

Name:	
Enrolment No:	

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

Course: LSCM7010 Production Planning and Control **Semester: II**
Programme: MBA General Management
Time: 03 hrs. **Max. Marks: 100**
Instructions: As per sections

SECTION A

S. No.	Attempt all questions	Marks	CO
Q 1	Mark True/False (T/F) for the following	8	
a)	In Make to Order, the product is completely made into their final form and stocked as finished goods (T/F)	2	1
b)	Process of breaking down of aggregate plan into finer details is called disaggregation (T/F)	2	4
c)	As per the book by Goldratt, the goal of any organization is increasing efficiency (T/F)	2	4
d)	Fixed order quantity is the method applicable to items when ordering costs are sufficiently high to rule out ordering (T/F)	2	3
Q 2	Fill in the blanks	12	
a)	In _____ model it is assumed that the replenishment is gradual.	2	3
b)	The three forecasting horizons in Operations Planning are _____, and _____.	3	2
c)	The full form of LDR and SDR is _____ and _____ respectively.	3	3
d)	The full form of ARIMA is _____	2	2
e)	The full form of priority decision rule EDD is _____	2	5

SECTION B

	Attempt any four questions	20	
Q3	Diagrammatically show the planning relationship in capacity management.	5	4
Q4	Based on the below factors, enlist the characteristics of Job Process a) Equipment, b) Labor skills, c) Managerial Approach, d) Volume output per design, e) Variety of designs produced	5	1
Q5	Explain the greedy algorithm by considering a sample relationship diagram.	5	2
Q6	Classify the various facility layouts. Explain any two.	5	2
Q7	Describe the type of inventory policy you might find in each of the following operations, and describe why- a hospital, a cafeteria, an automobile repair facility and a dental office?	5	3

SECTION-C

	Attempt all questions	30	
Q8	Find the optimal order quantity of a product for which the price breaks are as follows:	10	3

Quantity(units)	Price per unit(Rs.)
$0 < Q_1 < 500$	10.00
$500 \leq Q_2$	9.00

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.

Q9	You are given a time series model with demand values 4,7,9,13,16, and 18. Fit a linear model using Holt's method and find the forecast for period 6. Given $\alpha = 0.2$, $\beta = 0.3$	10	2
Q10	The annual demand for a product is 64,000 units. The buying cost per order is Rs. 10 and the estimated cost of carrying one unit of stock for a year is 20 percent. The normal price of the product is Rs 10 per unit. However, the supplier offers a quantity discount of 2 percent on an order of atleast 1000 units at a time, and the discount of 5 percent if the order is for atleast 5000 units. Suggest the most economic purchase quantity per order.	10	3

SECTION-D

Attempt any two questions

30

Q11	<p>Product A is made from two components, B and C. It takes one B and three C's to make a single product A. Component B is made from two parts D's. Component C is made from 1 part D and 2 part E's. Use this information together with data below to answer the following questions:</p> <table border="1"> <thead> <tr> <th>Part</th> <th>Lead Time</th> <th>Lot Size</th> <th>On hand</th> <th>Scheduled Rcpts</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>1</td> <td>Lot for Lot</td> <td>50</td> <td>None</td> </tr> <tr> <td>B</td> <td>1</td> <td>Lot for Lot</td> <td>10</td> <td>None</td> </tr> <tr> <td>C</td> <td>2</td> <td>200</td> <td>100</td> <td>None</td> </tr> <tr> <td>D</td> <td>1</td> <td>300</td> <td>120</td> <td>None</td> </tr> <tr> <td>E</td> <td>2</td> <td>500</td> <td>0</td> <td>500, week 1</td> </tr> </tbody> </table> <p>a) Make MRP records for A, B, C, D, and E. Production quantities and production start dates for A are: 20 in week 2, 50 in week 4, 30 in week 6, 40 in week 7, 50 in week 9, and 40 in week 11.</p> <p>Use the below MRP record:</p> <table border="1"> <thead> <tr> <th>Week</th> <th></th> </tr> </thead> <tbody> <tr> <td>Gross Requirement</td> <td></td> </tr> </tbody> </table>	Part	Lead Time	Lot Size	On hand	Scheduled Rcpts	A	1	Lot for Lot	50	None	B	1	Lot for Lot	10	None	C	2	200	100	None	D	1	300	120	None	E	2	500	0	500, week 1	Week		Gross Requirement		15	5
Part	Lead Time	Lot Size	On hand	Scheduled Rcpts																																	
A	1	Lot for Lot	50	None																																	
B	1	Lot for Lot	10	None																																	
C	2	200	100	None																																	
D	1	300	120	None																																	
E	2	500	0	500, week 1																																	
Week																																					
Gross Requirement																																					

