Unit 3 - Week 1
Assignment 1

The due date for submitting this assignment has passed. As per our records you have not submitted this assignment. Due on 2018-09-05, 23:59 IST.

1) Maximization of \( f(x) \) is equivalent to

- Minimization of \(- f(x)\)
- Minimization of \(\frac{1}{f(x)}\)
- Both of (i) and (ii)
- None of the above

No, the answer is incorrect.
Score: 0
Accepted Answers: Minimization of \(- f(x)\)

2) Minimize \( f(x_1, x_2) = x_1 + 2x_2 - 4 \) subject to \( 2x_1 + x_2 \leq 4, x_1 \geq 0, x_2 \geq 0 \)

- \( f(x_1, x_2) \approx -4 \)
- \( f(x_1, x_2) \approx 9 \)
- \( f(x_1, x_2) \approx 0 \)
- The problem is infeasible

No, the answer is incorrect.
Score: 0
Accepted Answers: \( f(x_1, x_2) \approx -4 \)

3) Feasible design can violate

- “\( \leq \)" type constraints
- “\( \geq \)" type constraints
- “\( = \)" type constraints
- None of these

No, the answer is incorrect.
Score: 0
Accepted Answers: None of these

4) The number of active inequality constraints at the optimum

- Must be larger than the number of design variables
- Can be less than or equal to the number of design variables
- No restriction on the number of active inequality constraints

Score: 0
Accepted Answers:
Must be equal to the number of design variables

No, the answer is incorrect.
Score: 0
Accepted Answers:
Can be less than or equal to the number of design variables

5) A function \( f(x) \) can have

- Only one global minimum point.
- Several local optima in a small neighborhood of \( x^* \)
- More than one global minimum point.
- Only one local minimum point.

No, the answer is incorrect.
Score: 0
Accepted Answers:
More than one global minimum point.

6) Hessian matrix of a discontinuous function can be

- Symmetric
- Asymmetric
- Identity
- Cannot be defined

No, the answer is incorrect.
Score: 0
Accepted Answers:
Cannot be defined

7) Write Taylor’s expansion for \( e^x \) in terms of \( x^* = 1 \) at the point

- \( e^x = 1 + x + 0.5x^2 \)
- \( e^x = 7.389 - 7.389x + 3.6945x^2 \)
- \( e^x = 2.7183 - 2.7183x + 1.3591x^2 \)
- Cannot be defined

No, the answer is incorrect.
Score: 0
Accepted Answers:
\( e^x = 2.7183 - 2.7183x + 1.3591x^2 \)

8) Determine the nature of the quadratic equation \( f(x) = x_1^2 - x_2^2 + x_3^2 - 2x_2x_3 \)

- Positive definite
- Indefinite
- Positive semi definite
- Negative definite

No, the answer is incorrect.
Score: 0
Accepted Answers:
Indefinite

9) A point satisfying the first order conditions of Lagrange multiplier theorem
   - Need not to be a minimum point
   - Can be a local minimum point
   - Can be an inflection point
   - All of these
   
   **No, the answer is incorrect.**
   **Score: 0**
   **Accepted Answers:**
   *All of these*

10) If the boundary of an active constraint is changed by one unit, the location of the optimum point
   - Doesn't change
   - Depends on the function, it may or may not change
   - It will change
   - ii and iii

   **No, the answer is incorrect.**
   **Score: 0**
   **Accepted Answers:**
   *Depends on the function, it may or may not change*