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**LV—12—2023**

**FACULTY OF COMMERCE AND MANAGEMENT**

**M.Com. (First Year) (Second Semester) EXAMINATION**

**NOVEMBER/DECEMBER, 2023**

(MC-VI)

**OPERATIONS RESEARCH**

**(Saturday, 09-12-2023)**

**Time : 10.00 a.m. to 1.00 p.m.**

*Time—3 Hours*

*Maximum Marks—75*

**N.B. :-** (i) All questions are compulsory.

(ii) Simple calculator is allowed.

1. Obtain the initial feasible solution for the following transportation problem by using Vogel's Approximation method : 15

खालील वाहतुक समस्येचे Vogel's Approximation Method वापरून Initial Feasible Solution काढा :

Plant	Distribution Centre			Production
	P	Q	R	
A	12	14	16	50
B	16	12	14	50
C	20	16	12	60
D	24	26	28	30
E	32	28	24	50
Sales	60	120	40	

P.T.O.

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2. Solve the following Assignment Problem :

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खालील Assignment Problem सोडवा :

	I	II	III	IV	V
A	10	5	9	18	11
B	13	9	6	12	14
C	3	2	4	4	5
D	18	9	12	17	15
E	11	6	14	19	10

Or / किंवा

Solve the following assignment problem :

खालील Assignment Problem सोडवा :

Program	Programmer			
	1	2	3	4
A	60	50	40	45
B	40	45	55	35
C	55	70	60	50
D	45	45	40	45

3. Seven jobs go first over Machine I and then over Machine II. Processing time in hours are given as follows : 15

सात कार्य आधी मशीन I व नंतर मशीन II वर पूर्ण केल्या जातात. कार्यास लागणारा तासांमधील वेळ खालील प्रमाणे आहे :

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Job	A	B	C	D	E	F	G
Machine I	24	96	120	48	80	88	72
Machine II	64	80	80	48	96	8	24

Calculate—काढा :

- Optimal Sequence
- Total Elapsed Time
- Idle time for Machine I
- Idle time for Machine II.

**Or/किंवा**

Nine jobs are performed first on Machine I and then on Machine II. The time taken in hours by each job is given below :

नऊ कार्य करण्यासाठी आधी Machine I व नंतर Machine II चा वापर केल्या जातो. कार्य पूर्ण करण्यासाठी लागणारा वेळ तासांमधे खाली दिला आहे :

Job	A	B	C	D	E	F	G	H	I
Machine I	2	5	4	9	6	8	7	5	4
Machine II	6	8	7	4	3	9	3	8	11

Calculate—काढा :

- Optimal Sequence
- Total Elapsed Time
- Idle time for Machine I
- Idle time for Machine II

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4. The data collected in running a machine, the cost of which is Rs. 1,80,000 are given below :

एक मशीन जीला चालवण्यासाठी लागणारा खर्च खाली दिला आहे. त्याची किंमत 1,80,000 रुपये आहे :

Year	1	2	3	4	5
Cost of Spares (₹)	12,000	12,810	14,640	17,100	20,400
Cost of Labour (₹)	42,000	48,000	54,000	63,000	75,000
Resale Value (₹)	1,26,000	90,000	61,200	43,200	28,950

Determine the optimal period of replacement of machine.

मशीनसाठी लागणारा Optimal Period of Replacement काढा.

Or/किंवा

- (a) Explain in detail the concept of EOQ.

EOQ संकल्पना स्पष्ट करा :

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- (b) The following information relating to a type of raw material is available :

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Annual Demand 2,400 units

Unit Price Rs. 2.40

Ordering Cost per order Rs. 4

Storage Cost 2% per annum

Interest Rate 10% per annum

Calculate EOQ.

वरील माहितीच्या आधारे दोन्ही Material चे EOQ काढा.

5. Write short notes on (any two) :

15

थोडक्यात टिपा लिहा (कोणत्याही दोन) :

(i) Operations Research

(ii) Vogel's Approximation Method

(iii) Replacement Problem

(iv) Sequencing Problem

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