K. J. Somaiya Institute of Technology, Sion, Mumbai-22
(Autonomous College Affiliated to University of Mumbai)

May-June 2025	
(B. Tech) Program: Computer Engineering	Scheme I/II/IIB/III: IIB
Regular Examination: LY	Semester: VIII
Course Code: **CEDLC8034** and Course Name: **Optimizations in Machine Learning**	

Date of Exam:23/5/2025	Duration: 02.5 Hours	Max. Marks: 60

Instructions:
(1)All questions are compulsory.
(2)Draw neat diagrams wherever applicable.
(3)Assume suitable data, if necessary.

Q. No.	Question	Max. Marks	CO	BT level
Q 1	**Solve any two questions out of three: (05 marks each)**	10		
a)	Compare and contrast linear regression and polynomial regression. Provide use cases for each.		CO1	An
b)	Explain in brief how the choice of batch size affects the performance of SGD.		CO3	U
c)	Describe averaging in Stochastic Gradient Descent (SGA).		CO6	U
Q 2	**Solve any two questions out of three: (05 marks each)**	10		
a)	Explain in brief the role of conservatism in robust optimization solutions?		CO3	U
b)	Differentiate between robust optimization and traditional optimization methods		CO5	U
c)	Explain in brief how quantitative evaluation ensures the reliability of optimization techniques.		CO2	U
Q.3	**Solve any two questions out of three. (10 marks each)**	30		
a)	Explain how the choice of batch size affects the performance of SGD (7M) Apply SGD to find the minimum of $f(w)=w^2+4w+4$ using an initial value $w_0=5$ and a learning rate $\eta=0.2$ Perform three iterations (3M)		CO3	Ap

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b)	Explain how do L1 and L2 regularization affect the weights of a model differently? Provide mathematical intuition and examples		CO1	U
c)	Explain the subgradient method and its use in optimizing non-differentiable functions.		CO2	U
Q.4	**Solve any two questions out of three. (10 marks each)**	30		
a)	Explain with an example of how extensions of optimization algorithms are applied in multi-objective optimization scenarios.		CO2	U
b)	Apply the RFTL algorithm to an online learning scenario and describe the outcome in terms of regret minimization.		CO6	Ap
c)	Explain with examples how regularization can lead to improved robustness in learning models.		CO5	U

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