Name: **Enrolment No:**	UPES

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2019

Course: Operations Management (LSCM 7001) **Semester: I**
Programme: MBA General &AVM
Time: 03 hrs. **Max. Marks: 100**
Instructions: As per sections

SECTION A

S. No.		Marks	CO
Q 1	**Attempt all questions**	**20**	
a)	What are the components in Trend forecast analysis?	**2**	**CO1**
b)	How does ABC system of qualification facilitate inventory management?	**2**	**CO5**
c)	What do you mean by backward integration in supply chain?	**2**	**CO3**
d)	How breakeven analysis helps in deciding outsourcing?	**2**	**CO2**
e)	Enumerate areas of Malcolm Baldrige National Quality Award Framework	**2**	**CO6**
f)	How Balance Score Card seeks balance in leading and lagging performance indicators?	**2**	**CO2**
g)	What are the components of supplier value index given in Gashti et al research on Supply Chain Value proposition?	**2**	**CO6**
h)	Differentiate Dis-satisfiers, Satisfiers, and Exciters used in product market strategy	**2**	**CO2**
i)	Enumerate few strategies for mass customization	**2**	**CO4**
j)	What do you understand by Quality function deployment in operations planning?	**2**	**CO2**

SECTION B

	Attempt any four questions	**20**	
Q2	What do you understand by process layout and product layout?	**5**	**CO 4**
Q3	What are the various techniques of capacity expansion? Explain.	**5**	**CO 4**
Q4	What do you mean by Economies of Scale, Vertical Integration and Mass customization?	**5**	**CO 2**
Q5	What are the various qualitative measures of forecasting?	**5**	**CO 3**
Q6	What are the three types of inventory costs? Explain	**5**	**CO 5**

SECTION-C

	Attempt any three questions	**30**	

<table>
<tr><td>Q7</td><td>Find the optimal order quantity of a product for which the price breaks are as follows:

<table><tr><th>Quantity(units)</th><th>Price per unit (Rs.)</th></tr><tr><td>$0 < Q_1 < 500$</td><td>10.00</td></tr><tr><td>$500 <= Q_2$</td><td>9.00</td></tr></table>
The monthly demand of the product is 200 units, the storage cost is 2 percent of the unit cost and the cost of ordering is Rs. 350 per order.</td><td>10</td><td>CO 5</td></tr>
<tr><td>Q8</td><td>A book binder has one printing press, one binding machine and manuscripts of 7 different books. The process is first printing and then binding. The times required for performing binding and printing operations for different books are shown below:

<table><tr><td>Book</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr><tr><td>Binding time(hours)</td><td>20</td><td>90</td><td>80</td><td>20</td><td>120</td><td>15</td><td>65</td></tr><tr><td>Printing time(hours)</td><td>25</td><td>60</td><td>75</td><td>30</td><td>90</td><td>35</td><td>50</td></tr></table>
Decide the optimum sequence of processing of books in order to minimize the total time required to bring out all the books. Also find the total minimum elapsed time.</td><td>10</td><td>CO 3</td></tr>
<tr><td>Q9</td><td>A publisher sells books to Barnes & Noble at $15 each. The marginal production cost for the publisher is $2 per book. Barnes & Noble prices the book at $26 and expects demand to be normally distributed with a mean of 25,000 and a standard deviation of 6,000. Barnes & Noble places a single order with the publisher. Currently, Borders discounts any unsold books down to $4 and any unsold books sell at this price. How many books should Barnes & Noble order to have maximum expected profit?</td><td>10</td><td>CO 6</td></tr>
<tr><td colspan="4">SECTION-D</td></tr>
<tr><td></td><td>Attempt any two questions</td><td>30</td><td></td></tr>
<tr><td>Q10</td><td>A company is setting up an assembly line to produce 192 units per 8-hour shift. The following table identifies the work elements, times, and immediate predecessors:
<table><tr><td>Work Element</td><td>Time (Sec)</td><td>Immediate Predecessor(s)</td></tr><tr><td>A</td><td>40</td><td>None</td></tr><tr><td>B</td><td>80</td><td>A</td></tr><tr><td>C</td><td>30</td><td>D, E, F</td></tr></table></td><td>15</td><td>CO 3</td></tr>
</table>

	D	25	B				
	E	20	B				
	F	15	B				
	G	120	A				
	H	145	G				
	I	130	H				
	J	115	C, I				
		Total 720					

a. What is the desired cycle time (in seconds) and the theoretical minimum number of stations?
b. Use trial and error to work out a solution and show your solution on a precedence diagram.
c. What are the efficiency and balance delay of the solution found?

Q11

Patel Machinery Co. has been offered a contract to build and deliver nine extruding presses to the ABC Bottling Co. The contract price is contingent on meeting specified delivery time, a bonus being given for early delivery. The marketing department has established the following cost and time information:

Activity	*Normal time (weeks)*			*Normal cost*	*Crash time*	*Crash cost (Rs.)*
	Optimistic	*Pessimistic*	*Most likely*			
1-2	1	5	3	15000	5	19000
2-3	1	7	4	18000	6	24000
2-4	1	5	3	14000	5	16000
2-5	5	11	8	15000	4	16000
3-6	2	6	4	13000	8	15000
4-6	5	7	6	12000	6	13000
5-7	4	6	5	20000	3	24000
6-7	1	5	3	17000	5	20000

The normal delivery time is 16 weeks for a contract price of Rs. 1,24,000. Based on the probability for each of the specified delivery time, recommend the delivery schedule that the Patel Machinery Co. should follow:

15 **CO 4**

	Contract Delivery Time(weeks) / Contract Amount (Rs.) 15 / 1,42,500 14 / 1,45,000 13 / 1,50,000 12 / 1,52,500		
Q12	The Costello Music company has been in business for 5 years. During that time its sales of electric organs have grown from 12 units to 76 units per year. Fred Costello, the firm's owner wants to forecast next year's organ sales. The historical data follows: Year 1 2 3 4 5 Sales 12 28 34 50 76 a) What forecasting method do you recommend and why? b) Use your recommendation to obtain the forecast for Years 6 and 7.	**15**	**CO 6**