

PRAGATI ENGINEERING COLLEGE: SURAMPALEM
(AUTONOMOUS)
M.Tech II Semester Regular/ Supplementary Examinations, July – 2024

OPTIMIZATION AND RELIABILITY
(CAD/CAM)

Time: 3 hours

Max. Marks: 60

Answer any FIVE questions
All questions carry EQUAL marks

5X12=60

Q.NO.		Question	BTL	CO	Marks
1.	a.	Minimize, $z=x_1^2 + x_2^2$ subject to constraints $x_1 + x_2 \geq 4$, $2x_1 + x_2 \geq 5$ and $x_1, x_2 \geq 0$ by Kuhn-Tucker conditions.	K3	CO1	6M
	b.	State and prove Kuhn-Tucker conditions.	K2	CO1	6M
2.		Find the maximum and minimum values of the function $f(x, y) = xy$ subject to the constraint $g(x, y) = 4x^2 + y^2 = 8$ using Lagrange multiplier method.	K3	CO1	12M
3	a.	Show that the Newton's method finds the minimum of a quadratic function in one iteration.	K3	CO2	6M
	b.	Use Newton's method, Minimize $f(X_1, X_2) = X_1 - X_2 + 2X_1^2 + 2X_1X_2 + X_2^2$ By taking the starting point as $X_1 = [0 \ 0]^T$	K3	CO2	6M
4	a.	Distinguish between GA and GP.	K3	CO3	6M
	b.	Explain random population generation in GP.	K2	CO3	6M
5.	a.	Describe the terms: (i) Cross over (ii) mutation (iii) reproduction	K2	CO3	6M
	b.	Construct the objective function to be used in GAs for a minimization problem with mixed equality and inequality constraints.	K3	CO3	6M
6.	a	Explain the formulation of General optimization model of a machining process.	K2	CO4	6M
	b	Explain the formulation of Optimization of path synthesis of a four bar mechanism.	K2	CO4	6M
7	a	State and explain about various parameters of springs which are subjected to optimization.	K2	CO4	6M
	b	State the typical formulation used for optimization of arc welding process.	K2	CO4	6M
8	a	What does design for reliability (DfR) mean? Explain DfR in manufacturing.	K2	CO5	6M
	b	Explain probabilistic approach to design in reliability.	K2	CO5	6M