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Semester III (B.Tech)

Number of printed pages 02

Er. No. 2018308...

Academic Year: 2021-22

Jaypee University of Engineering & Technology, Guna

T-3 (Odd Semester 2021)

18B11HS312-Techniques for Decision Making

Maximum duration: 2 Hours

Maximum Marks: 35

Notes:

1. This question paper has seven questions.
2. Write relevant answers only.
3. Do not write anything on question paper (Except your Er. No.).

Q1. The following data relate to age of employees and the number of days they reported sick in a month. [4+1]

Employee	1	2	3	4	5	6
Age (Years)	30	32	35	40	48	50
Sick Days	1	0	2	5	2	4

Compute Pearson's coefficient of correlation between the age of employees and sick days. Interpret the result.

Q2. Five applicants have applied for a job vacancy. Two judges study each application and list the five applicants independently in rank-order. Their rankings are as follows: [4+1]

Applicants	A	B	C	D	E
Judge J1	2	5	1	4	3
Judge J2	1	4	2	3	5

Compute Spearman's rank correlation coefficient. Find out whether two judges are similar or different in their ratings.

Q3. Develop the forecast for month 6 using the following methods: [1+1+3]

Month	1	2	3	4	5
Sales (in units)	9	12	17	15	10

- I. Simple average method
- II. 3-months moving average method
- III. 3-months weighted moving average method with weights assigned as 0.4 to last month, 0.3 to second last month and 0.3 to 3rd month.

Q4. (a) Find the Nash equilibrium for the following two-player game: [2.5]

		Company B		
		B1	B2	B3
Company A	A1	(8,4)	(3,6)	(5,2)
	A2	(6,3)	(8,4)	(9,6)
	A3	(7,2)	(6,5)	(8,4)

(b) Determine the Saddle point and the value of the following two-player game:

[2.5]

		Player Y		
		-2	-1	5
Player X	1	1	0	1
	4	4	-1	-3

Q5.

A company is considering 3 options for managing its data processing operations: continue with its own staff, hire an outsider vendor to do the managing (outsourcing), or use a combination of its own staff and an outsider vendor. The profit generated from the operations depends on future demand. The profit (in thousand \$) of each option is expressed in the following payoff table:

[5]

Decision Alternative	State of Nature			
	Very High Demand	High Demand	Moderate Demand	Low Demand
Own staff	52	36	29	15
Outsider vendor	27	12	14	26
Combination	45	17	35	20
Probability	0.2	0.2	0.5	0.1

Determine the optimal decision under each of the following decision criteria and show how you arrived at it:

- I. Expected Value Criteria II. Equal Likelihood (Laplace) Criteria III. EVPI
IV. Minimax Regret Criteria V. Hurwicz Criteria (Coefficient of Optimism $\alpha=0.7$)

Q6.

In an athletic competition held over two days, the following performances were recorded in the high jump and long jump competition. All distances are in meters. However, one competitor F was absent in high jump and one competitor G was absent in long jump.

[5]

Competitor	A	B	C	D	E	F	G
High Jump (X)	1.90	1.85	1.96	1.88	1.88	Absent	1.92
Long Jump (Y)	6.22	6.24	6.50	6.36	6.32	6.44	Absent

- I. Using regression equation of Y on X, predict G's performance in the long jump if G had competed.
II. Using regression equation of X on Y, predict F's performance in the high jump if F had competed.

Q7.

A restaurant manager must decide how many containers of juice to stock each week to meet the demand. The states of nature are 4 levels of demand: 15, 16, 17, and 18 juice containers. Accordingly, the restaurant manager has 4 decision alternatives, i.e., keep a stock of either 15, or 16, or 17, or 18 juice containers. The states of nature (demand) along with their probability distribution during a week is shown below:

[5]

Demand (Juice Container)	15	16	17	18
Probability	0.2	0.25	0.4	0.15

Each juice container costs Rs. 10 and sells for Rs. 12. Unsold juice containers are sold to a local farmer for Rs. 2 per container. If there is a shortage, the restaurant estimates the cost of customer ill-will and lost profit to be Rs. 4 for each container that consumer wants to purchase from the restaurant but cannot because of inadequate supplies. A restaurant manager must decide how many containers of juice to order each week. Construct a payoff table for this decision situation.