Code :R7311501

R7

III B.Tech I Semester(R07) Supplementary Examinations, May 2011
OPTIMIZATION TECHNIQUES
(Computer Science & Systems Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE questions
All questions carry equal marks
⋆ ⋆ ⋆ ⋆ ⋆

1. (a) What is optimization ? Discuss about terminology pertaining to formulation.
   (b) Classify the optimization problems.

2. Identify the optimum points of the following functions. Find the optimum function values.
   (a) $f(x) = x^3 - 10x - 2x^2 - 10$
   (b) $f(x) = (x-1)^2 - 0.01x^4$
   (c) $f(x) = (x^2 - 10x + 2)\exp(0.1x)$

3. Steelco manufactures two types of steel at three different steel mills, during a given month, each steel mill has 200 hours of blast furnace time available. Because of differences in the fornaces at each mill, the time and cost to produce a ton of steel differs for each mill. The time and cost for each mill are shown in table below. Each month Steelco must manufacture at least 500 tons of steel 1 and 600 tons of steel 2. Formulate an LPP to minimize the cost of manufacturing the desired steel.

Mill	Steel 1		Steel 2	
	Cost ($)	Time (minute)	Cost ($)	Time (minute)
1	10	20	11	22
2	12	24	9	18
3	14	28	10	30

4. A whole sale dealer wants to purchase the following quantities of computers.

Type of computer :	A	B	C	D	E
Quantity :	150	100	75	250	200

Tenders are submitted by four different manufacturers who undertake to supply not more than the quantities mentioned below (all types of computers combined)

Manufactures :	W	X	Y	Z
Total quantity :	300	250	150	200

Costs (in thosands of rupees) of manufacturer Vs computers are given below computers

	A	B	C	D	E
W	275	350	425	225	150
X	300	325	450	175	100
Y	250	350	475	200	125
Z	325	275	400	250	175

How should the orders be placed?

5. Solve the unimodal, single variable function
   $f(x) = x^2 + 54/x$

6. Use the method of steepest ascent to approximate the optimal solution to the following problem:
   $MaxZ = -(x_1 - 2)^2 - x_1 - x_2^2$
   Begin at the point (2.5, 1.5).

7. (a) What are characteristics of a constrained Non-linear programming.
   (b) Explain penalty function method.

8. A truck can carry a total of 10 tonnes of a product. Three types of products are available for slipment. Their weights and values are tabulated. Assuming that at least one of each type must be shipped, determine the type of loading that maximize the total value.

Product type	Value	Weight (kgs)
A	20	1
B	50	2
C	60	3

⋆ ⋆ ⋆ ⋆ ⋆