LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

THIRD SEMESTER – NOVEMBER 2016

ST 3103 - RESOURCE MANAGEMENT TECHNIQUES

Date: 12-11-2016   Dept. No.   Max. : 100 Marks
Time: 09:00-12:00

SECTION–A

Answer All the questions   (10 x 2 = 20)

1) What is meant by mathematical modeling?

2) Define feasible solution for a linear programming problem.

3) What are slack and surplus variables?

4) What is meant by a transportation problem?

5) State two basic assumptions in 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 main decisions in an inventory model?

SECTION–B

Answer any FIVE questions: (5 X 8= 40)

11. A manufacturer of furniture makes two products, chairs and tables. Processing of these products is done on two machines A and B. A chair requires 2 hours on machine A and 6 hours on machine B. A table requires 5 hours on machine A and no time on machine B. There are 16 hours of time per day available on machine A and 30 hours on machine B. Profit gained by the manufacturer from a chair and table is Rs. 20 and Rs. 100 respectively. What should be the daily production of each of the two products?

12. Use the graphical method to solve the following LPP:
    Minimize $Z = 2x_1 + x_2$ subject to the constraints: $5x_1 + 10 x_2 \leq 50$, $x_1 + x_2 \geq 1$, $x_1 \leq 4$, and.
    $x_1 , x_2 \geq 0$.

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 which minimizes the total man hours:

Men

Jobs	A	B	C	D
1	10	25	15	20
2	15	30	5	15
3	35	20	12	24
4	17	25	24	20

17. The following table gives the activities in construction project and time duration:

Activity	Preceding activity	Normal time
1-2	-	20
1-3	-	25
2-3	1-2	10
2-4	1-2	12
3-4	1-3, 2-3	5
4-5	2-4, 3-4	10

Draw the network activity of the project and find the critical path.

18. Explain the characteristics of an inventory model.

SECTION–C

Answer any TWO questions: (2 X 20= 40)

19. (i) Explain briefly the general phases of solving operations research models.

  (ii) In a factory there are 6 jobs to perform, each of which should go through 2 machines A and B in the order AB. The processing times in hours for the jobs are given. Determine the sequence for performing the jobs that would minimize the total elapsed time T, What is the value of T?

Job	J_1	J_2	J_3	J_4	J_5	J_6
Machine A	1	3	8	5	6	3
Machine B	5	6	3	2	2	10

20. For the following transportation problem, determine the initial basic feasible solution using (i) North-West corner rule, (ii) Least cost method (iii) Vogel's approximation method.

	D	E	F	G	Avaiability
A	11	13	17	14	250
B	16	18	14	10	300
C	21	24	13	10	400
Requirement	200	225	275	250	

21. The following table lists the job of a network along with their time estimates:

Job		Duration (days)		
i	j	Optimistic	Most likely	Pessimistic
1	2	3	6	15
1	6	2	5	14
2	3	6	12	30
2	4	2	5	8
3	5	5	11	17
4	5	3	6	15
6	7	3	9	27
5	8	1	4	7
7	8	4	19	28

  (i)   Draw the project network diagram.

  (ii)   Calculate the length and variance of the critical path.

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

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