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Roll No .....

CM-8004(1) (CBGS)

B.E. VIII Semester

Examination, June 2020

Choice Based Grading System (CBGS)

Chemical Process Optimization

Time : Three Hours

Maximum Marks : 70

Note: i) Attempt any five questions.

ii) All questions carry equal marks.

1. a) What is objective function? How it is decided for an Optimization problem?

   b) Explain an unconstrained single variable Optimization problem with suitable example.

2. a) What is direct search optimization problem.

   b) What is conjugate search method? Where it is used?

3. a) What are slack and surplus variables? Explain their physical significance.

   b) A calculator company produces a handheld calculator and a scientific calculator. Long-term projections indicate an expected demand of at least 150 scientific and 100 handheld calculators each day. Because of limitations on production capacity, no more than 250 scientific and 200 handheld calculators can be made daily. To satisfy a shipping contract, a minimum of 250 calculators must be shipped each day. If each scientific calculator sold, results in a 20 rupees loss, but each handheld calculator produces a 50 rupees profit; then how many of each type should be manufactured daily to maximize the net profit?

4. a) What are the necessary and sufficient conditions for a local extremum in case of a nonlinear programming problem?
   b) Explain Generalized reduced gradient method.

5. a) Explain design of a small heat exchanger network used in a chemical plant.
   b) Explain real-time optimization of a distillation column.

6. a) Discuss various steps of simplex method to solve LPP.
   b) What do you mean by quadratic programming where it is used?

7. a) Explain Newton's method for unconstrained Optimization.
   b) Explain the applications of optimization in chemical engineering.

8. Write short note on any two of the following:
   i) Difference between constrained and unconstrained optimization problem.
   ii) Software tools for optimization
   iii) Penalty function method

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