

**CDOE**  
**MASTER OF BUSINESS ADMINISTRATION (EXECUTIVE) (CBCS-2019 COURSE)**  
**M.B.A. (E) SEM - III : WINTER :- 2021**  
**SUBJECT: OPERATIONS RESEARCH**

**Day : Thursday**  
**Date 17-02-2022**

**W-22307-2021**

**Time : 10:00 AM-01:00 PM**  
**Max. Marks: 60**

**N.B.:**

- 1) Attempt **ANY THREE** questions from Section-I and **ANY TWO** questions from Section-II.
- 2) Figures to the right indicates **FULL** marks.
- 3) Answers to both the sections should be written in **SAME** answer book.
- 4) Use of Non-programmable **CALCULATOR** is allowed.
- 5) Graph paper will be provided if necessary.

**SECTION-I**

**Q.1** Explain the applications and limitations of Operation Research in detail. **(10)**

**Q.2** A company manufactures two types of gift items: ordinary O and deluxe D. **(10)**  
Each gift of type D takes twice as long to produce as that of type O and the company would have time to make a maximum of 2000 gifts per day, if it produces only the ordinary items. The supply of the plastic is sufficient to produce 1500 gift items per day (both O and D). The deluxe gift item requires a fancy sheet, of which there are only 600 pieces available per day. If the company makes a profit of ₹3 and ₹5 per gift item respectively on items O and D, how many of each should be produced per day to maximize the profit?

**Q.3** Solve the following transportation problem to find optimal solution. **(10)**

	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	D <sub>5</sub>	Available
O <sub>1</sub>	5	5	6	4	2	9
O <sub>2</sub>	6	9	7	8	5	13
O <sub>3</sub>	5	6	4	6	3	9
Requirement	3	7	8	5	8	

**Q.4** Solve the following Assignment problem to find optimal solution: **(10)**

		Persons				
		I	II	III	IV	V
Jobs	A	1	3	2	3	6
	B	2	4	3	1	5
	C	5	6	3	4	6
	D	3	1	4	2	2
	E	1	5	6	5	4

**Q.5** Write short notes on (**ANY TWO**): **(10)**

- a) Floats
- b) Applications of LPP
- c) Applications of simulation

**P.T.O.**

SECTION-II

Q.6 A project consists of activities A, B, C, D, E, F, G, H, and I with conditions (15)  
given in the following table:

Activity	Predecessor	Estimated time (weeks)	Activity	Predecessor	Estimated time (weeks)
A	-	3	F	C	9
B	-	5	G	D,E	8
C	-	4	H	B	7
D	A	2	I	H,F	9
E	B	3	-	-	-

Q.7 A car manufacturing company manufactures 40 cars per day. The sale of (15)  
cars depends upon demand which has the following distribution:

Sales of Cars:	37	38	39	40	41	42
Probability:	0.10	0.15	0.20	0.35	0.15	0.05

The production cost and sale price of each car are ₹. 4 lakh and ₹. 5 lakh respectively. Any unsold car is to be disposed off at a loss of ₹. 2 lakh per car. There is a penalty of ₹. 1 lakh per car, if the demand is not met. Using the following random numbers, estimate total profit/loss for the company for the next ten days: 02, 97, 80, 66, 55, 96, 50, 29, 58, 51.

Q.8 a) Solve the following LP problem using the graphical method: (08)

$Min Z = 20x_1 + 10x_2$

*Subject to*  $x_1 + 2x_2 \leq 40$

$3x_1 + x_2 \geq 30$

$4x_1 + 3x_2 \geq 60$

*and*  $x_1, x_2 \geq 0$

b) Explain Vogel's Approximation Method (VAM). (07)

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