

Dr. Babasaheb Ambedkar Open University
Term End Exam August – 2010

Course Code : DOR-01 Roll No. _____
Subject : Basics of Operation Research
Date : 02-08-2010 Marks : 70
Time : 11:00 to 02:00

Note : All questions carry equal marks.

Que 1: Define Operation Research and state its relations with decision making.

OR

Describe various Operation research Models.

Que 2: Describe the structure of the linear programming model.

OR

State the guidelines in linear programming model formulation.

Que 3: State the Importance of linear programming models.

OR

State the uses of Operation research in various area.

Que 4: Priti Ltd. has two machines A and B. He manufactures two products. P and Q on these machines. For manufacturing product P he has to use machine A for 3 hours and machine B for 6 hours, and for manufacturing product Q she has to use machine A for 6 hours and machine B for 5 hours. On each unit of P she earn Rs.4 and on each unit of Q she earn Rs.5. How many units of P and Q should be manufactured to get maximum profit? Each machine may not be used for more than 2100 hours.

OR

Use the graphical method to solve the following LP problem for Krishna Ltd.

Minimize $Z = 20x_1 + 10x_2$ subject to the constraints.

$$x_1 + 2x_2 < 40$$

$$3x_1 + x_2 > 30$$

$$4x_1 + 3x_2 \geq 60 \text{ and } x_1, x_2 \geq 0.$$

(P.T.O)

Que 5: Pintu furniture manufacturer makes two products: Chairs and tables. Processing of these products is done on two machines A and B. A chair requires 3 hours on machine A and 6 hours on machine B. A table requires 6 hours on machine A and no time on machine B. There are 16 hours per day available on machine A and 40 hours on machine B. Profit gained by the manufacturer from a chair and a table is Rs.4 and Rs.10 respectively.

What should be the daily production of each of the two products?

OR

A diet for a sick person must contain at least 4100 units of Vitamins, 50 units of minerals and 1300 calories. Two foods A and B are available in the market at a cost of Rs.50 and 35 respectively. One unit of A contain 250 units of vitamins, 1 unit of mineral and 40 calories and one unit of B contains 100 unit of vitamins, 2 units of minerals and 40 calories.

Solve the problem graphically.

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Course Code : DOR-02 Roll No. _____
Subject : Assignment and Transportation Problems
Date : 02-08-2010 Marks : 70
Time : 03:00 to 06:00

Note : All questions carry equal marks.

Que 1: Explain Assignment problem. (14)

OR

Explain traveling salesman problem.

Que 2: Obtain a basic feasible solution of the following transportation problem by North West corner rule for Amin Ltd. (14)

Origins		D1	D2	D3	D4	D5	Supply
	O1	3	4	6	8	9	20
	O2	2	0	1	5	8	30
	O3	7	11	20	40	3	15
	O4	2	1	9	14	16	13
Demand		40	6	8	18	6	78

OR

Que 2: Narrate the steps in solution method of Assignment problem.

Que 3: Solve the following Assignment problem to maximize the total profit for ABC Ltd. (14)

(Profit in Rs.)

	D1	D2	D3	D4
O1	3	4	11	9
O2	5	7	8	9
O3	5	6	6	7
O4	4	6	8	8

OR

(P.T.O)

Que 3: Solve the problem to minimize the total distance traveled.

	P	Q	R	S	T	U
A	41	62	39	52	25	51
B	22	29	49	65	81	50
C	27	29	60	51	32	32
D	45	50	48	52	37	43
E	29	40	39	26	30	33
F	82	40	40	60	51	30

Que 4: Solve the following transportation problem for Surya Ltd. By Vogel's method and find the total Expense. (14)

Destinations

Origins		D1	D2	D3	D4	Supply
	O1	1	2	1	4	30
	O2	3	3	2	1	50
	O3	4	2	5	9	20
Requirement		20	40	30	10	100

OR

Que 4: The price of a machine is Rs.9000. Its maintaince expense is Rs.200 for the first year and then it increase by Rs.2000 per year. At what time is it profitable to replace the machine?

Que 5: Write short notes on (14)

- 1) Vogel's Method to solve transportation problem
- 2) Problem of replacement.

