



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.C.A.DEGREE EXAMINATION – COMPUTER APPLICATIONS

FIRSTSEMESTER – APRIL 2018

17/16UCS1AL01- OPERATION RESEARCH

Date: 30-04-2018
Time: 01:00-04:00

Dept. No.

Max. : 100 Marks

SECTION-A

ANSWER ALL THE QUESTIONS:

(10X2=20)

1. Define Operations Research
2. What are the limitations of graphical method?
3. When is transportation problem said to be unbalanced? Give an example.
4. Write down the condition for solving assignment problem.
5. State job sequencing problem.
6. What is Total elapsed time?
7. Define dummy Activity.
8. What does CPM stand for? What is the objective of CPM?
9. What is setup cost?
10. Differentiate Reorder level and Reorder point.

SECTION-B

ANSWER ALL THE QUESTIONS:

(5X8=40)

11. a) A company manufactures 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	1	2	3	4	6
B	4	3	2	0	8
C	0	2	2	1	10
Requirements	4	6	8	6	

(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 machine.

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

(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	1000	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.

14. a) Write down the differences between PERT & CPM.

(OR)

b) A is the first 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.

15.a) Explain the following

i) Safety stock

ii) Shortage

(OR)

b) 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.

SECTION-C

ANSWER ANY TWO QUESTIONS:

(2X20=40)

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

Max $Z = 3x_1 + 4x_2$ Subject to the constraints:
 $x_1 + x_2 \leq 450$, $2x_1 + x_2 \leq 600$, $x_1, x_2 \geq 0$

ii) A company has 3 plants at located A, B & C. Supply warehouses located at D,E, F,G & H. monthly plant capacity are 800, 500 & 900 units respectively. Monthly warehouses requirements are 400,400,500,400 & 800 respectively. Unit transportation costs are given below:

		Warehouses				
		D	E	F	G	H
Plants	A	5	8	6	6	3
	B	4	7	7	6	6
	C	8	4	6	6	3

Determine an optimum distribution for a company in order to minimize the total transportation cost.(Using Least cost method)

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) Given the following information:

Activity	1-2	1-3	2-3	2-4	2-5	3-4	4-7	5-6	5-7	6-7
a	3	1	6	0	2	3	6	1	2	4
m	4	2	8	0	5	5	9	1	5	8
b	5	3	10	0	8	7	12	1	8	12

- 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) Define Inventory and also explain the various cost associated with Inventory.

(ii) 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. **(10)**

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