

GUJARAT TECHNOLOGICAL UNIVERSITY**BE- SEMESTER-V EXAMINATION – WINTER 2025****Subject Code:3152008****Date:19-11-2025****Subject Name:Production Optimization Techniques****Time:10:30 AM TO 01:00 PM****Total Marks:70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

- Q.1** (a) What are different types of inventories? Explain. **03**
 (b) List applications of optimization techniques. **04**
 (c) Explain: (1) Redundant constraint, (2) Slack Variable, (3) Artificial variable. **07**

- Q.2** (a) Define & list out the modern approach for production management? **03**
 (b) What do you understand by opportunity cost? **04**
 (c) Explain the Makespan finding using Johnson's algorithm, for 2 machines and assume 6 Jobs for flow shop scheduling. **07**

OR

- (c) Explain MODI method to solve Transportation Metrix. **07**

- Q.3** (a) State the two basic inventory decisions management must make as they attempt to accomplish the functions of inventory. **03**
 (b) Describe Hungarian method to solve assignment problem. **04**
 (c) A computer centre has three expert programmers. The centre wants three application programs to be developed. The head of the computer center, after studying carefully the programs to be developed, estimates the computer time in minutes required by the experts for the application programs follows. Assign the programmer to programs in such a way that the total computer time is minimum. **07**

Programs

Programmers

	A	B	C
1.	120	100	80
2.	80	90	110
3.	110	140	120

OR

- Q.3** (a) What is alternative optimal solution? **03**
 (b) Explain following terms with respect to CPM:
 (1)EST (2) EFT (3) LST (4) LFT **04**
 (c) Compare Least Cost Method and North West Corner method for finding initial feasible solution in transportation theory with example. **07**

- Q.4** (a) Explain Decision making. **03**
 (b) Discuss: EOQ, Price-break, Lead-time, Buffer stock. **04**
 (c) Write the rules for network construction. **07**

OR

- Q.4** (a) Why is it difficult to solve a transportation problem with simplex method? **03**
 (b) Write a brief note on crashing of project. **04**

- (c) The captain of a cricket team has to allot five middle order batting positions to five batsmen. The average runs scored by each batsman at these positions are as under. Find the assignment of batsmen to positions, which would give the maximum number of runs. 07

Batsman	Batting Position				
	3	4	5	6	7
Virat Kohli	50	48	40	60	50
Shreyash Iyer	20	16	20	18	25
Rishabh Pant	40	40	35	25	50
Hardik Pandya	42	30	16	25	27
K.L. Rahul	58	60	59	55	53

- Q.5 (a) Describe the techniques used for solving a transportation problem. 03
 (b) Explain SPT, FCFS, MWKR and MOPNR rules for priority. 04
 (c) A project schedule has the following characteristics as shown in table. 07

Activity	Name	Time	Activity	Name	Time(Days)
1-2	A	4	5-6	G	4
1-3	B	1	5-7	H	8
2-4	C	1	6-8	I	1
3-4	D	1	7-8	J	2
3-5	E	6	8-10	K	5
4-9	F	5	9-10	L	7

- Construct PERT network.
- Compute TE and TL for each activity.
- Find the critical path.

OR

- Q.5 (a) What do you understand by a redundant constraint? 03
 (b) What is unbalanced transportation problem? What should be done to balance the problem? 04
 (c) Describe special case of assignment problem- 'Transshipment' in detail with example. 07
