

End Semester Examination

May-June 2023

CET3001B - Design and Analysis of Algorithms

Schedule ID: 18765

Faculty/School	Faculty of Engineering & Technology	Term	IV
Program	Second Year, B. Tech	Duration	1 Hours 30 Minutes
Specialization		Max. Marks	40

Read the instructions provided for every question properly before attempting the answer.

Section - 1 : contain(s) **10** question(s) and each question carries **5** mark(s). You can answer any **8** questions out of **10**.

Click **Finish** only after completion of the Exam.

Section - 1 (8 X 5 Marks)

Answer any 8 questions

1	Discuss Proof Techniques and explain the following with examples: 1) Proof by contradiction 2) Proof by mathematical induction	5 marks	CO1	Understanding
2	Solve the following elements using merge sort: E, X, A, M, P, L, E in alphabetical order. Write its complexity equation and complexity - best case, worst case and average case.	5 marks	CO2	Analysing
3	Consider a Knapsack instance $n=3$, $(W_1, W_2, W_3)=(2, 3, 4)$, $(P_1, P_2, P_3)=(1, 2, 5)$ and $M=6$. Find optimal solution using dynamic programming	5 marks	CO3	Applying
4	Discuss and derive an equation for finding the longest common subsequence using dynamic programming method. Design and analyse the algorithm for the same.	5 marks	CO3	Understanding
5	Describe Travelling Salesperson Problem (TSP) using Dynamic Programming	5 marks	CO3	Understanding
6	Write an algorithm to solve n queen problem using Backtracking	5 marks	CO4	Remembering

7	Select optimal subset J with an optimal penalty for the following data. What will be the penalty corresponding to the optimal solution? Job Pi di ti 1 5 1 1 2 10 3 2 3 6 2 1 4 3 1 1 Draw a State Space Tree and Compute C^, U and Upper for each node.	5 marks	CO4	Applying
8	Explain in detail Control Abstraction of LC Search	5 marks	CO4	Understanding
9	What are steps to prove NP-completeness of a problem? Prove that vertex cover problem is NP-complete.	5 marks	CO5	Evaluating
10	Differentiate between deterministic and non-deterministic algorithm with example	5 marks	CO5	Applying

END OF QUESTION PAPER