

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)**

**CLASS: MTECH & Pre PHD
BRANCH: MECHANICAL**

**SEMESTER: I
SESSION: MO/2025**

SUBJECT: ME507 OPTIMIZATION TECHNIQUES

TIME: 3 Hours

FULL MARKS: 50

INSTRUCTIONS:

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
 2. Attempt all questions.
 3. The missing data, if any, may be assumed suitably.
 4. Before attempting the question paper, be sure that you have got the correct question paper.
 5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
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Q.1(a)	Define optimization in the context of engineering and explain its importance in solving real-world problems.	[5]	CO 01	BL L
Q.1(b)	Compare deterministic and stochastic optimization algorithms with suitable examples.	[5]	01	M
Q.2(a)	Describe bracketing methods in optimization and their main advantages.	[5]	02	L
Q.2(b)	Write short notes on the point estimation method of cubic interpolation.	[5]	02	L
Q.3(a)	Differentiate between unidirectional search and direct search methods.	[5]	03	M
Q.3(b)	Describe the simplex search method (Nelder-Mead method) and its working principle.	[5]	03	M
Q.4(a)	Differentiate between penalty function and barrier function methods.	[5]	04	M
Q.4(b)	Compare linearized search techniques and exact nonlinear optimization methods.	[5]	04	H
Q.5(a)	Explain the Bathtub Curve and its relevance to optimization.	[5]	05	M
Q.5(b)	Describe Advanced Genetic Algorithms and their improvements over standard GAs.	[5]	05	H

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