



**LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034**

**B.A. DEGREE EXAMINATION – ECONOMICS**

**THIRD SEMESTER – APRIL 2016**

**ST 3103 / ST 3100 - RESOURCE MANAGEMENT TECHNIQUES**

Date: 06-05-2016  
Time: 09:00-12:00

Dept. No.

Max. : 100 Marks

**SECTION – A**

**Answer All the questions**

**(10 x 2 = 20)**

- 1) Write any two applications of operations research.
- 2) Define feasible solution for a linear programming problem.
- 3) What are slack and surplus variables?
- 4) Express assignment problem as a linear programming problem.
- 5) What is the objective of a sequencing problem?
- 6) Distinguish between CPM and PERT.
- 7) What is meant by idle time in a sequencing problem?
- 8) Distinguish between pessimistic and optimistic time.
- 9) Define storage cost and setup cost.
- 10) What are the factors influencing the inventory models?

**SECTION – B**

**Answer any FIVE questions:**

**(5 X 8= 40)**

- 11) (a) Write down the standard form of the general L.P.P.  
(b) A firm can produce three types of cloth say A, B, C, three kinds of wool are required for it, say red wool, green wool and blue wool. One unit length of type A cloth needs 2 yards of red and 3 yards of blue wool; One unit length of type B cloth needs 3 yards of red, 2 yards of green wool and 2 yards of blue wool; One unit length of type C cloth needs 5 yards of green wool and 4 yards of blue wool. The firm has only a stock of 8 yards of red wool, 10 yards of green wool and 15 yards of blue wool. It is assumed that the income obtained from one unit length of type A is Rs. 3, of type B cloth is Rs. 5 and that of type C cloth is Rs.4. Determine how the firm should use the available material, so as to maximize the total income from the finished cloth. Formulate the above problem as a L.P.P. (3+5)
- 12) Use the graphical method to solve the following LPP:  
Maximize  $Z = 2x_1 + 3x_2$   
Subject to the constraints:  
 $x_1 + x_2 \leq 30$ ,  $x_1 - x_2 \geq 0$ ,  $x_2 \geq 3$ ,  
 $0 \leq x_1 \leq 20$  and  $0 \leq x_2 \leq 12$ .  
 $x_1, x_2 \geq 0$ .
13. Find all the basic feasible solutions of the equations:  
 $2x_1 + 6x_2 + 2x_3 + x_4 = 3$   
 $6x_1 + 4x_2 + 4x_3 + 6x_4 = 2$
- 14) Write down the algorithm of Simplex method.
- 15) Explain the concept of transportation problem and explain the least cost method of solving it.

16) Solve the following assignment problem:

	I	II	III	IV	V
1	11	17	8	16	20
2	9	7	12	6	15
3	13	16	15	12	16
4	21	24	17	28	26
5	14	10	12	11	15

17) A project has the following characteristic:

Activity	Preceding activity	Duration
A	None	5
B	None	2
C	A	6
D	A	12
E	C	10
F	D	9
G	B	5
H	E,F,G	9

Draw a network diagram for the above project.

18) Explain the characteristics of inventory model.

### SECTION – C

Answer any TWO questions:

(2 X 20= 40)

- 19) (i) State the rules to draw a network diagram.  
 (ii) Explain about the assignment problem.  
 (iii) Explain the concept of sequencing problem.

20) National oil company (NOC) has three refineries and four depots. Transportation cost per ton ,capacities and requirements are given below:

	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	Capacity(Kgs)
R <sub>1</sub>	5	7	13	10	700
R <sub>2</sub>	8	6	14	13	400
R <sub>3</sub>	12	10	9	11	800
Requirement (Kgs)	200	600	700	400	

Determine the I.B.F.S using (i) North-West corner rule, (ii) Least cost method and (iii) Vogel's approximation method. (6+7+7)

21) The data for a PERT network is displayed in the table given below. Determine the critical path and the expected duration of completion of the entire project. Give answers to the following:

- (22) What is the probability that the project duration will exceed 60 days?  
 (ii) What is the chance of completing the project between 45 days and 54 days? (20)

Time duration (days)

Activity nodes	1-2	1-3	1-4	2-3	2-5	3-4	3-6	4-6	5-6
a	2	6	6	2	11	15	3	9	4
m	4	6	12	5	14	24	6	15	10
b	6	6	24	8	23	45	9	27	16

22) Explain and derive the single item static model with one price break. (20)