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:VII
Class:FINAL	Program:B.Tech
Branch Code:ADS	Pattern:2022
Name of Course:Computational Intelligence	Course Code:ADS224006B
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 02 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	Discuss the role of CI in engineering problem-solving	(3)	CO1
Question No. 2			
2	Compare evolutionary computation with classical optimization techniques.	(3)	CO2
Question No. 3			
3.a)	Explain single-point and two-point crossover operations with examples.	(4)	CO3
	OR		
3.b)	What is a fitness function? Explain its importance in the GA process.	(4)	CO3
3.c)	Explain how crossover and mutation operators contribute to exploration and exploitation in GA.	(4)	CO3
	OR		
3.d)	Compare roulette wheel selection and tournament selection in genetic algorithms	(4)	CO3
Question No. 4			
4.a)	Explain the velocity update equation used in Particle Swarm Optimization (PSO) and describe the purpose of each term involved in the equation.	(4)	CO4
	OR		
4.b)	Compare Global Best PSO and Local Best PSO.	(4)	CO4
4.c)	Explain the concepts of p_{best} and g_{best} in Particle Swarm Optimization (PSO) and describe how they influence the movement of particles.	(4)	CO4
	OR		
4.d)	Describe the social network structures used in Particle Swarm Optimization (PSO) and explain the characteristics of the Ring and Star social structures.	(4)	CO4
Question No. 5			

5.a)	Differentiate between GA-NN and PSO-NN hybrid systems.	(4)	CO5

OR

5.b)	Explain the concept of synergistic integration in hybrid systems.	(4)	CO5
5.c)	Describe how Genetic Algorithm (GA) is used for Neural Network training.	(4)	CO5

OR

5.d)	Explain the advantages of hybrid intelligent systems over traditional single AI methods.	(4)	CO5

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