

Seat No.: _____

Enrolment No. _____

Marwadi Education Foundation's Group of Institutions**SEMESTER-EXAMINATION –****Subject code: 2820006****Date:****Subject Name: Production and Operations Management****Time:****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

Que-1(a) Attempt Multiple Choice questions

	Q.1 (a)	Textile Industry is an example of		
1.	A.	Job shop	B.	Project
	C.	Batch process	D.	Continuous Process
2.	Which one is NOT a method for Facility location Planning			
	A.	Assignment Method	B.	Centroid Method
	C.	Simple Median Method	D	Transportation method
3.	Product layout is often called as			
	A.	Functional layout	B.	Group technology
	C.	Assembly line	D.	Cellular layout
4.	Slack of an event is equal to			
	A.	LS-ES	B.	LS+ES
	C.	ES-LS	D.	LS-LF
5.	Anticipation inventory is dependent on			
	A.	Safety stock	B.	Demand
	C.	Season	D.	Transit stock
6.	JIT was originally developed by			
	A.	Toyota Motor Company	B.	Sony
	C.	Boeing	D.	Kirloskar Copeland Ltd.
Q.1	(b)	a) EOQ (b) Productivity (c) TQM (d) Kaizen		
Q.1	(c)	Explain the types of manufacturing process in brief.		
Q.2	(a)	What are the key differences between level strategy and chase strategy in Aggregate Production Planning formulation?		

	(b)	Define costs associated with inventory. Consider the data pertaining to purchase of a component as given below for a small manufacturing organization: ▪ Annual demand- 1200 units ▪ Cost of ordering- Rs.15 per order ▪ Cost of holding inventory- Rs.2.5per unit per year ▪ Price- Rs. 25 per unit ▪ Average working days in year- 365 ▪ Lead time- 7 days Calculate (i) EOQ, (ii) reorder point, and (iii) total annual cost associated to inventory.																																			
		OR																																			
	(b)	An auto industry purchases spark plugs at the rate of Rs. 35 per piece. The annual consumption of spark plug is 20000 nos. If the ordering cost is Rs. 350 per order and carrying cost is 30% p.a. Find out EOQ and time between orders assuming 360 working days? If he supplies of spark plugs offers a discount of 5% for order quantity of 2000 nos. per order, do you accept the discount offer? Bank rate of interest is 5% and obsolescence cost is Rs. 35000.																																			
Q.3	(a)	What do you understand by Operations Scheduling? What are the problems faced in the absence of proper scheduling?																																			
	(b)	An oil packaging company wants the oil to be packed must be exactly 10 liter with a tolerance of + 0.5 liter. The packaging process had a process mean of 9.85 liter and a standard deviation of 0.12 liter. Find out process capability ratio and process capability index and comment on it.																																			
		OR																																			
Q.3	(a)	Define inventory and inventory management. What different cost components to be considered while controlling the inventory?																																			
	(b)	Determine the optimal sequence of performing 5 jobs on 4 machines and total processing time. The machining of each job is required in the order ABCD and the process timings in hours are as follows: <table><tr><th>Job</th><th colspan="4">Machine</th></tr><tr><th></th><th>A</th><th>B</th><th>C</th><th>D</th></tr><tr><td>1</td><td>8</td><td>3</td><td>4</td><td>7</td></tr><tr><td>2</td><td>9</td><td>2</td><td>5</td><td>5</td></tr><tr><td>3</td><td>6</td><td>4</td><td>5</td><td>8</td></tr><tr><td>4</td><td>12</td><td>5</td><td>1</td><td>9</td></tr><tr><td>5</td><td>7</td><td>1</td><td>2</td><td>3</td></tr></table>	Job	Machine					A	B	C	D	1	8	3	4	7	2	9	2	5	5	3	6	4	5	8	4	12	5	1	9	5	7	1	2	3
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Q.4	(a)	Draw the ‘operating characteristics’ curve and explain ‘producer’s risk’ and ‘consumer’s risk’.																																			

