

MANIPAL INSTITUTE OF TECHNOLOGY

VII SEMESTER B.TECH. (MECHATRONICS ENGINEERING)

END SEMESTER EXAMINATIONS, NOV 2017

SUBJECT: ROBOTIC PATH PLANNING [MTE 4008]

REVISED CREDIT SYSTEM (28/11/2017)

Time: 3 Hours

MAX. MARKS: 50

5

Instructions to Candidates:

- ✤ Answer ALL the questions.
- Data not provided may be suitably assumed
- 1A. Construct a Pseudo code for D star
- 1B. For 3 link Planar manipulator, device a strategy to implement A* to move 5 between two configurations without bumping into obstacles.
- 2A Given the following workspace with obstacles as shown in figure Q.3B, find the path between the start and the end point using the following algorithms. Also discuss the merits and demerits of each of them.
 - a. Voronoi graph
 - b. Bug2 Algorithm
 - c. Expansive space tree
 - d. Artificial Potential Function
 - e. Visibility graph



Figure Q.2A

3A.	What is configuration space? How does configuration space differ from Manipulators to mobile robots?	04
3B.	Discuss sensor based Path planning Algorithms.	06
4 A	Design Boustrophedon Decomposition algorithm for determining a coverage path in any given scenario.	02
4B	Investigate in what scenarios are the PRM used? Detail out the series of step involved in it. Also discuss any 3 sampling strategies.	08
5A	Explain any one single query sampling problem	05
5B	Find the parameterized path in joint coordinates for the RP manipulator shown	05

5B Find the parameterized path in joint coordinates for the RP manipulator shown **05** in figure Q.5B using inverse kinematics technique. Extend this and elaborate the significance of Decoupled Trajectory Planning for a dynamic system.



Figure Q.5B