MSDS - Optimization

Module 5	
Sr. No.	**Questions**
1	Explore the intricacies a major cruise line might face in the assignment problem, determining which routes to sail, considering factors such as fuel efficiency, customer demand, and geopolitical considerations.
2	For a large city's emergency response system, elucidate how they would use network analysis to optimize response times for ambulances, fire trucks, and police, considering traffic patterns, incident locations, and available resources.
3	Dive deep into how an international art museum might tackle the knapsack problem to curate exhibits, ensuring a balance between showcasing iconic pieces and accommodating space and preservation constraints.
4	Given the vast logistics network of a major online marketplace, how might they employ the simplex method variants to optimize delivery routes during peak shopping seasons, considering factors like package volume, weather disruptions, and manpower availability?
5	In the complex realm of genetic research, explain how a biotech firm might use linear programming to allocate resources for projects, ensuring the best chances of breakthroughs while operating within funding and time constraints.
6	Detail how a multinational beverage company might apply the warehouse problem when deciding where to source ingredients globally, factoring in freshness, cost, and supply chain complexities.
7	Considering the challenges of urban development, how might city planners use network analysis to optimize the placement of public amenities like parks, libraries, and community centers, ensuring accessibility and enhancing residents' quality of life?
8	Dive into a scenario where a global music recording company employs the knapsack problem to determine which artists to promote in a given year, ensuring a balance between emerging talents and established stars, all while managing a tight budget.
9	For a large zoo or wildlife sanctuary, elaborate on how they might address the assignment problem to allocate space for various species, considering their habitat needs, visitor interest, and conservation priorities.
10	In the realm of quantum computing research, elucidate how a tech giant might apply linear programming to prioritize projects, ensuring optimal outcomes in terms of computational advancements and patent potential.