

Hall Ticket No:

Question Paper Code: 16MCA110

**MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE**

(UGC-AUTONOMOUS)

**MCA(2Yrs) I Year I Semester (R16) Supplementary End Semester Examinations – October 2020**

(Regulations: R16)

**DESIGN & ANALYSIS OF ALGORITHMS**

Time: 3Hrs

Max Marks: 50

Attempt all the questions. All parts of the question must be answered in one place only.

**In Q.no 1 to 5 answer either Part-A or B only**

Q.1(A) How to sort the given set of elements using heap sort? Explain it with an example. 10M

**OR**

Q.1(B) Define space complexity and time complexity. 4M

What is the time and space complexity of binary search algorithm? 6M

Q.2(A) Explain merge sort algorithm with suitable example. Also discuss the time complexity of the merge sort algorithm. 10M

**OR**

Q.2(B) What is minimum spanning tree? How to find minimum spanning tree for an undirected graph explain with example? 10M

Q.3(A) How to visit all the vertices in a multistage graph by using all pair shortest path technique. Explain with an example. 10M

**OR**

Q.3(B) Write and explain BFS and DFS algorithm to solve traveling salesman problem. 10M

Q.4(A) Write short notes on the following: 10M

- i. Hamiltonian problem and explain with example.
- ii. Graph coloring and explain with example.

**OR**

Q.4(B) Explain backtracking concept and apply same to 8-queens problem. 10M

Q.5(A) a) Define P, NP, NP Complete and NP hard. 5M

b) State and Explain the Cook's theorem. 5M

**OR**

Q.5(B) Explain about the Node cover decision problem in detail. 10M

**\*\*\* END\*\*\***