours**Max. Marks: 60**

(Answer all Five Units 5 x 12 = 60 Marks)

UNIT-I

- 1 a Describe briefly about the cellular telephone system with neat diagram. CO1 L2 6M
b Explain paging systems. CO1 L2 6M

OR

- 2 a Illustrate a mobile handoff scenario at the cell boundary while a conversation is in progress. CO1 L3 6M

- b A spectrum of 30 MHz of bandwidth is allocated to a particular FDD cellular telephone system which uses two 25 kHz simplex channels to provide full duplex voice and control channels, compute the number of channels available per cell if a system uses (i) four-cell reuse, (ii) seven-cell reuse, and (iii) 12-cell reuse. If 1 MHz of the allocated spectrum is dedicated to control channels, determine an equitable distribution of control channels and voice channels in each cell for each of the three systems.

UNIT-II

- 3 a Explain the ground-reflection (two-ray) model. And derive the expression for total E-field envelope $|E_{TOT}|$. CO3 L2- 6M
b Using the method of images, derive the path difference, phase difference, and path loss for the two ray model. CO3 L3 6M

OR

- 4 a (i) Explain reflection from perfect conductors. CO3 L2 3M
(ii) Explain multiple knife-edge diffraction. CO3 L2 3M
b Find the Fraunhofer distance for an antenna with maximum. CO1 L3 6M

UNIT-III

- 5 a Illustrate the Doppler shift in radio propagation. CO2 L2 6M
b Explain parameters of mobile multipath channels and Time dispersion parameters. CO1 L2 6M

OR

- 6 a Describe Doppler spread and coherence time in time varying nature of the channel in small-scale region. CO3 L2 6M

- b Compute the rms delay spread for the following power delay profile. CO5 L4 6M



- (i) Calculate the rms delay spread for the given figure.
(ii) If BPSK modulation is used, what is the maximum bit rate that can be sent through the channel without needing an equalizer.

UNIT-IV

- 7 a Derive the expression input covariance matrix for adaptive equalizer. CO1 L2 6M
b Rewrite the four matrix algebra rules used in the study of adaptive equalizers. CO1 L2 6M

OR

- 8 a Explain about selection diversity and feedback diversity. CO4 L2 6M
b Explain about maximal ratio combining and equal gain diversity. CO4 L1 6M

UNIT-V

- 9 a Describe the features of time division multiple access (TDMA) scheme. CO1 L2 6M
b A normal GSM has 3 start bits, 3 stop bits (also called as trailing bits), 26 training bits for allowing adaptive equalization, 8.25 guard bits and 2 bursts of 58 bits of encrypted data which is transmitted at 270.833 kbps in the channel. Find

- (i) Number of overhead bits per frame, both
(ii) Total number of bits/frame
(iii) Frame rate
(iv) Time duration of a slot
(v) Frame efficiency

OR

- 10 a Differentiate between Pure ALOHA and slotted ALOHA. CO1 L4 6M
b Explain in detail packet radio schemes and packet radio protocols. CO5 L3 6M

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