Enrollment No./Seat No.: _____

GUJARAT TECHNOLOGICAL UNIVERSITY
MBA - SEMESTER - II EXAMINATION - SUMMER 2025

Subject Code: 1529605   **Date: 10-06-2025**

Subject Name: Production & Operations Management

Time: 10:30 AM TO 01:30 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.

		Marks
Q.1	ALL 7 Questions must be Compulsory.	**14**
(a)	Robust Design	
(b)	Concurrent engineering	
(c)	Semi continuous process design	
(d)	Aggregate production Schedule	
(e)	EOQ	
(f)	Statistical Quality Control	
(g)	TQM	
Q.2 (a)	Discuss responsibilities of production manager from view of manufacturing industry.	**07**
(b)	Explain Product layout with example.	**07**

OR

(b) Zunzunwala softwares ltd. sources 9000 blank CDs annually from supplier. The OC   **07**
per order is Rs. 10 and each CD costs Rs. 20. CC is 10% of CD price. The supplier
offers the following discounts.

Quantity	Discount
100-449	2%
450-899	4%
900 and Above	5%

Evaluate various discount options and also EOQ option. Advise the management
about best inventory policy.

Q.3 (a) Identify the sequence from following job timing (Hours) and determine the ideal time **07** of jobs and machines

Jobs	M1	M2
A	9	2
B	5	4
C	8	10
D	3	5
E	4	6
F	1	11
G	7	6

(b) Bank of Hindustan is considering opening a drive thru window for customer service. **07** Management estimates that customers will arrive at the rate of 15 per hour. The teller who will staff the window can service customers at the rate of one every three minutes.

Find

1. Utilization of teller
2. Average number in the waiting line
3. Average number in system
4. Average waiting time in line
5. Average waiting in the system including service

OR

(a) Pooja solutions is planning an expansion project as per the following schedule. Draw **07** a network diagram from the following information and determine mean and standard deviation.

Activity	Node	a	m	b
A	1-2	10	11	12
B	2-3	6	10	14
C	2-4	5	8	11
D	2-5	1	5	9
E	3-6	3	7	5
F	4-6	4	9	14
G	5-7	1	2	3
H	6-7	3	7	11
I	7-8	9	12	15
J	7-9	3	5	7

(b) From following information, Calculate Earliest Start, Earliest Finish, Latest Start and Latest Finish. Determine critical path from the network diagram. **07**

Activity	Duration (Weeks)	Preceding activity
A	2	-
B	3	-
C	4	-
D	1	A
E	2	B
F	5	B
G	7	C
H	2	D, E
I	3	F, G
J	1	H, I

Q.4 (a) Elaborate control charts and control limits in detail. **07**

(b) Jerry and partners assemble electric vehicles. In order to control the quality of vehicles, QC manager selects 15 vehicles at random and inspects the number of scratches on each of them. Results are given below, from which determine whether the control limits. **07**

Sample no	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
No of defects	13	9	19	7	8	10	12	0	2	5	7	11	9	13	1

OR

(a) Explain DMAIC model of six sigma. **07**

(b) Find probability of acceptance for a single sampling plan (50, 8, 1) if P'=0.02 **07**

Q.5 In 2017, Amazon launched a highly publicized search for a location to build its second headquarters (HQ2), aiming to create a campus that would eventually house over 25,000 employees with average salaries exceeding $150,000. Over 200 cities across North America submitted proposals, offering tax incentives, land, infrastructure support, and workforce development promises.

After a year-long process, Amazon selected Arlington, Virginia—specifically, the National Landing area, which includes parts of Crystal City, Pentagon City, and Potomac Yard—as the winning location. The choice was influenced by several key factorss

- Highly Educated Workforce: Arlington and the broader D.C. metro area are home to one of the most educated labor pools in the country, with a high percentage of residents holding advanced degrees.
- Proximity to the Federal Government: Being close to Washington, D.C., offers strategic advantages, especially for Amazon Web Services (AWS), which contracts with many federal agencies.
- Transportation Infrastructure: Arlington is well-connected via metro rail (WMATA), highways, and airports, making commuting and travel convenient.
- Incentives Offered: Virginia offered up to $750 million in performance-based incentives, including grants based on job creation and infrastructure upgrades.
- Real Estate Availability: National Landing provided underused office space and areas ripe for redevelopment, minimizing initial construction delays.
- Quality of Life and Amenities: The area already had high livability ratings, access to parks, dining, and proximity to cultural landmarks.

Impacts and Controversies:

- Economic Impact: Amazon's HQ2 is expected to generate over $3.2 billion in tax revenue over 20 years and stimulate local business activity.
- Housing Market Effects: Real estate prices in Arlington and surrounding areas rose significantly after the announcement, raising concerns about housing affordability.
- Gentrification and Displacement: Some residents worry that long-term communities, particularly low-income and minority groups, will be priced out.
- Infrastructure Strain: Local officials had to plan for increased pressure on transportation, schools, and public services.
- Community Opposition: Some community activists opposed the secrecy of the bidding process and the size of the incentives.

Construction began in 2020, with the first phase of HQ2 ("Metropolitan Park") officially opening in 2023. The second phase, "PenPlace," is under review and may be adjusted based on economic conditions and workforce trends

(a) Why did Amazon choose Arlington, Virginia, for its second headquarters? **07**

(b) What are the potential economic benefits and drawbacks of Amazon's HQ2 for Arlington and its residents? **07**

OR

(a) How might Amazon's HQ2 affect the social and demographic landscape of the area? **07**

(b) If you were an urban planner, what policies would you implement to ensure sustainable and inclusive growth in response to Amazon's arrival? **07**

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