

Biyani Girls College
I Internal Examination 2019-20
B.COM. HONORS (III Year)
Subject- Operation Research and Quantitative Techniques

Time: 1.30 Hrs.

Set: B

MM: 40

[I] Multiple Choice Questions

(10*1=10)

Q1. Game theory was developed by

- (a) John vonneuman (b) Thomas
(c) Robert (d) Donald

Q2. Dominance rule is applicable for

- (a) 2*4 (b) 2*3
(c) 3*3 (d) 3*2

Q3. Saddle point exist when

- (a) Maximin= minimax (b) Rows=column
(c) it is related to graphical method (d) None of the above.

Q4. Full form of PERT

- (a) Programme Equation Review Technique (b) Programme Evaluation Revolving Technique
(c) Programme Evaluation Review Technique (d) Present Evaluation Review Technique

Q5. What is Degeneracy in transportation model?

- (a) $(m+n+1)$. (b) $(m+n-1)$
(c) $(m+n+2)$ (d) $(m+n-2)$

Q6. In a balanced transportation model where supply equals demand,

- (a) all constraints are equalities (b) none of the constraints are equalities
(c) all constraints are inequalities (d) none of the constraints are inequalities

Q7. In a transportation problem, items are allocated from sources to destinations

- (a) at a maximum cost (b) at a minimum cost
(c) at a minimum profit (d) at minimum revenue

Q8. The assignment model is a special case of the _____ model.

- (a) maximum-flow (b) Transportation
(c) Shortest-route (d) none of the above

Q9. What do you mean by two person zero sum game?

(a) Profit= loss

(c) 1 and 2

(b) There are two players

(d) None of the above

Q10. Which one is the method of game theory...

(a) Oddoment

(c) Saddle point

(b) Probability

(d) All of the above

B. Long type Questions:

(10*3=30)

Q1. Solve Transportation Problem

Vogel's Method

	W1	W2	W3	W4	Supply	Penalty			
F1	13(2)	11	15	40	2	2	-	-	-
F2	17	14(3)	12(3)	13	6	1	1	1	5
F3	18(1)	18	15(1)	12(5)	7	3	3	3	3
Demand	3	3	4	5	15				
Penalty	4	3	3	1					
	1	4	3	1					
	1	-	3	1					
	1	-	3	-					

$IOTC=13*2+18*1+14*3+12*3+15*1+12*5=197$

Q2. Two players R and C have one coin each. After a signal each of them exposes the coin.

Player R wins a unit when there are two heads, wins nothing when there are two tails and loses 1/2 unit when there is one head and one tail. Determine the payoff matrix, the best strategies for each player and the value of the game.

The pay off matrix of the game will be

Player C

	H	T
Player R	H $\left(\begin{matrix} 1 & -1/2 \end{matrix} \right)$	T $\left(\begin{matrix} -1/2 & 0 \end{matrix} \right)$

as there is no saddle point, we will solve it by using oddoment

method.

Step 1; Difference

$$\begin{array}{c}
 \text{Player R} \\
 \begin{array}{cc}
 \text{H} & \text{T} \\
 \left(\begin{array}{cc}
 1 & -1/2 \\
 -1/2 & 0
 \end{array} \right) \\
 \text{T}
 \end{array}
 \end{array}
 \begin{array}{l}
 3/2 \\
 1/2
 \end{array}$$

Step 1; Interchange

$$\begin{array}{c}
 \text{Player R} \\
 \begin{array}{cc}
 \text{H} & \text{T} \\
 \left(\begin{array}{cc}
 1 & -1/2 \\
 -1/2 & 0
 \end{array} \right) \\
 \text{T}
 \end{array}
 \end{array}
 \begin{array}{l}
 1/2 \\
 3/2
 \end{array}$$

Step 1; Divide by their respective sum

$$\begin{array}{c}
 \text{Player R} \\
 \begin{array}{cc}
 \text{H} & \text{T} \\
 \left(\begin{array}{cc}
 1 & -1/2 \\
 -1/2 & 0
 \end{array} \right) \\
 \text{T}
 \end{array}
 \end{array}
 \begin{array}{l}
 1/4 \\
 3/4
 \end{array}$$

VALUE OF THE GAME

$$(1 \cdot 1/4) + (-1/2 \cdot 3/4) = -1/8$$

STRATEGY FOR PLAYER R $\left[\begin{array}{c} 1/4 \\ 3/4 \end{array} \right]$

STRATEGY FOR PLAYER C $\left[1/4, 3/4 \right]$

Q3. Find the critical path and all floats

Activity	Expected time	EST	EFT	LST	LFT	FLOAT		
						TOTAL	FREE	IND.
1-2	7	0	7	0	7	0	0	0
1-6	6	0	6	1	7	1	0	0
2-3	14	7	21	7	21	0	0	0
2-4	5	7	12	20	25	13	0	0
3-5	11	21	32	21	32	0	0	0
4-5	7	12	19	25	32	13	13	0
6-7	11	6	17	7	18	1	0	0
5-8	4	32	36	32	36	0	0	0
7-8	18	17	35	18	36	1	1	0

Values are

E1=0, L1=0, S1=0

Where E= Early, L= late, S= Slack

E2=7, L2=7, S2=0

Es=tail event

E3=21, L3=21, S3=0

Ef=Es+t

E4=12, L4=25, S4=13

Ls=Lf-t

E5=32, L5=25, S5=7

Lf=head event

E6=6, L6=12, S6=6

TF=LS-ES OR LF-EF

E7=17, L7=18, S7=1

FF=TF-Sj

E8=36, L8=36, S8=0

IF= FF-Si

Critical path is 1-2-3-5-8= 36 days

