

**Roll No.**

**Paper Code**  
**3C3002**

**MCA III-Sem (Main & Back) Exam Jan 2026**  
**MCA-302(N) Analysis and Design of Algorithm**  
**3C3002**

**Time : 3 Hours**

**Maximum Marks : 70**

**Instructions To Candidates:**

- (1) The question paper is divided in three parts.
  - (2) Part A contains 10 questions which are compulsory . Part B contains 08 questions out of which five are to be attempted. Part C contains one question which is compulsory .
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**Part A (Word limit 25 only)**

**All questions are compulsory.**

**10x2=20**

- Q.1 Why does the complexity of an algorithm need to be analysed.
- Q.2 What is hashing?
- Q.3 Compare linear search.
- Q.4 What is selection sort?
- Q.5 What is AVL Tree?
- Q.6 What is Back Track?
- Q.7 Define multistage graph.
- Q.8 What do you mean by asymptotic notation?
- Q.9 Define spanning tree.
- Q.10 What is NP-complete problem?

**Part B**

**All questions are compulsory.**

**5x6=30**

- Q.1 What is meant by algorithm analysis? What is time space trade off?  
Define best case, worst case and average case analysis of an algorithm.
- Q.2 Discuss the working of Radix sort technique with an example. Also explain its complexity.

- Q.3 Describe the 8-queens problem using back tracking concept.  
Q.4 Write a control abstraction for 'Greedy Method'.  
Q.5 Define NP HARD and NP COMPLETE problem.  
Q.6 What is Node cover? Also explain the size of the node cover.  
Q.7 Explain about travelling salesperson problem.  
Q.8 Briefly explain about 'Articulation point'.

**Part-C**

**Compulsory**

- Q.1 Explain how to solve the 15-puzzle problem using branch and bound technique? 20

OR

State and prove the cook's theorem.