	(b)	<table><tr><td>Activity</td><td>Predecessor</td><td>Time Period (Weeks)</td></tr><tr><td>A</td><td>-</td><td>2</td></tr><tr><td>B</td><td>A</td><td>3</td></tr><tr><td>C</td><td>A</td><td>4</td></tr><tr><td>D</td><td>B,C</td><td>5</td></tr><tr><td>E</td><td>D</td><td>3</td></tr><tr><td>F</td><td>D</td><td>4</td></tr><tr><td>G</td><td>B,C</td><td>5</td></tr><tr><td>H</td><td>E</td><td>2</td></tr><tr><td>I</td><td>G,F</td><td>3</td></tr><tr><td>J</td><td>H,I</td><td>4</td></tr></table>	Activity	Predecessor	Time Period (Weeks)	A	-	2	B	A	3	C	A	4	D	B,C	5	E	D	3	F	D	4	G	B,C	5	H	E	2	I	G,F	3	J	H,I	4							
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Q.4	(a)	Explain the pull approach of JIT manufacturing. Compare it with conventional push approach.																																								
	(b)	Assume that the BRTS extension project in Mavadi area of Rajkot has been defined to contain the following major activities, along with their time estimates for completion: <table><tr><td>Activity</td><td>a</td><td>m</td><td>b</td><td>Immediate predecessor</td></tr><tr><td>A – Tender approval</td><td>1</td><td>4</td><td>7</td><td>-</td></tr><tr><td>B – Allocation of Contractors</td><td>2</td><td>6</td><td>7</td><td>A</td></tr><tr><td>C – Demolition of illegal structures</td><td>3</td><td>4</td><td>6</td><td>A,D</td></tr><tr><td>D – Relocating sewage pipes and other utilities</td><td>6</td><td>12</td><td>14</td><td>A</td></tr><tr><td>E – leveling and preparation of main roads</td><td>3</td><td>6</td><td>12</td><td>D</td></tr><tr><td>F – Construction of BRTS corridor and bus Stands</td><td>6</td><td>8</td><td>16</td><td>B,C</td></tr><tr><td>G – Installation of Lamps and other Utilities</td><td>1</td><td>5</td><td>6</td><td>E,F</td></tr></table> a. Calculate the expected time and variance for each activity b. Draw the network diagram c. Calculate the early start, early finish times and late start, late finish times d. Show the critical path e. What is the probability that the BRTS buses can start running in 34 weeks?	Activity	a	m	b	Immediate predecessor	A – Tender approval	1	4	7	-	B – Allocation of Contractors	2	6	7	A	C – Demolition of illegal structures	3	4	6	A,D	D – Relocating sewage pipes and other utilities	6	12	14	A	E – leveling and preparation of main roads	3	6	12	D	F – Construction of BRTS corridor and bus Stands	6	8	16	B,C	G – Installation of Lamps and other Utilities	1	5	6	E,F
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Q.5		Some tasks and the order in which they must be performed according to their assembly requirements are shown in the following table. These are to be combined into workstations to create an assembly line. The assembly line operates 7.5 hrs per day. The output requirement is 1000 units per day. <table><tr><td>Task</td><td>Preceding tasks</td><td>Time (seconds)</td></tr><tr><td>A</td><td>-</td><td>15</td></tr><tr><td>B</td><td>A</td><td>24</td></tr><tr><td>C</td><td>A</td><td>6</td></tr><tr><td>D</td><td>B</td><td>12</td></tr><tr><td>E</td><td>B</td><td>18</td></tr><tr><td>F</td><td>C</td><td>7</td></tr><tr><td>G</td><td>C</td><td>11</td></tr><tr><td>H</td><td>D</td><td>9</td></tr><tr><td>I</td><td>E</td><td>14</td></tr><tr><td>J</td><td>F,G</td><td>7</td></tr><tr><td>K</td><td>H,I</td><td>15</td></tr><tr><td>L</td><td>J,K</td><td>10</td></tr></table> 1.What is the workstation cycle time? 2. Balance the line using the longest task time based on the 1000 unit forecast, stating which tasks would be done in each workstation? 3. For (2), what is the efficiency of your line balance? 4. After production was started, marketing realized that they understand demand and must increase output to 1100 units. What action would you take? Be specific in quantitative terms, if appropriate.	Task	Preceding tasks	Time (seconds)	A	-	15	B	A	24	C	A	6	D	B	12	E	B	18	F	C	7	G	C	11	H	D	9	I	E	14	J	F,G	7	K	H,I	15	L	J,K	10											
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Q.5		A project has the details given in table. The total normal cost = Rs. 500, cost of supervision= Rs. 30/day, and penalty = Rs. 10/day over 14 days. Crash the duration of the project and find: 1. The duration of the project with minimum total cost 2. The minimum possible duration of the project. <table><tr><td>Activity</td><td>Nodes</td><td>Normal time (days)</td><td>Crash time(day)</td><td>Incremental cost of crashing (Rs/day)</td></tr><tr><td>A</td><td>1-3</td><td>3</td><td>1</td><td>60</td></tr><tr><td>B</td><td>1-2</td><td>4</td><td>3</td><td>20</td></tr><tr><td>C</td><td>2-3</td><td>3</td><td>2</td><td>40</td></tr><tr><td>D</td><td>2-5</td><td>5</td><td>4</td><td>50</td></tr><tr><td>E</td><td>2-4</td><td>6</td><td>3</td><td>30</td></tr><tr><td>F</td><td>3-5</td><td>4</td><td>3</td><td>20</td></tr><tr><td>G</td><td>4-6</td><td>5</td><td>4</td><td>50</td></tr><tr><td>H</td><td>3-6</td><td>3</td><td>2</td><td>40</td></tr><tr><td>I</td><td>5-6</td><td>5</td><td>4</td><td>30</td></tr></table>	Activity	Nodes	Normal time (days)	Crash time(day)	Incremental cost of crashing (Rs/day)	A	1-3	3	1	60	B	1-2	4	3	20	C	2-3	3	2	40	D	2-5	5	4	50	E	2-4	6	3	30	F	3-5	4	3	20	G	4-6	5	4	50	H	3-6	3	2	40	I	5-6	5	4	30
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