

END TERM EXAMINATION

SIXTH SEMESTER [B.TECH] MAY-JUNE 2018

Paper Code: ETIT-302

Subject: Decision Science

Time: 3 Hours

Maximum Marks: 75

Note: Attempt five questions in all including Q no.1 which is compulsory. Select one question from each unit.

Q1 Attempt any five parts from the following:- (5x5=25)
(a) Given $P(A)=.6$, $P(B)=.1$, $P(C)=.2$, $P(A \cap C)=.1$ and $P(B \cup C)=.3$, solve the following-

- (i) $P(A \cap B)$
- (ii) $P(B \cup C)$
- (iii) If A and B are mutually exclusive, $P(A \cap B)$

(b) Calculate the mean, median and mode of following series.

Class Interval	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79
No. of Students	27	14	55	32	15	4	17	6

(c) Does the following linear program involved infeasibility, unboundedness, and/or alternative optimal solutions? Explain-

Max $4A + 8B$

s.t. $2A + 2B \leq 10$

$-1A + 1B \geq 8$

$A, B \geq 0$

(d) Explain PERT. How it is different from CPM?

(e) Solve the game given below in Table after reducing it to 2x2 game.

	Player B		
	1	2	3
Player A	1	(1, 7)	(2, 2)
	2	(6, 2)	(7, 7)
	3	(5, 1)	(6, 6)

(f) Two dice are rolled. Find the probability of sum being 7.

(g) Explain zero sum game with example.

UNIT-I

Q2 (a) Explain Bayes Theorem. (5)

(b) Solve using the Simplex method the following problem: (7.5)

Maximize $Z = f(x, y) = 3x + 2y$

subject to: $2x + y \leq 18$

$2x + 3y \leq 42$

$3x + y \leq 24$

$x \geq 0, y \geq 0$

Q3 (a) A committee of 5 people is to be formed randomly from a group of 10 women and 6 men. Find the probability that the committee has (7.5)

- (i) 3 women and 2 men,
- (ii) 4 women and 1 men
- (iii) 5 women
- (iv) at least 3 women

(b) Explain the types of descriptive statistics. (5)

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UNIT-II

- Q4 Construct the decision tree for following table. Suppose the probabilities of the states of nature occurring are $s_1=0.15$, $s_2=0.25$, $s_3=0.30$, $s_4=0.20$. Use these probabilities and expected monetary values to reach a conclusion about the decision alternatives. (12.5)

Alternative/States	S1	S2	S3	S4	S5
D1	50	20	15	5	1
D2	75	50	20	-5	-20
D3	15	12	10	8	6

- Q5 What is multicriterai decision making? (12.5)

UNIT-III

- Q6 A two-server queueing system is in a steady-state condition and the steady state probabilities are $p_0=1/16$, $p_1=4/16$, $p_2=6/16$, $p_3=4/16$, $p_4=1/16$, $p_n=0$ if $n>4$. Calculate (12.5)
- (i) L (the expected number of customers in the system) and L_q (the expected number of customers in the queue)
- (ii) The expected number of customers being served.

- Q7 Explain pure and mixed strategy in two person zero sum games. Elaborate the role of concept of dominance with example. (12.5)

UNIT-IV

- Q8 A factory has three warehouse W_1 , W_2 and W_3 which supply to four stores S_1 , S_2 , S_3 and S_4 . Monthly capacities of the warehouses are $W_1=100$ units, $W_2=40$ units and $W_3=60$ units. Monthly demand at stores are $S_1=30$ units, $S_2=50$ units, $S_3=65$ units and $S_4=55$ units. The shipping cost in terms of rupees from warehouses to stores is as given below: (12.5)

Warehouse/stores	S1	S2	S3	S4
W1	14	16	12	20
W2	12	14	10	8
W3	10	16	8	15

The problem here is to determine the optimum distribution for the factory to minimize shipping costs.

- Q9 Explain different network models. (12.5)

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P2/2