Enrollment No: _____

KADI SARVA VISHWAVIDYALAYA

B.E. SEMESTER – 5 REGULAR/REMEDIAL EXAMINATION APRIL 2025

SUBJECT CODE:- CT506D-N **SUBJECT NAME:- Optimization Techniques**

DATE:- 21/04/2025 **TIME: - 12:30PM to 03:30PM** **MARKS:-70 Marks**

Instructions:

1. Answer each section in separate Answer Sheet.
2. Use of scientific calculator is permitted.
3. All questions are compulsory.
4. Indicate clearly, the options you attempted along with its respective question number.
5. Use the last page of main supplementary for rough work.

SECTION-I

Q1	A	Write a short note on LPP.	[5]
	B	Explain hyper plane in brief.	[5]
	C	Explain norms of vector with example.	[5]
		OR	
	C	Prove with example that taken matrix is indefinite.	[5]
Q-2	A	Explain Simplex Method with example.	[5]
	B	State use of eigenvalues and eigenvectors.	[5]
		OR	
Q-2	A	Explain steps to solve LPP using two phase Method.	[5]
	B	Write and explain duality theory with example.	[5]
Q-3	A	Compare Karmarkar's method with other LPP method.	[5]
	B	Write formula of Taylor series expansion with its use.	[5]
		OR	
Q-3	A	Explain process of formulating LPP problem with example.	[5]
	B	Explain chain and product rule.	[5]

SECTION-II

Q4	A	Define and Explain Global Maxima with diagram.	[5]
	B	State FONC and SOSC condition.	[5]

C Using Newton's method, find the minimum of $f(x) = (x^2/2) - \sin x$. (Take $x^{(0)}=0.5$ and get answer in minimum 3 iteration) [5]

OR

C Find value of x where the function $f(x) = x^4 - 14x^3 + 60x^2 - 70x$, which minimize using Golden Section method in range of [0, 2]. (Get answer in minimum 3 iteration) [5]

Q-5 **A** List steps to solve function using BFGS method. [5]

B Explain how KKT multiplier is used to get extremizer. [5]

OR

A Explain use of Conjugate Direction with example. [5]

B Explain how Lagrange multiplier is useful to get minimum values of a function. [5]

Q-6 **A** Write down steps to minimize function with Rank two methods. [5]

B Explain Steepest Descent method with diagram. [5]

OR

A Write a short note on Projected Gradient Method. [5]

B Explain Tangent and Normal Space using appropriate diagram. [5]