LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

THIRD SEMESTER – **APRIL 2013**

ST 3103 - RESOURCE MANAGEMENT TECHNIQUES

Date : 04/05/2013 Dept. No. Max. : 100 Marks

Time : 9:00 - 12:00

Answer ALL the questions. (10 x 2 = 20 marks)

1. Define an optimal solution.
2. Distinguish between slack and surplus variables.
3. Briefly describe transportation problem.
4. Explain a 'two machines and n jobs' sequencing problem.
5. What is meant by idle time in a sequencing problem.
6. Discuss the aims of inventory control.
7. Write a note on (i) setup cost (ii) ordering cost.
8. Explain the factors (i) lead time (ii) order cycle.
9. When is an activity said to be critical in network analysis?
10. Distinguish between pessimistic time and optimistic time.

SECTION - B

Answer any FIVE questions. (5 x 8 = 40 marks)

11. A company sells two different products A and B. The company makes a profit of Rs.40 and Rs.30 per unit on products A and B respectively. The two products are produced in a common production process and are sold in different markets. The production process has a capacity of 30,000 man hours. It takes 3 hours to produce one unit of A and one hour to produce one unit of B. The market has been surveyed, and the company officials feel that the maximum number of units of A that can be sold is 8,000 and the maximum of B is 12,000 units. Formulate this problem as a linear programming problem.
12. Solve graphically the following L.P.P.:
    Maximize $z = x_1 + x_2$
    subject to the constraints:
    $$x_1 + x_2 \leq 1$$
    $$-3x_1 + x_2 \geq 3$$
    $$x_1, x_2 \geq 0.$$
13. Find all the basic solutions to the system of linear equations:
    $$x_1 + 2x_2 + x_3 = 4$$
    $$2x_1 + x_2 + 5x_3 = 5.$$
    Are the solutions degenerate?

14. Consider the following transportation problem:

Source	Destination	Availability

	1	2	3	4	
1	21	16	25	13	11
2	17	18	14	23	13
3	32	27	18	41	19
Requirement	6	10	12	15	43

Determine an initial basic feasible solution using Vogel's approximation method.

15. Consider the problem of assigning five jobs to five persons. The assignment costs are given as follows:

Persons	Job				
	1	2	3	4	5
A	8	4	2	6	1
B	0	9	5	5	4
C	3	8	9	2	6
D	4	3	1	0	3
E	9	5	8	9	5

Determine the optimum assignment schedule.

16. In a factory, there are six jobs to perform, each of which should go through two machines A and B, in the order A, B. The processing timings (in hours) for the jobs are given here. 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

17. Draw a network diagram for the following data.

Activity :	A	B	C	D	E	F	G	H	I	J
Preceding activity :	None	A	A	B	A	B,E	C	D,F	G	H,I .

18. Explain the concept of EOQ and draw the graph of EOQ.

SECTION – C

Answer any TWO questions. (2 x 20 = 40 marks)

19. Use Simplex Method to solve the following L.P.P.:
Maximize $z = 107x_1 + x_2 + 2x_3$
subject to the constraints:
$14x_1 + x_2 - 6x_3 + 3x_4 = 7$
$16x_1 + (1/2)x_2 - 6x_3 \leq 5$
$3x_1 - x_2 - x_3 \leq 0$
$x_1, x_2, x_3 \geq 0.$

20. Obtain an initial basic feasible solution to the following T.P. using least cost method:

	D_1	D_2	D_3	D_4

O_1	1	2	3	4	6	
O_2	4	3	2	0	8	Capacity
O_3	0	2	2	1	10	
Demand	4	6	8	6		

Also determine an optimum basic feasible solution to the T.P. using MODI Method.

21. Determine the optimal sequence of jobs that minimizes the total elapsed time based on the following information. The processing time on machines is given in hours and passing is not allowed:

Job :	A	B	C	D	E	F	G
Machine M_1 :	3	8	7	4	9	8	7
Machine M_2 :	4	3	2	5	1	4	3
Machine M_3 :	6	7	5	11	5	6	12

22. A project consists of seven activities for which the relevant data are given below:

Activity	Preceding Activities	Activity Duration (Days)
A	-	4
B	-	7
C	-	6
D	A, B	5
E	A, B	7
F	C, D, E	6
G	C, D, E	5

(i)Draw the network and find the project completion time.

(ii) Calculate total float for each of the activities and highlight the critical path.

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