 LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

**M.Sc.** DEGREE EXAMINATION - **MATHEMATICS**

FOURTH SEMESTER – APRIL 2012

# MT 4811 - OPERATIONS RESEARCH

Date : 18-04-2012 Dept. No. Max. : 100 Marks

Time : 1:00 - 4:00

Answer ALL the questions

**All questions carry equal marks**

I a) Explain sensitivity analysis. Is it really useful to a company?

(or)

b) Explain branch and bound method. (5)

c) Find the optimum integer solution to the following LPP.



(15)

(or)

1. Solve the problem



Discuss the effect of changing the requirement vector from  on the optimum solution.

II a)What is goal programming? How is it useful for a manufacturing company?

(or)

b) Mention the differences between LP and GP approach. (5)

c) A firm produces two products A and B. Each product must be processed through two departments. Department I has 30 hours of production capacity per day, and department II has 60 hours. Each unit of Product A requires 2 hours in department I and 6 hours in department II. Each unit of product B requires 3 hours in department I and 4 hours in department II. Management has rank ordered the following goals it would like to achieve in determining the daily product mix.

P1 : Minimize the underachievement of joint total production of 10 units.

P2 : Minimize the underachievement of producing 7 units of product B.

P3 : Minimize the underachievement of producing 8 units of product A. Formulate

this problem as a GP problem and illustrate with graph. (15)

(or)

d) A factory can manufacture two products A and B. The profit on a unit of A is `.80 and of B is `.40. The maximum demand of A is 6 units per day and of B is 8 units. The manufacturer has set up a goal of achieving a profit of `.640 per day. Formulate the problem as goal programming and solve it. (15)

III a) Explain the following terms in inventory: setup cost, holding cost, lead time, optimal cost and stock out cost.

(or)

b) Explain the term Price Break. Is it advisable to accept it always? (5)

c) Group the items given below into an ABC classification.

|  |  |  |
| --- | --- | --- |
| Item No. | Units | Unit cost in Rs. |
| 1 | 7000 | 5 |
| 2 | 2400 | 3 |
| 3 | 1500 | 10 |
| 4 | 600 | 22 |
| 5 | 3800 | 1.50 |
| 6 | 40000 | 0.50 |
| 7 | 60000 | 0.20 |
| 8 | 3000 | 3.50 |
| 9 | 300 | 8.00 |
| 10 | 29000 | 0.40 |
| 11 | 11500 | 7.10 |
| 12 | 4100 | 6.20 |

Explain by graphical representation.

(or)

d) (i) A company operating 50 weeks in a year is concerned about its stock of

copper cables. One meter costs `.240 and there is a demand for 8000 meters per

week. The setup cost is `.2,700 and the holding cost is 25 % of one meter cost.

Assuming no shortages are allowed, find the optimal inventory policy. Also find

the number of orders and total inventory cost.

(ii) Plastic drums are produced at the rate of 50 items per day. The demand

occurs at the rate of 25 items per day. If the setup cost is `.1000 per setup and

holding cost is `.1.00 per unit of item per day find the economic lot size for one

run, assuming that the shortages are not allowed. Also find the time of cycle

and the minimum total cost of one production run. (8+7)

IV. a) Explain optimistic time and pessimistic time in network model.

(or)

b) Explain Kendall’s notation for representing queuing models. (5)

c) Use Branch and Bound technique to solve the following:

 (15)

(or)

d) With usual notation show that the probability distribution of queue length is

given by  where .

V a) Write Kuhn-Tucker conditions for a quadratic programming problem.

(or)

b) State Wolfe’s algorithm. (5)

c) Using Kuhn-Tucker conditions

 (15)

(or)

d) State the special features of dynamic programming technique. Find the shortest

route for traveling from city 1 to 10 using dynamic programming technique.



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