Dr. Babasaheb Ambedkar Open University
Term End Examination January - 2013

Course : Diploma in Operation Research **(DOR)**

Roll No.: _____

Subject : Basics of Operation Research **(DOR-01)**
Date : **27/01/2013**
Time : **11.00 to 02.00**
N.B. : All questions carry equal Marks. **Total Marks : 70**

Q.1 Define Operation Research and state its relation with decision making. **(14)**

OR

Describe various Operation Research Models.

Q.2 Describe the structure of Linear Programming Model. **(14)**

OR

State the advantages and limitations of Linear Programming Models.

Q.3 State the guidelines in Linear Progamming Model formulation. **(14)**

OR

Explain the history, nature and significance of Operaions Research.

Q.4 Explain the application areas of linear Programming. **(14)**

OR

Use the Graphical method to solve the following LP problem for Shyam Ltd.

Minimize $Z = -x_1 + 2x_2$

Subject to the constraints

$-x_1 + 3x_2 \leq 10$

$x_1 + x_2 \leq 6$

$x_1 - x_2 \leq 2$

$x_1, x_2 \geq 0$

Q.5 A Watch dealer wishes to buy new watches and has two models M_1 and M_2. Model M_1 costs Rs. 250 and M_2 costs Rs. 390. His show case has space for 30 watches and he has Rs. 7500 to spend. The watch dealer may make a profit of Rs. 20 in model M_1 and Rs. 50 in Model M_2. How many watches of each model should he buy to obtain Maximum profit? **(14)**

OR

Use the graphical method to solve the following LP problem in following equation for Z Ltd.

Minimize $Z = 15\ x_1 + 10\ x_2$

Subject to the constraints

$4x_1 + 6x_2 \leq 360$

$3x_1 + 0x_2 \leq 180$

$0x_1 + 5x_2 \leq 200$

and $x_1, x_2 \geq 0$

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Course : Diploma in Operation Research **(DOR)**

Roll No.: _____

Subject : Assignment and Transportation Problems. **(DOR-02)**
Date : **27/01/2013**
Time : **03.00 to 06.00**
N.B. : All questions carry equal Marks. **Total Marks : 70**

Q.1 Describe the steps to the method of solution for Assignment problem. **(14)**

OR

Explain Traveling Salesman problem.

Q.2 Narrate the steps in solution method of Assignment problem. **(14)**

OR

Obtain a basic feasible solution of the following transportation problem by North-West corner rule for Harshil Ltd.

Destinations

Origins		**O_1**	**O_2**	**O_3**	**O_4**	**O_5**	**Supply**
	Q_1	3	4	6	8	9	20
	Q_2	2	0	1	5	8	30
	Q_3	7	11	20	40	3	15
	Q_4	2	1	9	14	16	13
Demand		40	6	8	18	6	78

Q.3 Solve the following assignment problem to maximize the Total Profit for Suraj Ltd. **(14)**

(Profit in Rs.)

	O_1	**O_2**	**O_3**	**O_4**
O_1	3	4	11	9
O_2	5	7	8	9
O_3	5	6	6	7
O_4	4	6	8	8

OR

Explain Assignment Problem.

Q.4 A machine expenses Rs. 6,100 and its resale value is Rs. 100. Its Maintainance expenses is estimated as follows when should the Machine be replaced? **(14)**

Years	1	2	3	4	5	6	7	8
Maintainance expense(in Rs.)	100	250	400	600	900	1200	1600	2000

OR

The price of machine is Rs. 9000/- Its maintainance expanses is Rs. 200/- for the first year and then it increased by Rs. 2000/- per year. At what time is it profitable to replace the Machine?

Q.5 **Write a short-note on Any two of the following.** **(14)**

(a) Matrix Minima Method.
(b) Problem of replacement.
(c) Least cost method.
(d) Vogel's Method to solve transportation.

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Roll No.: _____

Subject : PERT & CPM **(DOR-03)**
Date : **29/01/2013**
Time : **11.00 to 02.00**
N.B. : All questions carry equal Marks. **Total Marks : 70**

Q.1 Explain the meaning and significance of PERT and CPM. **(14)**

OR

Discuss phases of Project Management.

Q.2 Discuss PERT/CPM Network components and Precedence Relationships. **(14)**

OR

Explain Critical Path Analysis.

Q.3 Discuss float of an Activity and Event. **(14)**

OR

Write a note on : Backward Pass Method.

Q.4 **Write Short note on any two:**(1) Project Crashing. **(14)**
(2) Resource Allocation and Resource Levelling.
(3) Resource Smoothing.
(4) Net work Diagram.

Q.5 From the following. **(14)**
(a) Draw an arrow diagram.
(b) Indentify the Critical path What is its length?

Task	Description	Precedence	Duration (Hours)
A	Dismantle pipe connection	-	07
B	Dismantle header, closure	A	11
C	Remove tube bundle	B	05
D	Clean bolts	B	08
E	Clean header	B	06
F	Clean tube bundle	C	05
G	Clean Shell	C	03
H	Replace tube bundle	F,G	08
I	Prepare shell Pressure test	D,E,H	12
J	Prepare tube pressure test and make the final reassembly	I	08

OR

Draw Network diagram from following Activities:-

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

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Course : Diploma in Operation Research **(DOR)**

Roll No.: _____

Subject : PERT & CPM **(DOR-04)**
Date : **29/01/2013**
Time : **03.00 to 06.00**
N.B. : All questions carry equal Marks. **Total Marks : 70**

Q.1 Describe Decision Tree Analysis. **(14)**

OR

Write a short note on Expeccted value of Perfect information.

Q.2 Explain Sensivity Analysis as a risk reducing measure in Capital Budgeting. **(14)**

OR

Write a short note on Maximax criteria of decision making.

Q.3 **Write Short note on the following (Any two)** **(14)**

(1) Expected Opporatunity Loss.
(2) Concept of decision making.
(3) Expected value of perfect information.
(4) Degrees of Certainty.

Q.4 Explain the techuniques to deal with risk. **(14)**

OR

Summarise EMV and EOL Criteria.

Q.5 The probability distribution of Monthly Sales of an item of Raj Ltd. is as follows:-**(14)**

Monthly sales (units)	0	1	2	3	4	5	6
Probability	0.01	0.06	0.25	0.30	0.22	0.10	0.06

The expense of carrying inventory (Unsold during the month) is Rs. 30 per unit per month and expense of unit shortage is Rs. 70. Determine optimum stock to minimize expected expense.

OR

Amar Ltd. is considering two mutually exclusive Project 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 projects has no 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 the present value and state which Project is better out of the two. The annuity of Re. 1 at 10% for 10 years is Rs. 6.145.
