

30/9/14

Library  
NO10AADSYAF  
Q.M-II

Time: 2:30hrs

Max.Marks:75

Instructions:

- (1) All questions are compulsory.
- (2) Each question carries the same marks.
- (3) Only simple calculators are allowed.

Q1 (A) Attempt any eight questions out of ten. (8)

- (i) Write full form of EOL and EMV.
- (ii) Intersection of incoming and outgoing vector called as \_\_\_\_\_.
- (iii) If any executive assigned in dummy row/column, then executive will be \_\_\_\_\_.
- (iv) Write the full form of EVPI.
- (v) Write the formula of EPPI.
- (vi) A decision will be best if EOL is \_\_\_\_\_.
- (vii) In decision tree event nodes represented by \_\_\_\_\_.
- (viii) Common shaded portion also called as \_\_\_\_\_.
- (ix) Take least value of each column and then subtract it from all values of that column called as \_\_\_\_\_.
- (x) In assignment if no. of rows are equal to no. of columns, then problem called as \_\_\_\_\_.

Q1 (B) Attempt any seven questions out of ten. (7)

- (i) Convert the payoff matrix into regret matrix:

	S1	S2	S3
N1	60	40	-10
N2	70	50	20
N3	80	20	0

(S=strategy)(N=state of nature)

- (ii) Find best strategy using laplace technique for the given data:

	S1	S2	S3
N1	700	400	300
N2	150	100	900
N3	400	550	0

(S=strategy)(N=state of nature)

- (iii) Plot and shade the inequality:  $3X + 6Y \geq 12$
- (iv) Write the inequality if a company produces a product through two machines, which requires 12 units of machine 1 and 6 units of machine 2 and capacity of machine is 220 units.

- (v) In transportation, the starting point of loop always has \_\_\_\_\_ sign.
- (vi) In transportation, penalty is \_\_\_\_\_.
- (vii) In simplex method, slack variable represents \_\_\_\_\_.
- (viii) A simplex solution is optimal if all Delta values will be \_\_\_\_\_.
- (ix) Write all methods to find initial feasible solution of transportation problem.
- (x) In LPP, row which has minimum replacement ratio called as \_\_\_\_\_.

Q2 (A) A retailer wants to buy a product from a dealer. The product is supplied only in lots of 100. The probabilities of market demand based on past experience are: (15)

Market demand	100	200	300	400	500
Probability	0.15	0.35	0.25	0.15	0.1

- Find: (i) Prepare pay-off table and suggest best decision alternative.  
 (ii) Calculate EVPI.  
 (iii) Calculate EOL.

Cost of product is Rs. 20 per unit. The retailer will sell the product at Rs.45 per unit. But unsold products will not have any salvage value.

**OR**

Q2 (A) A company produces two products A and B. 1 unit of product A requires 10 labour hours. 1 unit of product B requires 5 labour hours. Availability of labour hours is 400. Maximum market demand for product B is 60 units. Minimum market demand for product A is 20 units. Cost per unit of product A and B is Rs. 3 and Rs. 5 respectively. Formulate L.P.P. and obtain optimal solution using graphical method. (7)

Q2 (B) A company has choice of launching any one of three variants of detergent-super, excel and ultra. Pay-off table is given below. Find appropriate decision using: (8)

- (i) Maximin Criterion.
- (ii) Maximax Criterion.
- (iii) Hurwicz( $\alpha=0.6$ )
- (iv) Minimax regret.

Demand	Product variant		
	Super	Excel	ultra
20000	60	50	35
15000	35	40	30
10000	15	25	20
5000	-10	5	10

Q3 (A) Using the simplex method solves the L.P.P. (15)

Maximise  $Z = 45x + 55y$

Subject to constraints:

$6x + 3y \leq 120$

$4x + 10y \leq 180$

$x, y \geq 0$

**OR**

Q3 (A) Find the optimal assignment to maximize the total revenue. (7)

Parties	Hall			
	1	2	3	4
A	10	9	---	---
B	8	10	8	5
C	7	10	6	8
D	10	8	---	---

Q3 (B) Find initial feasible solution of transportation problem using the method of VAM. (8)

Plant	WH	Market				Supply
		P	Q	R	S	
A		6	4	14	12	10
B		14	10	4	6	12
C		4	10	8	10	5
Demand		12	8	4	30	

Q4 (A) A firm employs typist for job work on an hourly basis. There are five typists available and their charges and speeds are different. Only one job is given to one typist and a typist is paid full hour even if /she works for a fraction of an hour. Find the least cost allocation for the given data: (15)

Typist	Rate per hour (Rs.)	No. of pages typed per hour	Job	No. of pages
A	5	12	P	200
B	6	14	Q	176
C	3	8	R	150
D	4	10	S	300
E	4	11	T	180

**OR**

Q4 (A) An outsourcing company ltd. has production centres at Mumbai, Chennai and Kolkata. The company has its distribution centres at Ahemdabad, Bhopal, Banglore and Goa. Production costs are equal and fixed at all three production centres, however the variable costs are only the transportation costs. The monthly productions at Mumbai, Chennai and Kolkata are 10,000 units, 12,000 units and 5000 units respectively. The monthly demand at company's four distribution centres viz. Ahemdabad, Bhopal, Banglore and Goa are 12,000 units, 8,000 units, 4,000 units and 3,000 units respectively. The transportation cost per unit from different production centres to different distribution centres are given in the following table:

Production centres	Distribution centres			
	Ahmedabad	Bhopal	Bangalore	Goa
Mumbai	6	4	14	12
Chennai	14	10	4	6
Kolkata	4	10	8	10

Obtain an optimum transportation schedule so as to minimize the transportation cost. (15)

Q5 (A) What is meant by redundant constraint and infinite no. of solution in linear programming? Show with graphical sketch. (8)

(B) Explain how operations research plays a crucial role in business development? (7)

**OR**

Q5 Attempt any three sub-questions out of five: (15)

- (A) Define in short what is a decision tree .
- (B) Write in brief Decision making under uncertainty, with decision criteria.
- (C) Write in short on application areas for linear programming.
- (D) Explain what is meant by decision variables, objective function and constraints in linear programming.
- (E) How do you detect and find optimal solution for restricted problem in an assignment.