Registration No.: | | | | | | | | | | |

Total Number of Pages: 02 **Course: B.Tech**

Sub_Code: EOPE3001

5th Semester Regular Examination: 2025-26

SUBJECT: WIRELESS COMMUNICATION

BRANCH(S): ECE, ETC

Time: 3 Hours

Max Marks: 100

Q.Code : U044

Answer Question No.1 (Part-I) which is compulsory, any eight from Part-II and any two from Part-III.

The figures in the right-hand margin indicate marks.

Part-I

Q1 **Answer the following questions:** **(2 x 10)**

a) Define fading and its reasons.

b) Define path loss exponent.

c) Why the hexagon shape is used as a cell shape?

d) Draw the constellation diagram of 16-QAM modulation.

e) Define bit error rate (BER).

f) Compare the basic technological differences between LTE and CDMA.

g) Distinguish between TDMA & FDMA.

h) Define spectral efficiency?

i) Write 4 features of 5G Technology.

j) Distinguish between MIMO and massive MIMO.

Part-II

Q2 **Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)** **(6 x 8)**

a) Explain about various path loss models & two ray ground reflection model.

b) What is narrow band and wide band fading, how it can be mitigated.

c) Define SIR and derive it for cellular communication.

d) Consider the AMPS system in which an SIR ratio of 22 dB is required for the accepted voice quality. What should be the reuse factor for the system. Assume path loss exponent is 4. What will be the reuse factor of the GSM system in which an SIR of 14 dB is required?

e) Explain about TDMA frame structure with neat diagram.

f) Explain FDMA and TDMA in detail with suitable diagram.

g) What are the various diversity combining techniques, explain in detail.

h) Point out the difference between delay spread and Doppler spread.

i) How the coverage and capacity can be improved in cellular communication.

j) What is near far problem in CDMA? How to overcome it?

k) Explain the concept of massive MIMO and its merits.

l) What is frequency selective fading? Explain with neat diagram. How it can be mitigated?

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

Q3 What are the various types of fading, its challenges, mitigation techniques? Justify the need for outdoor & indoor propagation model. **(16)**

Q4 Explain the various types of modulation techniques used in wireless communication system, its transmitter, receiver, and constellation diagrams. **(16)**

Q5 What are the various types of multiple access techniques, its merits, demerits, and applications. How diversity techniques can improve the performance of wireless communication system? **(16)**

Q6 Explain long term evolution (LTE) architecture in detail with diagram. How the coverage & capacity of wireless communication system can improve? Explain in detail. **(16)**