

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST-3 EXAMINATION- Jun 2016
M.Tech(CSE) IV Semester

COURSE CODE: 15M1WCI432

MAX. MARKS: 35

COURSE NAME: Advanced Computational Techniques in Engineering

MAX. TIME: 2 Hrs

COURSE CREDITS: 3

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

Poisson CDF tables and standard normal probability tables will be made available.

Q.1. [8 Marks. Each part is 1 mark]

- a) List known matrix multiplication algorithms and comment on their computational cost?
- b) What is a perturbed linear system?
- c) List properties of eigenvalues.
- d) Define least square problem.
- e) List steps to solve a linear system using rotators.
- f) List properties of SVD.
- g) Explain forward and backward substitution.
- h) List five properties of normal distribution.

Q.2. [7 Marks] Define fourier transform. Find and sketch the fourier transform for the following function:

$$f(t) = \begin{cases} 1 & -T \leq t \leq T \\ 0 & |t| > T \end{cases}$$

Q.3. [7 Marks] A web server is visited on weekdays at a rate of 7 visits per min. In a random 1 min on Sunday the web server is visited 11 times.

- (a) Test at 10% level of significance, whether or not there is evidence that the rate of visits is greater on a Sunday than other weekdays. State your hypothesis clearly.
- (b) State the minimum number of visits required to obtain a significant result.
- (c) In a random 2 minute period on a Sunday, the web server was visited 22 times. Using the suitable approximation, test on a 10% level of significance, whether or not the rate of visits is greater on Sunday.

Q.4. [7 Marks] Solve the following system of differential equations

$$dx/dt = \begin{bmatrix} 1 & -4 \\ 4 & -7 \end{bmatrix} x \quad x(0) = \begin{bmatrix} -2 \\ 1 \end{bmatrix}$$

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

- a) Common Matrix norms
- b) Geometric interpretation of Condition Numbers
- c) Binomial distribution
- d) Wavelet transform

JNT TEST 3 EXAMINATION JUN 2016