

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
T2 EXAMINATION- April 2019
M-Tech-II/B-Tech-VIII

COURSE NAME: ADVANCED ALGORITHMS
COURSE CODE: 10M11CI211
COURSE CREDITS: 3

MAX. MARKS: 25
MAX. TIME: 1.5 Hr

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

Question 1:

[2+3 Marks]

Explain is Masters Theorem and its usage? Find the complexity of following using Masters Theorem and back substitution:

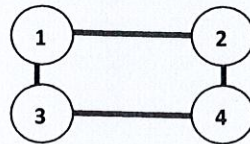
a) $T(n) = 2^n T(n/2) + n^n$

b) $T(n) = \sqrt{2} T(n/2) + \log n$

Question 2:

[2+3 Marks]

Explain Branch and Bound approach? find the chromatic number of given graph using backtracking?



Question 3:

[2+3 Marks]

Write the difference between NP-Complete and NP-Hard? Proof that Vertex Cover problem is NP complete?

Question 4:

[5 Marks]

Solve the given objective function for maximization using Simplex method:

Objective function: $Z_{\text{Max}} = 12x_1 + 15x_2 + 14x_3$ Subject to:
 $-x_1 + x_2 \leq 0$, $-x_1 + 2x_3 \leq 0$, $x_1 + x_2 + x_3 \leq 100$, $x_1, x_2, x_3 \geq 0$

Question 5:

[1.5+1+2.5 Marks]

Write the difference between Las Vegas vs Monte Carlo randomized algorithm? Is it possible to determine whether $n \times n$ matrices A, B, and C satisfy the condition $AB = C$ in only $O(n^2)$ steps? If it is possible then write its algorithm and compute your algorithms error probability (if exist)?