



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc.DEGREE EXAMINATION – COMPUTER SCIENCE

FIFTH SEMESTER – APRIL 2017

CS 5503- RESOURCE MANAGEMENT TECHNIQUES

Date: 20-04-2017
Time: 01:00-04:00

Dept. No.

Max. : 100 Marks

SECTION-A

ANSWER ALL THE QUESTIONS:

(10X2=20)

1. Define OR.
2. Write a note on slack variables.
3. Write is unbalanced transportation problem.
4. Write down the route condition for the traveling salesman problem.
5. What is total elapsed time?
6. Define dummy Activity
7. What does PERT stands for? Write the objective of PERT.
8. Define Inventory.
9. What is setup cost?
10. List down the situations for replacement.

SECTION-B

ANSWER ALL THE QUESTIONS:

(5X8=40)

11. a) A company manufacturers two products A and B in two departments namely assembly department and painting department. It takes two hours in the assembling department and one hour in painting department to manufacture one unit of product A. It takes two hours in the assembling department and 2 hours in painting department for manufacturing one unit of product B. The assembling department works for three 8 hours shift per day and painting department works two 8 hours shift per day. The profit of the product A is Rs.100 and the profit of the product B is Rs.150 per unit. How many units of product A and B to be manufactured so as to maximize the profit for the company?

(OR)

- b) Solve the following LPP by Graphical method:

Max $Z = 3x_1 + 5x_2$ Subject to the constraints:

$$x_1 + 2x_2 \leq 2000, \quad x_1 + x_2 \leq 1500, \quad x_2 \leq 600, \quad x_1, x_2 \geq 0$$

12. a) Obtain an initial basic feasible solution to the following transportation Problem using North-West Corner Rule.

	D	E	F	G	Available
A	6	8	8	5	30
B	5	11	9	7	40
C	8	9	7	13	50

Requirements 35 28 32 25

(OR)

- b) Solve the following assignment problem:

	A	B	C	D
I	1	4	6	3
II	9	7	10	9
III	4	5	11	7
IV	8	7	8	5

13. a) Find the sequence that minimizes the total elapsed time (in Hrs) required to complete the following task on 2 machines. Also find the total elapsed time and idle time of each machine.

Jobs	J1	J2	J3	J4	J5	J6
Machine A	3	12	5	2	9	11
Machine B	8	10	9	6	3	1

(OR)

- b) A is the operation on the project. B&C can be done concurrently & both must follow A. B must proceed D. E can not begin until both B&C are completed. F is dependent on the completion of both D&E. F is the last operation on the project. Draw the arrow network and number the nodes according to Fulkerson's Rule.

14. a) The annual demand for an item is 3200 units. The unit cost is Rs.6/- and inventory carrying charges 25% per annum. If the cost of one procurement is Rs.150/- determine the following (i) Economic order quality (ii) time between two consecutive orders (iii) number of order per year (iv) the optimal total cost.

(OR)

b) A stockiest has to supply 12,000 units of a product per year to his customer. The demand is fixed and known and the shortage cost is assumed is to be infinite. The inventory holding cost is Re.0.20 per unit per month and the ordering cost per order is Rs.350. Determine the following

- (i) The optimum lot size q_0
- (ii) Optimum scheduling period t_0
- (iii) Minimum total variable yearly cost.

15. a) A machine cost Rs.900. The annual operating cost is Rs,200 for the first year and is then increasing by Rs.2000 per year for subsequent years. There is no scrap value. Determine the best age to replace the machine.

(OR)

b) The maintenance cost and the resale price of a truck are given below:

Year	1	2	3	4	5	6	7	8
Maintenance cost	100	1300	1700	2200	2900	3800	4800	6000
Resale Price	4000	2000	1200	600	500	400	400	400

The purchase price of the truck is Rs.8000. Determine the time at which it is profitable to replace the truck.

SECTION-C

ANSWER ANY TWO QUESTIONS: (2X20=40)

16. i) Solve the following LPP by Graphical method:

Max $Z = 3x_1 + 5x_2$ Subject to the constraints:

$$x_1 + 2x_2 \leq 2000, \quad x_1 + x_2 \leq 1500, \quad x_2 \leq 600, \quad x_1, x_2 \geq 0$$

ii) A firm has 3 factories producing certain product and it is to be transported to five distribution centers. The unit transportation cost (in 100's of Rupees) from factories to the distribution center are given below.

		Distribution Centers				
		D1	D2	D3	D4	D5
Factories	F1	3	2	3	4	1
	F2	4	1	2	4	2
	F3	1	0	5	3	2

Total productions of F1,F2 & F3 are 100,125,75 and the demands of distribution centers D1,D2,D3,D4 & D5 are 100,60,40,75,25 units respectively. Determine the transportation pattern to minimize the overall shipping cost.(Using VAM) (10)

17. i) Find the sequence that minimizes the total elapsed time (in Hrs) required to complete the following task on 2 machines. Also calculate total elapsed time and idle time of each machine.

(10)

Tasks	A	B	C	D	E	F	G	H	I
Machine 1	2	5	4	9	6	8	7	5	4
Machine 2	6	8	7	4	3	9	3	8	11

ii) a) Given the following information:

Activity	1-2	1-6	2-3	2-4	3-5	4-5	6-7	5-8	7-8
a	3	2	6	2	5	3	3	1	4
m	6	5	12	5	11	6	9	4	19
b	15	14	30	8	17	15	27	7	28

- i) Draw the Project Network
- ii) Find the length and variance of each activity.
- iii) Find the critical path.
- iv) Find the length and variance of the critical path. (10)

18. (i) A particular item has a demand of 9,000 units/year. The cost of one procurement is Rs.100 and the holding cost per unit is Rs.2.40 per year. The replacement is instantaneous and no shortages are allowed. Determine

- (i) The economic lot size,
- (ii) The number of orders per year,
- (iii) The time between orders,
- (iv) The total cost per year if the cost of one unit is Re.1. (10)

(ii) Machine A cost Rs.5000. Annual operating cost is Rs. 1000 for the first year and is increasing at the rate of Rs. 2000 per year afterwards. The machine has no resale value.

Another machine B costs Rs.10000. The annual operating cost is Rs.400 for the first year and is increasing at the rate of Rs.800 every year with no resale value. If the machine A is one year old, is it advisable to replace A with B? If so find the appropriate time for replacement. (10)
