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JAYPEE UNIVERSITY OF INFORMATRION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- Feb 2016

M.Tech(CSE) IV Semester

COURSE CODE: 15M1WCI432 **MAX. MARKS: 15**

COURSE NAME: Advanced Computational Techniques in Engineering

COURSE CREDITS: 3 **MAX. TIME: 1 HR**

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

Q.1. [3 Marks. Each part is 1 mark]

a) Explain the terms FLOP COUNTS, Memory Traffic.

b) Explain the matlab functions CPUTIME and RANDN?

c) Let $u = [1,2,3]^T$ and $v = [-1,-2,-3]^T$ be vectors in R^3. Determine $u.v$ and $||u-v||_2$.

Q.2. [4 marks] Partitioning matrices into blocks is powerful tool for developing faster variants of algorithms. Illustrate with matrix-matrix multiplication AX=B where A, X, B are conformable matrices.

Q.3. [4 marks] Conventional multiplication of two n x n matrices requires $2n^3$ flops. Explain Strassen's algorithm and comment on its FLOP COUNT.

Q.4. [4 marks] Use LU factorization and solve the following linear system.

$$\begin{aligned} x_1 - 2x_2 + 2x_3 &= 5 \\ x_1 - x_2 &= -1 \\ -x_1 + x_2 + x_3 &= 5 \end{aligned}$$

Also comment on the sensitivity of your solution.