



K. K. Wagh Institute of Engineering Education & Research, Nashik
(An Autonomous Institute From A.Y. 2022-23)

WINTER-2025	
Exam Seat No.:	
Academic Year:2025-2026	Semester:III
Class:SY	Program:B.Tech
Branch Code:ROB	Pattern:2022
Name of Course:Robot Path Planning	Course Code:ROB222005
Max. Marks:60	Duration:2.30 Hrs.

Instructions: Candidates should read carefully the instructions printed on the Question Paper and on the cover page of the Answer Book, which is provided for their use.

1. This question paper contains 2 pages.
2. Answer to each new question is to be started on a new page.
3. Assume suitable data wherever required, but justify it.
4. Draw the neat labelled diagrams, wherever necessary.
5. The last columns indicates the Course Outcome and level of Blooms Taxonomy of the Question/sub-question.

Marks CO

Question No. 1

- 1a) Why square and a rectangle are not diffeomorphic? (6) CO1

Question No. 2

- 2a) How separating line and supporting line used in Reduced visibility graph? (6) CO2

Question No. 3

- 3a) Define "cell" in Exact cell decomposition and how does it relate to the concept of "Adjacent cells" (8) CO3

OR

- 3b) Explain different types of events that can occur in Trapezoidal Cell Decomposition? (8) CO3

- 3c) Describe Concentric circle pattern with diagram in coverage pattern (8) CO3

OR

- 3d) Describe Square pattern with diagram in coverage pattern (8) CO3

Question No. 4

- 4a) Describe Potential function with diagram (8) CO4

OR

- 4b) Explain the Repulsive Potential Function with mathematical representation. (8) CO4

- 4c) Explain the strategies for addressing local minima in potential function (8) CO4

OR

- 4d) What is the Significance of the gradient of the quadratic attractive potential function? (8) CO4

Question No. 5

- 5a) Describe Problem definition of multi robot path planning and its optimization criteria. (8) CO5

OR

- 5b) Describe Coupled path planning (8) CO5
- 5c) Explain the concept of Potential Deadlock and Completeness with diagram in multi robot path planning. (8) CO5

OR

- 5d) Write down the advantages and disadvantages of multi robot system. (8) CO5

..... End of question paper.....