

Enrollment No./Seat No.:

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**MBA - SEMESTER - II EXAMINATION - WINTER 2025**

**Subject Code: MB02092051**

**Date: 21-01-2026**

**Subject Name: Production & Operations Management**

**Time: 02:30 PM TO 05:30 PM**

**Total Marks: 70**

**Instructions**

- 1. Attempt all questions.**
- 2. Make suitable assumptions wherever necessary.**
- 3. Figures to the right indicate full marks.**
- 4. USE of SIMPLE calculators AND non-programmable scientific calculators are permitted.**

	<b>Marks</b>
<b>Q.1</b>	<b>14</b>
(a) Shop floor control	
(b) JIT	
(c) Lean Manufacturing	
(d) Push system	
(e) Subcontracting or outsourcing	
(f) Effective Capacity	
(g) Automation	
<b>Q.2 (a)</b> Briefly discuss safety management.	<b>07</b>
(b) A Pizza Delivery Service is considering to locate its business in your city. Enlist the factors which this service should take into consideration while locating in your city.	<b>07</b>
<b>OR</b>	
(b) A manufacturing unit has an annual demand of 60,000 units of a raw material. The company operates for 48 weeks in a year. The ordering cost is ₹400 per order, and the cost per unit of the raw material is ₹20. Inventory carrying cost is 12% of the unit price. The lead time for procurement is 4 weeks. The company maintains a safety stock equal to 15% of EOQ. Calculate Economic Order Quantity (EOQ), Safety Stock, Reorder Level, Minimum Inventory Level, Maximum Inventory Level.	<b>07</b>
<b>Q.3 (a)</b> Define operations management. Describe input – transformation - output relationship in an automobile factory.	<b>07</b>

- (b) Cetrox limited manufactures 7 products which have to be processed on 2 work centers (W1 and W2 in sequence). The processing times(in days) required by the products on the two work centers are in the table. Sequence these jobs using Johnson's method. Also find out waiting time of the jobs and idle times of the machines. 07

JOB	W1	W2
A	8	5
B	6	3
C	10	7
D	11	12
E	10	8
F	14	6
G	4	7

**OR**

- (a) Which manufacturing method—intermittent or continuous—is more effective for producing customized products, and why? 07
- (b) Assume that at a bank teller window the customer arrival rate of 20 per hour according to Poisson distribution. Also, that the bank teller spends on an average of 2 minutes per customer to complete a service and the service time is exponentially distributed. Customers, who arrive from an infinite population, are served on a first come first served basis. 07

1. What is the expected waiting time in the system per customer?
2. What is the mean number of customers waiting in the queue?
3. What is the probability of zero customers in the system?
4. What value is the utilization factor?

- Q.4 (a) Define the various types of plant layout in brief with suitable examples of each. 07

- (b) The owner of a chain of fast food restaurants is considering a new computer system for inventory control. A company spent the following information about the system installation. Find the critical path of the project and its expected duration. 07

Activity	Immediate Predecessors	Most Optimistic	Most Likely	Most Pessimistic
A	-	4	6	8
B	A	5	7	15
C	A	4	8	12
D	B	15	20	25
E	B	10	18	26
F	C	8	9	16
G	E	4	8	12
H	D,F	1	2	3
I	G,H	6	7	8

**OR**

- (a) What are the key differences between level strategy and chase strategy in Aggregate Production Planning formulation? 07

- (b) For a project consisting of several activities, the duration of each activity is given below. Draw the network diagram and identify the critical path. Obtain the forward and backward pass calculation. 07

Activities	Duration (Days)
1-2	4
1-3	3
1-4	6
2-4	4
2-5	8
3-4	4
3-5	4
4-5	6

**Q.5**

Stellar Electronics, a mid-sized manufacturer of consumer electronics in Pune, began facing increasing customer complaints related to product durability and service delays. An internal review exposed root causes such as inconsistent quality control, poor inventory practices, and fragmented interdepartmental coordination.

In 2022, Stellar's leadership launched a combined initiative centered around Total Quality Management (TQM) and Just-in-Time (JIT) production to address these issues. TQM was aimed at instilling a company-wide quality culture, while JIT was introduced to reduce waste and inventory holding costs.

Under TQM, the company formed cross-functional Quality Circles, launched employee training in Six Sigma tools, and created a real-time dashboard to monitor defects, returns, and service metrics. Meanwhile, JIT principles were applied by coordinating tighter schedules with suppliers, minimizing buffer stock, and synchronizing production with real-time demand.

As a result, product return rates dropped by 40%, and customer satisfaction improved by 25%. Inventory costs were reduced by 30% due to JIT implementation. Employee engagement rose, and communication across departments improved.

Challenges included initial resistance from staff, time spent on training, and ensuring supplier compliance with JIT timelines. Stellar's initiative demonstrated how aligning TQM and JIT can deliver better quality, lower costs, and a more agile production environment.

- (a) What measurable improvements did Stellar experience after implementing TQM and JIT? 07
- (b) To what extent were the operational problems faced by Stellar Electronics indicative of a need for TQM and JIT implementation? Justify your evaluation 07

**OR**

- (a) What challenges did the company face during the transition to TQM and JIT practices? 07
- (b) How effective was Stellar's application of Total Quality Management and Just-in-Time production principles in addressing its operational challenges? Support your evaluation with evidence. 07

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