GOVERNMENT ARTS AND SCIENCE COLLEGE,

 PEARAVURANI (Affiliated to Bharathidasan university )

OPERATIONAL RESEARCH

Author By

M.MANIKANDAN, M.B.A.,M.Phil.,MHRM.,Ph.D(doing)

Guest Lecturer

DEPARTMENT OF BUSINESS ADMINISTRATION

GOVERNMENT ARTS AND SCIENCE COLLEGE,

PEARAVURANI-614804

THANJAVUR- DISTRICT

UNIT- I

1. Write any four characteristics of operations research.

Ans : (i) Scientific Approach (ii) Usage of models (iii) Quantification of Problems (iv) Team Approach

1. What do you understand by linear function?

Ans : A linear function is one which indicates the relationship between different variables say X and Y of degree one (i.e. The power of variables x and y is 1)

1. A Company Produces two products A and B. Each product requires processing in three machines M1, M2, and M3. Each machine can be use utmost 70hours, 40hours and 90hours respectively. Product A requires 2 hours in M1, 1 hour in M2 and 1 hour in M3. Product B requires 1 hour in each of M1 and M2 and 3 hours in M3. The profit per represent the above in LP format.

Ans : Z=Rs. 50x1+30x2

 Subject to

 2x1+x2<=70,

 x1+x2<=40,

 x1+3x2<=90,

 x1>=0, x2>=0

1. Solve the following problem graphically

 Maximize Z=2x1+x2

Subject to

3x1+2x2<=12

x1+2x2<=7

x1+x2<=5

x1>0, x2>0

Ans: Max Z=8, X1=4 and X2=0

UNIT-II

1. What do you understand by transportation problem?

Ans: A transportation problem is a special type of L.P.P. it deals with the transportation of a product from multiple supply centers to multiple demand centers in an optimal way as to minimize the overall transportation cost while satisfying the demand and supply conditions.

1. What is balanced and unbalanced transportation problem?

Ans: Balanced transportation problem: This is one in which total supply is exactly equal to total demand.

 Unbalanced transportation problem: This is one in which total supply is not equal to total demand.

1. Using VAM, solve the following and arrive at an optimal solution

Available

|  |  |  |
| --- | --- | --- |
| 50 | 30 | 220 |
| 90 | 45 | 170 |
| 250 | 200 | 50 |

1

3

4

Requirement 4 2 2

Ans : X11=1, X21=3, X32=2, X33=2 ; Rs . 820

1. Find the starting solution in the following transportation problem by (i) NWCM (ii) LCM

 Supply

|  |  |  |  |
| --- | --- | --- | --- |
| 3 | 7 | 6 | 4 |
| 2 | 4 | 3 | 2 |
| 4 | 3 | 8 | 5 |

5

2

3

 Demand 3 3 2 2

Ans : (i) NWCM X11=3 , X12=2, X22=1, X23=1, X33=1, X34=2; Rs. 48

 (ii) LCM X11=1, X12=3, X13=2, X14=2, X21=2, X32=3; Rs. 36

UNIT-III

1. What is your cost of carrying inventory?
2. What are the causes of the variances and how are you ensuring their reduction?
3. Find the EOQ (Qe) and TC assuming the following: P= Rs.5, D=20000. O=Rs.10, I=10% and H=Rs.75

Ans:

UNIT-IV

1. What is meant by balanced assignment problem?

Ans: A balanced assignment problem is one where the number of rows and number of columns are exactly equal.

1. State the two features of an assignment problem.

Ans: (i) The number of tasks and the number of assignees are finite in number.

 (ii)The number of assignees and the number of tasks are equal.

1. Solve the following assignment problem which minimizes the total man hours.

Men

 A B C D

|  |  |  |  |
| --- | --- | --- | --- |
| 10 | 25 | 15 | 20 |
| 15 | 30 | 05 | 15 |
| 35 | 20 | 12 | 24 |
| 17 | 25 | 24 | 20 |

 1

 JOB 2

 3

 4

Ans : **A->2, B->3, C->4, D-> 1: Rs. 38**

1. Solve the following travelling salesman problem so as to minimize the cost per cycle.

To

 A B C D E

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| - | 3 | 6 | 2 | 3 |
| 3 | - | 5 | 2 | 3 |
| 6 | 5 | - | 6 | 4 |
| 2 | 2 | 6 | - | 6 |
| 3 | 3 | 4 | 6 | - |

Ans: **A->D->B->C->E->A (Or) A->E->C->B->D->A**

 **Minimum cost per cycle Rs. 16**