

GUJARAT TECHNOLOGICAL UNIVERSITY**MBA. Evening Sem-III Regular Examination January 2011****Subject code: 820006****Subject Name: Production and Operation Management****Date: 06 /01 /2011****Time: 10.30 am – 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.

- Q.1 (a)** A project consists of activities from A to J as shown in following table. Draw the project network and, find the critical path and the project completion time. Also find the total float as well as free float for each of the non-critical activities. **07**

Activity	Immediate predecessor(s)	Duration(weeks)
A	-	4
B	-	3
C	A,B	2
D	A,B	5
E	B	6
F	C	4
G	D	3
H	F,G	7
I	F,G	4
J	E,H	2

- (b)** What would be the important location factors that Ultratech Cement Company might consider before opening a new cement plant? **07**

- Q.2 (a)** Explain major competitive dimension that form the competitive position of a firm **07**
(b) Distinguish between a process and product layout. Give an example of each. **07**

OR

- (b)** Explain different categories of manufacturing process. **07**

- Q.3 (a)** Explain qualitative techniques in forecasting **07**
(b) Annual demand for an item is 6000 units. Ordering cost is Rs.600 per order. Inventory carrying cost is 18% of the purchase price/unit/year. The price breakups are as shown below. **07**

Quantity	Price(in Rs.) per unit
$0 \leq Q_1 < 2000$	20
$2000 \leq Q_2 < 4000$	15
$4000 \leq Q_3$	9

Find the optimal order size.

OR

- Q.3 (a)** Discuss the importance of the master production schedule in the MRP system. **07**
(b) Consider the problem of project scheduling as shown below table. Obtain a schedule which will minimize the peak manpower requirement and also smooth out period-to-period variation of manpower requirement. **07**

Activity	Duration(weeks)	Manpower requirement
1-2	8	7
1-3	6	13
1-4	8	9
2-4	12	11
2-5	4	6
3-5	4	3
4-6	10	15
5-6	10	5

- Q.4 (a)** Describe several alternatives for adjusting capacity. **07**
- (b)** Consider the two machine and six jobs flow shop scheduling problem as shown in following table. Using Johnson's algorithm, obtain the optimal sequence which will minimize the makespan. Also, determine the corresponding makespan. **07**

Job, i	Machine 1	Machine 2
1	4	6
2	10	12
3	14	10
4	8	12
5	18	6
6	16	8

OR

- Q.4 (a)** Describe the input-transformation-output relationship in the following systems: **07**
- 1) An Airline 2) A Hospital 3) A Branch Office Bank
 - 4) The home office of a Major Banking Firm
- (b)** RIL operate a fast lube and oil change garage. On a typical day, customers arrive at the rate of three per hour, and lubes are performed at an average rate of one every 15 minutes. The mechanics operate as a team on one car at a time. Assuming Poisson arrivals and exponential service, Find **07**
- 1) Utilization of the lube team.
 - 2) The average number of cars in line.
 - 3) The average time a car waits before it is lubed.
 - 4) The total time it takes to go through the system (that is, waiting in plus lube time)

OR

- Q.5 (a)** Describe major tools and techniques of JIT manufacturing? **07**
- (b)** Describe how outsourcing works. Why would a firm want to outsource? **07**
- Q.5 (a)** Describe the steps in the Six Sigma Breakthrough strategy for quality improvement. **07**
- (b)** The Western Jeans Company produces denim jeans. The company wants to establish a p –chart to monitor the production process and maintain high quality. Western believes that approximately 99.74% of the variability in the production process (corresponding to 3 –sigma limits, or $z=3.00$) is random and thus should be within control limits, whereas 0.26% of the process variability is not random and suggests that the process is out of control. The company has taken 20 samples (one per day for 20 days), each containing 100 pairs of jeans ($n=100$), and inspected them for defects, the results of which are as follows. **07**

Sample	No of Defects	Proportion Defective	Sample	No of Defects	Proportion Defective
1	6	0.06	11	12	0.12
2	0	0.00	12	10	0.10
3	4	0.04	13	14	0.14
4	10	0.10	14	8	0.08
5	6	0.06	15	6	0.06
6	4	0.04	16	16	0.16
7	12	0.12	17	12	0.12
8	10	0.10	18	14	0.14
9	8	0.08	19	20	0.20
10	10	0.10	20	18	0.18

The proportion defective for the population is not known. The company wants to construct a p-chart to determine when the production process might be out of control.
