Name:

**Enrolment No:** 

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

Course: LSCM7010 Production Planning and Control

## Programme: MBA General Management

Time: 03 hrs.

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)	and       .         The full form of LDR and SDR is and respectively.         The full form of ARIMA is	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



Semester: II

Max. Marks: 100

0	$0 < Q_1 < 500$ $500 <= Q_2$		10.00				
			9.00				
unit cost and the	cost of ordering is	Rs. 350 per or	der.	•			
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 $\alpha = 0.2$ , $\beta = 0.3$							2
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					Rs. 10 e antity nt of 5	10	3
		SECTIO	N-D		I		1
Attempt any tw	o questions					30	
answer the follo	wing questions:	Lot Size	On hand	Scheduled Rcpts			
A	1	Lot for Lot	50	None			
В	1	Lot for Lot	10	None			
С	2	200	100	None			
D	1	300	120	None		15	5
Е	2	500	0	500, week 1			
<ul> <li>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.</li> <li>Use the below MRP record:</li> </ul>							
	The monthly der unit cost and the You are given a model using Hol The annual dema and the estimate normal price of t discount of 2 per percent if the ord quantity per orde Attempt any tw Product A is may make a single pr made from 1 par answer the follow Part A B C D E a) Make MRP resistant dates for week 9, and 40 i	The monthly demand of the product unit cost and the cost of ordering is         You are given a time series model windel using Holt's method and find         The annual demand for a product is and the estimated cost of carrying onormal price of the product is Rs 10 discount of 2 percent on an order of percent if the order is for atleast 500 quantity per order.         Attempt any two questions         Product A is made from two compormate from 1 part D and 2 part E's. answer the following questions:         Part       Lead Time         A       1         B       1         C       2         D       1         E       2         a) Make MRP records for A, B, C, J start dates for A are: 20 in week 2 week 9, and 40 in week 11.         Use the below MRP record:	The monthly demand of the product is 200 units, t         unit cost and the cost of ordering is Rs. 350 per or         You are given a time series model with demand va         model using Holt's method and find the forecast ff         The annual demand for a product is 64,000 units.         and the estimated cost of carrying one unit of stoch         normal price of the product is Rs 10 per unit. How         discount of 2 percent on an order of atleast 1000 u         percent if the order is for atleast 5000 units. Sugge         quantity per order.         SECTIO <b>Attempt any two questions</b> Product A is made from two components, B and C         make a single product A. Component B is made fr         made from 1 part D and 2 part E's. Use this inform         answer the following questions:         Part       Lead Time         Lot for Lot         B       1         Lot for Lot         C       2         D       1         300         E       2         500         a) Make MRP records for A, B, C, D, and E. Prod         start dates       for A are: 20 in week 2, 50 in week 4,         week 9, and 40 in week 11.         Use the below MRP record:	The monthly demand of the product is 200 units, the storage counit cost and the cost of ordering is Rs. 350 per order.         You are given a time series model with demand values 4,7,9,13, model using Holt's method and find the forecast for period 6. C         The annual demand for a product is 64,000 units. The buying c and the estimated cost of carrying one unit of stock for a year is normal price of the product is Rs 10 per unit. However, the sup discount of 2 percent on an order of atleast 1000 units at a time percent if the order is for atleast 5000 units. Suggest the most e quantity per order.         SECTION-D         Attempt any two questions         Product A is made from two components, B and C. It takes one make a single product A. Component B is made from two parts made from 1 part D and 2 part E's. Use this information togeth answer the following questions:         Part       Lead Time       Lot for Lot       50         B       1       Lot for Lot       10         C       2       200       100         D       1       300       120         E       2       500       0         a) Make MRP records for A, B, C, D, and E. Production quantis start dates       for A are: 20 in week 2, 50 in week 4, 30 in week 0         week 9, and 40 in week 11.       Use the below MRP record:	The monthly demand of the product is 200 units, the storage cost is 2 percent o unit cost and the cost of ordering is Rs. 350 per order.         You are given a time series model with demand values 4,7,9,13,16, and 18. Fit a model using Holt's method and find the forecast for period 6. Given $\alpha = 0.2$ , $\beta$ The annual demand for a product is 64,000 units. The buying cost per order is 1 and the estimated cost of carrying one unit of stock for a year is 20 percent. Th normal price of the product is Rs 10 per unit. However, the supplier offers a qu discount of 2 percent on an order of atleast 1000 units at a time, and the discoup percent if the order is for atleast 5000 units. Suggest the most economic purchat quantity per order.         SECTION-D         Attempt any two questions         Product A is made from two components, B and C. It takes one B and three C's make a single product A. Component B is made from two parts D's. Component made from 1 part D and 2 part E's. Use this information together with data below answer the following questions:         Part       Lead Time       Lot for Lot       50       None         B       1       Lot for Lot       50       None         B       1       Lot for Lot       10       None         C       2       200       100       None         a 1       Lot for Lot       50       None         B       1       Lot for Lot       50       None         B       1       Lot for Lot <td< td=""><td>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.         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 <math>\alpha = 0.2, \beta = 0.3</math>         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.         SECTION-D         <b>Attempt any two questions</b>         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:         Part         Lead Time       Lot for Lot       50         None       B       1       Lot for Lot       10         None       E       2       500       0       500, week 1         and the store for A, B, C, D, and E. Production quantities and production start dates       500       120       None</td><td>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.       10         You are given a time series model with demand values <math>4,7,9,13,16</math>, and 18. Fit a linear model using Holt's method and find the forecast for period 6. Given <math>\alpha = 0.2</math>, <math>\beta = 0.3</math>       10         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 at time, and the discount of 5 percent if the order is for atleast 5000 units. Suggest the most economic purchase quantity per order.       10         <b>SECTION-D Attempt any two questions 30</b>         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:       11         <b>15 16 17 18 10 10 10 10 10 10 10</b></td></td<>	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.         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 $\alpha = 0.2, \beta = 0.3$ 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.         SECTION-D <b>Attempt any two questions</b> 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:         Part         Lead Time       Lot for Lot       50         None       B       1       Lot for Lot       10         None       E       2       500       0       500, week 1         and the store for A, B, C, D, and E. Production quantities and production start dates       500       120       None	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.       10         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         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 at time, and the discount of 5 percent if the order is for atleast 5000 units. Suggest the most economic purchase quantity per order.       10 <b>SECTION-D Attempt any two questions 30</b> 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:       11 <b>15 16 17 18 10 10 10 10 10 10 10</b>

	Sch	eduled	receipts				
	Projected Available						
	Net requirements       Planned order receipt						
	Pla	nned or	der release				
Q12 Q13	Consider a single item with the following data:D= 1000/year, Co = Rs. 300/order, Cc = Rs. 4/unit/year, Cs = Rs. 25/unit/year.Find the economic ordered quantity and Total inventory cost.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					15	3
	there are 25 working days of 8 hours duration each. The number of overtime hours cannot exceed 12 hours per worker in each month.						
	$W_t$	=	Workforce size for month	n t			
	$H_t$	=	Number of employees his	red at the beginning of n	nonth <i>t</i>		
	$L_t$ = 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 <i>t</i>				
	$O_t$	=	Number of overtime hour	per of overtime hours worked in month			1
	Item			Cost		15	
	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			