S4(H/F) Quant. Methods - II

ADYNAMIA

TIME : 2 hrs. March '09 MARKS : 60

Instruction : 1) Attempt any one Q.1 or Q.2 in section - I. 15

Section - I

Q.1 A) What are uses and limitations of quantitative techniques. 07

Q.1 B) i) What are various applications of linear programming 03

ii) Briefly explain various terminologies used in linear programming 05

OR

Q.2 A) Define operational Research & Describe its chief characterstics. 07

B) Define simplex method and briefly explain all terminologies in simplex method 08

Section - II 15

Q.3 a) A manufactures of furniture makes 2 products. Tables and chairs, which must be processed through assembly and finishing deprtments. Assembly department has 60 hours available per week. Finishing has 80 hrs. available per week. 04

Manufacturing 1 table requires 4 hours of assembly, 2 hrs of finishing while a chairs requires 2 hours of assembly and 4 hours in finishing department.

If profit is Rs.8/- per table, Rs.6/- per chair find optimum values of chairs & tables to obtain maximum profits. (graphical method)

Q.3 b) Use graphical method : 03

Minimize $Z = 6x_1 + 24x_2$

Subject to; $x_1 + 2x_2 \geq 3$

$x_1 + 4x_2 \geq 4$

$x_1, x_2 \geq 0.$

Q.4 a) Solve the following problem by simplex method. 05

Maximize $Z = 100x_1 + 40x_2$

Subject to;

$x_1 + 2x_2 \leq 60$

$2x_1 + x_2 \leq 102$

$x_1, x_2 \geq 0.$

Q.4 B) Solve the minimum Assignment problem. 03

	C_1	C_2	C_3	C_4	C_5
R_1	52	68	40	91	72
R_2	61	74	21	63	49
R_3	77	82	101	61	71
R_4	38	54	77	67	70

Section - III

{Attempt any One Q.5 or Q.6 in section III} 15

Q.5 A) Find optimum solution to the following transportation problem. The figures here are transportation costs per unit of product from origin to Destination. 08

Destination	D	D	D	D	Availability

Use VAM & MODI METHOD

Q.5 B) A salesman visits 5 cities. Distance in kms. is given below. He has to visit each city only once. If he starts from A what route should he take to finally come back to A, travelling the minimum distance. 07

	A	B	C	D	E
A	-	70	60	80	40
B	70	-	80	50	60
C	60	80	-	90	70
D	80	50	90	-	80
E	40	60	70	80	-

OR

Q.6 A) There are 4 bus depots where the buses are parked for night. These emptly buses should reach the starting points early in the morning to start the bus service on various routes. The cost per unit transportation for empty buses from the depots to starting points are given below. Find the optinums movement of empty buses from depots to starting points so as to minimise total transportation cost. 08

Bus Depot. \ Starting point	1	2	3	4	5	6	Supply
A	10	12	11	14	15	12	30
B	12	13	12	11	14	13	50
C	14	12	15	19	16	12	75
D	13	11	17	13	14	16	20
Demand	20	40	30	10	50	25	175

Use VAN & MODI methods.

Q.6 B) A Salesman visits 4 cities. The distance in Kms. are given below. He starts froms city A & comes back to city A. How should he plan the route so that he travels minimum distance without visiting any city more than once. 07

From \ To	Cities			
	1	2	3	4
1	-	40	70	30
2	40	-	60	30
3	70	60	-	70
4	30	30	70	-

Section - IV

15

Q.7 A) (i) Determine Relation between Nominal and effective rate of interest 02

(ii) Find the effective rate of interest corresponding to 8% compounded 06

a) half yearly

b) quarterly

c) continuously

When r = 8%

Q.7B) (i) Find the present value of ordinary annuity of Rs.1,000 twenty six months for 10 years at 5% compounded half - yearly 03

(ii) A machine costing Rs.80,000 has an estimated effective life of 15years. Company 04