

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST-3 EXAMINATION- May 2019
M.Tech(CSE) II and IV Semester

COURSE CODE: 15M1WCI432

MAX. MARKS: 35

COURSE NAME: Advanced Computational Techniques in Engineering

MAX. TIME: 2Hrs

COURSE CREDITS: 3

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

Use of Calculator is permitted.

Q.1. [10 Marks. Each part is 2 marks]

- What do mean by probability mass function of discrete distribution?
Define PMF of binomial distribution.
- Define the transform from time to frequency domain and viva versa.
- Explain steps in the forward substitution algorithm for solution of a linear system.
- Explain the steps in QR decomposition of a matrix.
- Define eigenvalue and eigenvector of a matrix.

Q.2. [6 Marks]

- Prove that poisson distribution is a special case of binomial distribution.
- Vehicles pass a junction on a busy road at 300 vehicles per hour. Find the probability that expected number passes in a given 2 minute interval. Assume vehicle arrivals are poisson distributed.

Q.3. [7 Marks]

If $A = \begin{bmatrix} 1 & 2 & 4 \\ 3 & 8 & 14 \\ 2 & 6 & 13 \end{bmatrix}$ and $b = \begin{bmatrix} 3 \\ 13 \\ 4 \end{bmatrix}$

Find the LU decomposition of A and solve the linear system $A.x=b$. Comment on the complexity of the solution.

Q.4. [6 Marks] Find and sketch the fourier transform for the following function:
 $f(t) = [e^{-a|t|}]$ with $a > 0$

Q.5. [6 Marks] Write short notes on the following:

- Exponential distribution.
- SVD decomposition.
- Sensitivity analysis of a linear system $A.x=b$.