



JAIPURIA INSTITUTE OF MANAGEMENT, NOIDA

PGDM / PGDM (M) / PGDM (SM)

THIRD TRIMESTER (Batch 2021-23)

ENDTERM EXAMINATION, April 2022

Course Name	Operations Research	Course Code	20521
Max. Time	2 hours	Max. Marks	40 MM

INSTRUCTIONS:

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- a. All questions are compulsory.
- b. Answer sheet is to be saved as (roll no-student name) a single excel file and uploaded on Moodle.
- c. For different questions, students are required to create separate worksheets named as Q1, Q2 etc..
- d. Students need to be precise while answering questions and interpretation is required for each result they obtain.

Q1. A company management and the labour union are negotiating a new three year settlement. Each of these has 4 strategies. I: Hard and aggressive bargaining II: Reasoning and logical approach III: Legalistic strategy IV: Conciliatory approach

The costs to the company are given for every pair of strategy choices.

Company Strategies	Union Strategies				
		I	II	III	IV
I		20	15	12	35
II		25	14	8	10
III		40	2	10	5
IV		-5	4	11	0

Suggest the strategy the two sides should adopt? Also determine the value of the game. (10)

Q2. Elaborate Markov chain analysis. Suggest three business application of Markov chain.

(6)

Q3. Warren Buffy is an enormously wealthy investor who has built his fortune through his legendary investing acumen. He currently has been offers three major investments and he would like to choose one. The first one is a conservative investment that would perform very well in an improving economy and only suffer a small loss in a worsening economy. The second is a speculative investment that would perform extremely well in an improving economy but would do very badly in a worsening economy. The third is a counter-cyclical investment that would lose some money in an improving economy but would perform well in a worsening economy.

Warren believes that there are three possible scenarios over the lives of these potential investments: (1) an improving economy, (2) a stable economy, and (3) a worsening economy. He also estimates that his profits under these respective scenarios are those given by the following table:

	Improving Economy	Stable Economy	Worsening Economy
Conservative investment	\$30 million	\$5 million	\$ -10 million
Speculative investment	\$40 million	\$10 million	\$ -30 million
Countercyclical investment	\$ -10 million	0	\$15 million

Determine which investment should Warren make under each of the following criteria?

- a) Criterion of Optimism (3)
- b) Hurwitz criterion (Alpha = 0.85) (3)
- c) Laplace criterion (4)

Q4. An electronic company is engaged in the production of two components C1 and C2 used in T.V. sets. Each unit of C1 costs the company Rs. 25 in wages and 25 in material, while each unit of C2 costs the company Rs. 125 in wages and 75 in material. The company sells both products on one-period credit terms, but the company labour and the material expenses must be paid in cash. The selling price C1 is Rs. 150 per unit and of C2 it is Rs. 350 per unit. Because of the strong monopoly of the company for these products, it is assumed that the company can sell at the prevailing prices as many units as it produces. The company's production capacity is, however, limited by two considerations. First, at the beginning of production-period, the company has an initial balance of Rs. 20000 (cash plus bank credit plus collection from past credit sales). Second, the company has available in each period 4000 hours of machine time and 2800 hours of assembly time. The production of each C1 requires 6 hours of machine time and 4 hours of assembly time, whereas the production of each C2 requires 4 hours of machine time and 6 hours of assembly time. Determine optimum product-mix. (14)