OR

Que 5: Write short notes on

- 1) Matrix Minima method
- 2) Least cost Method

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Course Code : DOR-03 Roll No. _____
Subject : PERT and CPM Marks : 70
Date : 03-08-2010
Time : 11:00 to 02:00

Note : All questions carry equal marks.

Que 1: Write short notes on any two of the following.

- 1) Resource Smoothing.
- 2) Project Crashing.
- 3) Project Scheduling with uncertain activity times.
- 4) Forward pass method.

Que 2: What is PERT and CPM? What is the basic difference between PERT and CPM?

OR

Explain the different phases of project management.

Que 3: Explain significance of using PERT and CPM.

OR

Describe PERT and CPM network components and precedence relationships.

Que 4: Describe errors and dummies in network.

OR

Explain critical path analysis.

Que 5: Draw network diagrams from the following list of activities for Sunny Ltd.

Activity	Predecessor Activity		
	Set1	Set2	Set3
A	-	-	-
B	-	-	-
C	-	-	-
D	A	A	A
E	B	A,B	A,B
F	B,C	A,B,C	B,C
G	D,E,F	D,E,F	C
H	E,F	F	D,E,F

OR

(P.T.O)

Que 5: An architect has been awarded a contract to prepare plans for an urban renewal project for Europe Ltd. The jobs consists of the following activities and their estimated times:

Activity	Description	Immediate Predecessors	Time(days)
A	Prepare Preliminary Sketches	-	2
B	Outline specifications	-	1
C	Prepare drawings	A	3
D	Write Specifications	A,B	2
E	Run off print	C,D	1
F	Have specification	B,D	3
G	Assemble bid packages	E,F	1

A) Draw an arrow diagram for this project.

B) Indicate the critical path, and calculate the total float and free float for each activity.

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Course Code : DOR-04 Roll No. _____
Subject : Other Methods of Operation Research
Date : 03-08-2010 Marks : 70
Time : 03:00 to 06:00

Note : All questions carry equal marks.

Que 1: Describe the steps involved in the process of decision making.

OR

Explain and illustrate the following principles of decision making

- a) Maximax
- b) Equally likely

Que 2: What are decision trees? How and in what type of situations are they employed for decision making?

OR

Describe the types of decision making environment.

Que 3: Explain the techniques to deal with risk.

OR

Classify the degree of certainty with explanation.

Que 4: Dharmilk, a small industry finds from the past data that the expense of making an item is Rs.25, the selling price is Rs.30 if it is sold within a week, and it could be disposed of at Rs.20 per item at the end of the week:

Weekly Sales	<3	4	5	6	7	>8
No.of weeks	0	10	20	40	30	0

Find the optimum number of items per week the industry should produce.

OR

Que 4: The Research department of Hindustan Lever has recommended the

(P.T.O)

marketing department to launch a shampoo of three different types. The marketing manager has to decide one of the types of shampoo to be launched under the following estimated pay-offs (in millions of Rs) for various levels of sales:

Types of shampoo	Estimates level of sale (Units)		
	15,000	10,000	5,000
Egg shampoo	30	10	10
Clinic shampoo	40	15	5
Deluxe shampoo	55	20	3

What will be the marketing manager's decision if (a) Maximin (b) Maximax (c) Laplace and (d) Regret criterion is applied?

Que 5: The Nirma Ltd. is considering the purchase of a new investment. Two alternative investments are available (A and B) each costing Rs. 1,00,000. Cash inflows are expected to be as follows:

Year	Cash inflows	
	Investment A Rs.	Investment B Rs.
1	40,000	50,000
2	35,000	40,000
3	25,000	30,000
4	20,000	30,000

The company has a target return on capital of 10%. Risk premium rates are 2% and 8% respectively for investments A and B. Which investment should be preferred?

Or

Que 5: Neetu Ltd. is considering two mutually exclusive projects A and B. In both the cases, initial investment will be rs.1,10,000 and the useful life of both will be 10 years. No project has scrap value. The probable cash flow will be as follows:

	Project A Rs.	Project B Rs.
Optimistic	50,000	70,000
Most Likely	40,000	35,000
Pessimistic	18,000	4,000

If the rate of discount is 10% calculate present value and state which project is better out of two. The annuity of Rs.1 at 10% for years is Rs. 6.145.