

H

Roll No.

MB-201(SC1)

M. B. A. (SECOND SEMESTER)

MID SEMESTER

EXAMINATION, April, 2023

OPERATIONS RESEARCH

Time : 1½ Hours

Maximum Marks : 50

- Note :** (i) This question paper contains two Sections—Section A and B.
- (ii) Both Sections are compulsory.
- (iii) Answer any two sub-questions among (a), (b) & (c) in each main question of Section A. Each sub-question carries 10 marks.
- (ii) Section B consisting of case study is compulsory. Section B is of 20 marks.

(2)

MB-201(SC1)

Section-A

1. (a) Discuss the importance and limitations of Operations Research in management. 5 (CO1, CO2)
- (b) Define a model with respect to operation research. How can models be classified? 5 (CO1, CO2)
- (c) Define the following with examples : 5 (CO1, CO2)
 - (i) Feasible solution
 - (ii) Infeasible solution
 - (iii) Bounded solution
 - (iv) Unbounded solution
 - (v) Optimal solution
2. (a) Elaborate and major assumptions of an LP model. 5 (CO3)
- (b) Explain Vogel's approximation method in detail. 5 (CO3)
- (c) A company manufactures three types of parts which use precious metals platinum and gold. Due to shortage of these

(3)

MB-201(SC1)

precious metals, the government regulates the amount that may be used per day.

The relevant data with respect to supply, requirements and profits are summarized in the table as follows : 5 (CO3)

Product	Platinum required/unit (g)	Gold required/unit (g)	Profit/ unit (₹)
A	2	3	500
B	4	2	600
C	6	4	1,200

Daily allotment of platinum and gold are 160 g and 120 g respectively. How should the company divide the supply of scarce precious metals ? Formulate a linear programming problem.

3. (a) Solve the following LP problem using the simplex method : 5 (CO4)

Max. : $Z = 7X_1 + 14X_2$

Subject to :

$$3X_1 + 2X_2 \leq 36$$

$$X_1 + 4X_2 \leq 10$$

and $X_1, 4X_2 \geq 0.$

P. T. O.

(4) MB-201(SC1)

OR

- (b) Assign the workers to the jobs and find total minimum cost using below given matrix : 5 (CO4)

	J1	J2	J3	J4
W1	12	30	21	15
W2	18	33	9	31
W3	44	25	24	21
W4	23	30	28	14

- (c) Find initial solution of the following transportation problem using North West Corner method :

Corner method : 5 (CO4)

	D1	D2	D3	D4	Supply
O1	11	13	17	14	250
O2	16	18	14	10	300
O3	21	24	13	10	400
Demand	200	225	275	250	

(5) MB-201(SC1)

Section—B

4. Case Study : 20 (CO5)

Solve the following LP problem using the graphical method :

Max. :

$$Z = 5X_1 + 3X_2$$

Subject to

$$X_1 + X_2 \leq 2$$

$$5X_1 + 2X_2 \leq 10$$

$$3X_1 + 8X_2 \leq 12$$

and $X_1, X_2 \geq 0$.