	<table border="1"> <tr><td>Scheduled receipts</td></tr> <tr><td>Projected Available</td></tr> <tr><td>Net requirements</td></tr> <tr><td>Planned order receipt</td></tr> <tr><td>Planned order release</td></tr> </table>	Scheduled receipts	Projected Available	Net requirements	Planned order receipt	Planned order release																	
Scheduled receipts																							
Projected Available																							
Net requirements																							
Planned order receipt																							
Planned order release																							
Q12	<p>Consider a single item with the following data: $D = 1000/\text{year}$, $C_o = \text{Rs. } 300/\text{order}$, $C_c = \text{Rs. } 4/\text{unit}/\text{year}$, $C_s = \text{Rs. } 25/\text{unit}/\text{year}$. Find the economic ordered quantity and Total inventory cost.</p>	15	3																				
Q13	<p>Generate the objective function and constraints for aggregate production plan for the data given below. Assume that the demand data is given for 6 months. Consider that there are 25 working days of 8 hours duration each. The number of overtime hours cannot exceed 12 hours per worker in each month.</p> <p> W_t = Workforce size for month t H_t = Number of employees hired at the beginning of month t L_t = Number of employees laid off at the beginning of month t P_t = Production in month t I_t = Inventory at the end of month t S_t = Number of units stocked out at the end of month t C_t = Number of units subcontracted for month t O_t = Number of overtime hours worked in month </p> <table border="1"> <thead> <tr> <th>Item</th> <th>Cost</th> </tr> </thead> <tbody> <tr><td>Material cost</td><td>\$8/unit</td></tr> <tr><td>Inventory holding cost</td><td>\$3/unit/month</td></tr> <tr><td>Marginal cost of stockout/backlog</td><td>\$6/unit/month</td></tr> <tr><td>Hiring and training costs</td><td>\$200/worker</td></tr> <tr><td>Layoff cost</td><td>\$400/worker</td></tr> <tr><td>Labor hours required</td><td>4/unit</td></tr> <tr><td>Regular time cost</td><td>\$4/hour</td></tr> <tr><td>Overtime cost</td><td>\$8/hour</td></tr> <tr><td>Cost of subcontracting</td><td>\$20/unit</td></tr> </tbody> </table>	Item	Cost	Material cost	\$8/unit	Inventory holding cost	\$3/unit/month	Marginal cost of stockout/backlog	\$6/unit/month	Hiring and training costs	\$200/worker	Layoff cost	\$400/worker	Labor hours required	4/unit	Regular time cost	\$4/hour	Overtime cost	\$8/hour	Cost of subcontracting	\$20/unit	15	4
Item	Cost																						
Material cost	\$8/unit																						
Inventory holding cost	\$3/unit/month																						
Marginal cost of stockout/backlog	\$6/unit/month																						
Hiring and training costs	\$200/worker																						
Layoff cost	\$400/worker																						
Labor hours required	4/unit																						
Regular time cost	\$4/hour																						
Overtime cost	\$8/hour																						
Cost of subcontracting	\$20/unit																						