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S.Y.B.Sc. Semester – IV QP Code: 65508

Statistics – Paper III

SOLUTIONS

Q1. A) i) False - Relationship between floats of an activity in a network diagram is, 'total float $\geq$ free float $\geq$ independent float'.

- ii) False - The word CPM means Critical Path **Method**.
- iii) False - Both the players choose **pure**strategies, when a game has a saddle point.
- iv) False - An mXngame can be solved **by converting it into linear programming problem**.
- v) False - A value of the coefficient of optimism 'α' is needed, while using the criterion of **Hurwicz**.

Q2. b) ii) Pl. refer network:

Activity (i-j)	Estimated duration	Ei	Li	Ej	Lj
A	2	0	0	2	9
B	4	0	0	4	4
C	3	0	0	3	12
D	1	2	9	10	10
E	6	4	4	10	10
F	5	3	12	17	17
G	7	10	10	17	17
H	2	17	17	19	19

Critical path: B-E-G-H. Minimum expected duration of the project is 19 days.

Q2. c) ii) Pl. refer network:

Activity (i-j)	Estimated duration	Ei	Li	Ej	Lj	TF	FF	IF
A	3	0	0	3	3	0	0	0
B	7	0	0	9	9	2	2	2
C	6	3	3	9	9	0	0	0
D	5	3	3	15	15	7	7	7
E	6	9	9	15	15	0	0	0
F	4	15	16	19	19	0	0	0

Critical path: A-c-E-F. Minimum expected duration of the project is 19 weeks.

Q3. C) ii) a)

3	2	4	0
3	4	2	4
4	2	4	0
0	4	0	8

R3 dominates R1

b) c)

3	4	2	4
4	2	4	0
0	4	0	8

c3 dominates c1

4	2	4
2	4	0
4	0	8

(1/2)C3+(1/2)C4 dominates C2

d)

2	4
4	0
0	8

(1/2)R3+(1/2R4 dominates R2

e)

4	0
0	8

Solving game with the above payoff matrix : Value of the game = 8/3,

Optimum Strategy for Player A: [0 0 2/3 1/3] and Optimum Strategy for Player B: [0 0 2/3 1/3]

Q4. c) Profit per unit when product is sold: Rs. 20 per unit

Cost of production = (60 X No. of units produced) , Selling price = (80 X No. of units demanded)

Payoff = Selling price - Cost of production

EMV =∑(payoff X probability)

Payoff Table

Production → Demand ↓	Probability	40	45	50	55	60	65
40	0.10	800	500	200	-100	-400	-700
45	0.20	800	900	600	300	0	-300
50	0.30	800	900	1000	700	400	100
55	0.25	800	900	1000	1100	800	500
60	0.10	800	900	1000	1100	1200	900
65	0.05	800	900	1000	1100	1200	1300
EMV		800	**860**	840	700	460	180

Regret in cell (I,j) = Maximum payoff for ith demand value – payoff in the cell (I,j)

EOL = Expected regret = ∑(regret X probability)

EVPI = Minimum EOL

Regret Table

Production / Demand	Probability	40	45	50	55	60	65
40	0.10	0	300	600	900	1200	1500
45	0.20	100	0	300	600	900	1200
50	0.30	200	100	0	300	600	900
55	0.25	300	200	100	0	300	600
60	0.10	400	300	200	100	0	300
65	0.05	500	400	300	200	100	0
EOL		220	**160**	180	320	560	840

Optimum act corresponds to maximum EMV or Minimum EVPI.

Optimum act is act of producing 45 units using both the methods.

Q5. b)iii) Saddle point is (1,2).

Value if the game = (-4)

Optimum Strategy for Player A: [1 0 0 0 0]

Optimum Strategy for Player B: [0 1 0 0 0]

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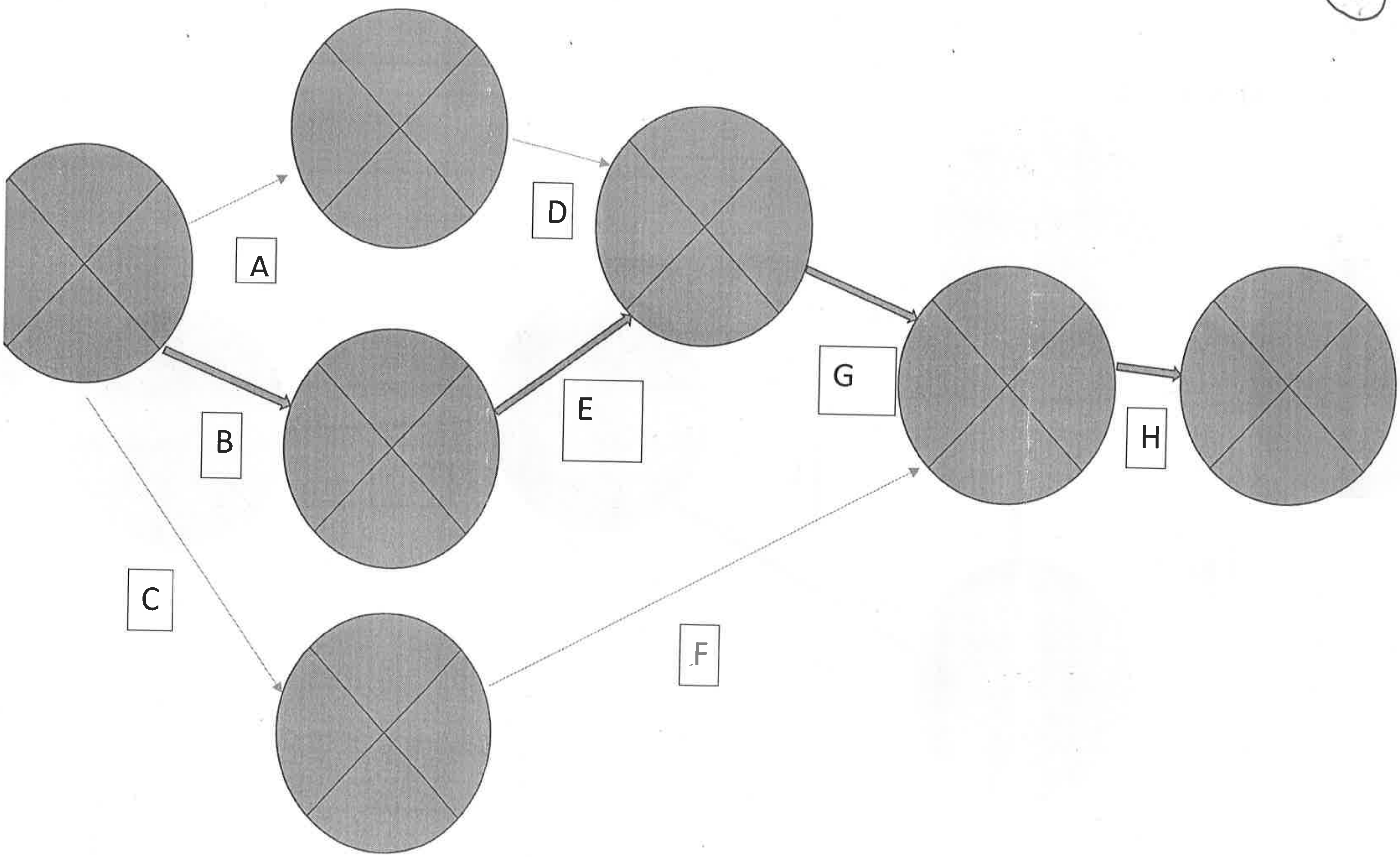
Q2.b) ii) Network:



Q2.c) ii) Network: