

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST-2 EXAMINATION—March-April 2017

M.Tech. (4th Semester) /DD (ECE)

COURSE CODE: 12M1WEC432

MAX. MARKS: 25

COURSE NAME: Fundamentals of MIMO Systems

COURSE CREDITS: 03

MAX. TIME: 1.5 Hrs

Note: All questions are compulsory. Carrying of mobile phone during examination will be treated as case of unfair means.

- Q1. a) At what amplitude of Rayleigh fading, deep fade occurs at SNR of 30 dB? (2)
- b) Give analysis of bit error rate for multiple antenna system. (3)
- Q2. a) What is the idea behind diversity order in wireless communication system? Compare wired and single antenna and multiple antenna wireless channel in terms of diversity order. (3)
- b) Why pseudo inverse is considered in wireless channel performance analysis? Find pseudo inverse of matrix $\begin{bmatrix} 2 & 3 \\ 4 & 1 \\ 1 & 5 \end{bmatrix}$ (3)
- Q3. a) Explain any linear MIMO receiver with its advantages and drawbacks. (3)
- b) What are the advantages of singular value decomposition (SVD) in MIMO? Perform SVD of given channel matrix $\begin{bmatrix} 2 & 3 \\ 2 & -3 \end{bmatrix}$ (3)
- Q4. a) Discuss optimal power allocation scheme in MIMO system. (3)
- b) How to achieve diversity gain in MISO system without channel state information (CSI) at transmitter? (2)
- Q5. Apply successive interference cancellation (SIC) in MIMO communication system. (3)