

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST-3 EXAMINATION - 2021

B. Tech. VII Semester

COURSE CODE: 18B1WCE640

MAX. MARKS: 35

COURSE NAME: OPTIMIZATION TECHNIQUES

COURSE CREDITS: 3

MAX. TIME: 2 Hours

Instructions:

1. All questions are compulsory
2. Carrying mobile phones during examinations will be treated as a case of unfair means.
3. Write your name, roll number and page number on each page submitted.
4. Use of Scientific Calculator is allowed.

1. Classify and enumerate the methods for one dimensional optimization. (2 Marks)
2. State and prove the following:
 - a. Jensen's Inequality. (3 Marks)
 - b. Theorem OT1. (5 Marks)
3. Using Golden Section Search Method (4 steps only), minimize the function $f(x) = 4x^3 + x^2 - 7x + 14$, in the interval $[0,1]$. Take $\epsilon = 0.15$. (3 Marks)
4. Define a Convex Hull. What is its significance? (2 Mark)
5. State and explain Farka's Lemma. (3 Marks)
6. Prove that every local minimum of a convex programming problem is a global minimum. (3 Marks)
7. Briefly discuss the operations that preserve the convexity of a function. (4 Marks)
8. Through a neat diagram, describe the significance of Armijo Goldstein Conditions in an optimization algorithm. (2 Marks)
9. What is Descent Direction? How do you determine the direction of steepest descent for a function? (3 Marks)
10. Write the algorithm for:
 - a. Dichotomous Search Method. (2 Marks)
 - b. Unconstrained minimization through inexact line search method, briefly explaining each step. (3 Marks)