K. K. Wagh Institute of Engineering Education & Research, Nashik

(An Autonomous Institute From A.Y. 2022-23)

InSem Examination-IISummer2025	
Exam Seat No.:	
Academic Year:2024-2025	Semester:VI
Class:TY	Program:B.Tech
Branch Code:ROB	Pattern:2022
Name of Course:Swarm Robotics	Course Code:ROB223017
Max. Marks:30	Duration:1.15 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 page(s).
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			
1 a)	**Explain the following terms of Swarm Robotics.** **a.Decentralized control** **b.Stigmergy**	(7)	CO1
Question No. 2			
2 a)	**Explain features of Swarm Robotics.**	(8)	CO1
	OR		
2 b)	**Write short note on challenges and limitations of Swarm robotics**	(8)	CO1
Question No. 3			
3 a)	**Explain the working of Particle Swarm Optimization (PSO).**	(7)	CO2, CO3

Question No. 4

4 a) **Ant colony optimization problem is used to solve a travelling salesman problem with 5 stations. The distance matrix is given below. Considering the start and finish station as A, What is the % probability that an ant will choose the path A to C ? Assume initial pheromone deposition level for all paths as 1.** (8) CO2, CO3

	A	B	C	D	E
A	0	14	16	19	12
B	14	0	15	13	10
C	16	15	0	11	17
D	19	13	11	0	21
E	12	10	17	21	0

OR

4 b) **Ant colony optimization problem is used to solve a travelling salesman problem with 5 stations. The distance matrix is given below. Considering the start and finish station as A, What is the % probability that an ant will choose the path A to E ? Assume initial pheromone deposition level for all paths as 1.** (8) CO2, CO3

	A	B	C	D	E
A	0	14	16	19	12
B	14	0	15	13	10
C	16	15	0	11	17
D	19	13	11	0	21
E	12	10	17	21	0

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