MBSC-3.1D

Sl. No.

III Semester M.B.A. Degree Examination, May/June - 2026

MANAGEMENT

Elective - D : Operations

Operations Research and Analytics

(CBCS SLM Scheme)

Time : 3 Hours **Maximum Marks : 80**

SECTION - A

Answer any FIVE questions. Each question carries Five marks. (5×5=25)

1. Explain the statistical quality control technique.

2. How operational research helps in decision making?

3. Explain the types of data mining.

4. What are the various sources of data collection? Explain.

5. Explain the application of simulation in Business.

6. Explain the role of analytics in strategic decision - making processes.

7. What are the assumptions of Markov - analysis.

SECTION - B

Answer any Four questions. Each question carries Ten marks. (4×10=40)

8. Discuss the importance of sequencing problems in manufacturing and production planning.

9. Explain the Monte Carlo simulation method with a suitable example.

10. Define Business Analytics. Explain its importance in decision - making.

11. Solve using Graphical method.

Maximize $Z = 3X+4Y$

Subject to :

$$2X + Y \leq 10$$
$$X + 2Y \leq 12$$
$$X, Y \geq 0$$

[P.T.O.

12. Solve using Vogel's Approximation Method (VAM) :

	D_1	D_2	D_3	D_4	**Supply**
P_1	8	6	10	9	20
P_2	9	12	13	7	40
P_3	14	9	16	5	40
Demand	30	30	20	20	

13. A machine costs Rs. 60,000 and has no scrap value. The maintenance cost at the end of each year is :

Year	1	2	3	4	5
Maintenance Cost (Rs.)	5,000	6,000	9,000	12,000	18,000

If the machine's life is 5 years and the interest rate is 10% per year, determine the optimal replacement time.

SECTION - C

14. Case (Compulsory) **(1×15=15)**

A leading retail chain aimed to improve its inventory management system by leveraging business analytics to accurately forecast product demand across multiple regions and seasons. The company collected and analyzed large volumes of historical sales data, promotional activity records, and regional demographic information to gain deeper insights into customer preferences and purchasing trends. By applying descriptive analytics, the business identified past sales patterns, while predictive analytics techniques such as time - series forecasting and machine learning models helped anticipate future product demand.

Questions:

a) Explain how descriptive, predictive, and prescriptive analytics were applied in this retail case study.

b) Discuss the importance of using demographic and promotional data for accurate demand forecasting.

c) How can predictive analytics improve inventory management and reduce operational costs?

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