**Fundamentals of Big Data & Business Analytics**

**December 2024 Examination**

**Q1. A retail chain wants to improve customer experience by using big data to understand and predict customer behavior. Discuss how the company can aggregate and process data from transactions, online browsing, and social media to build customer profiles. Explain the role of predictive analytics in forecasting customer needs and prescriptive analytics in creating personalized marketing strategies. Address the challenges of handling large-scale data and suggest solutions. (10 Marks)**

**Ans 1.**

**Introduction**
In today’s competitive retail landscape, enhancing customer experience is paramount. Big data plays a crucial role in enabling companies to understand and predict customer behavior through comprehensive analysis of diverse data sources. Retailers can now leverage data from transactions, online browsing, and social media to create detailed customer profiles. By integrating predictive and prescriptive analytics, companies can forecast future customer needs and personalize their marketing efforts effectively. However, handling large-scale data comes with challenges, such as data integration, storage, processing, and ensuring data privacy. To address these, retail chains must employ advanced data management strategies and tools, ensuring efficient data handling, while maintaining customer trust. This answer will discuss how a retail chain can harness big data to

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**Q2. An energy company wants to optimize power grid operations using data from smart meters, weather forecasts, and real-time energy consumption. Discuss how descriptive analytics can help understand energy usage patterns and detect anomalies. Explain the importance of scalability and real-time processing, and how predictive analytics can forecast energy demand. Describe how prescriptive analytics can optimize energy distribution and reduce costs, considering data management challenges. (10 Marks)**

**Ans 2.**

**Introduction**
Energy companies are increasingly turning to data analytics to optimize power grid operations, using data from smart meters, weather forecasts, and real-time energy consumption. Descriptive, predictive, and prescriptive analytics can provide insights into energy usage patterns, forecast future demand, and create efficient energy distribution strategies. By leveraging these forms of analytics, companies can detect anomalies in energy consumption, balance supply and demand, and minimize operational

**Q3a. An e-commerce company wants to streamline warehouse operations by analyzing data on order fulfillment, stock levels, and shipping delays. Describe how descriptive analytics can identify bottlenecks in warehouse processes. Discuss data integration challenges and how visualization tools can present findings to management. (5 Marks)**

**Ans 3a.**

**Introduction**
In the fast-paced e-commerce industry, optimizing warehouse operations is essential for maintaining customer satisfaction and operational efficiency. Descriptive analytics enables companies to analyze historical and real-time data on order fulfillment, stock levels, and shipping delays to identify inefficiencies. By leveraging this data, companies can pinpoint bottlenecks and improve the flow of goods within the warehouse. However, challenges in data integration and the need for effective visualization tools make it crucial to ensure seamless data analysis and clear communication with

**b. The company also needs to anticipate global supply chain disruptions, such as weather or geopolitical factors. Discuss how predictive analytics can forecast disruptions and the importance of a robust infrastructure. Explain how prescriptive analytics can develop contingency plans and optimize shipping routes, considering data processing challenges. (5 Marks)**

**Ans 3b.**

**Introduction**
In today’s interconnected global economy, e-commerce companies must be prepared for disruptions in the supply chain caused by factors such as extreme weather events or geopolitical issues. Predictive analytics helps businesses forecast potential disruptions by analyzing historical data and real-time signals from global markets. With robust infrastructure, companies can mitigate the impact of these disruptions. Additionally, prescriptive analytics enables companies to create contingency plans and optimize shipping routes, ensuring that supply chains remain resilient despite data