Name: **Enrolment No:**	

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, May 2023

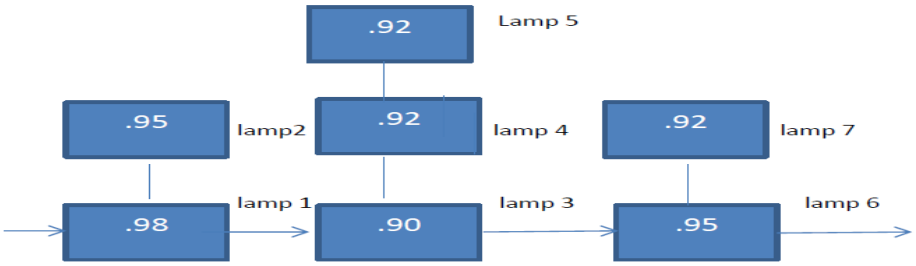
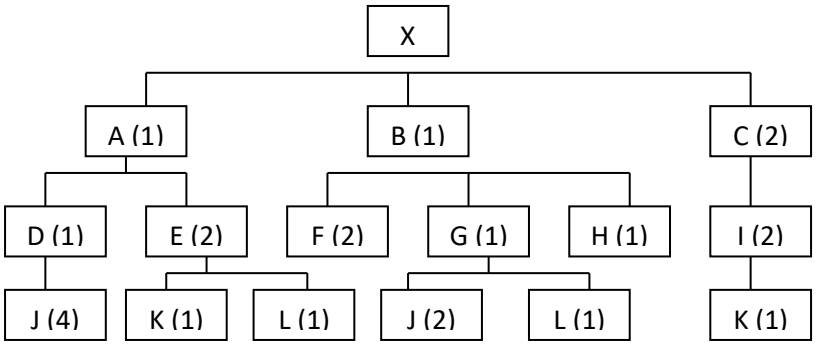
Course: Operations Management **Semester: II**
Program: MBA All Programs **Time : 03 hrs.**
Course Code: LSCM 7001
Max. Marks: 100

Instructions:

SECTION A
10Qx2M=20Marks

S. No.	**Attempt all questions in this section**	**Marks**	**CO**
Q 1	**Explain the following and fill in the blank**		
(a)	Which of the following is not true regarding the differences between goods and services? A. Demand for services is easier to forecast. B. Customers participate in many services. C. Services cannot be stored as physical inventory. D. Patents do not protect services.	**2**	**CO1**
(b)	Which of the following is not a key activity of an operations manager? A. translating market knowledge into goods, services, and processes B. continually learning and adapting to global and environmental changes C. managing cash flows and strategic investments D. exploiting technology to improve productivity	**2**	**CO1**
(c)	Assembly line balancing A.Is a one-time activity. B. Tries to minimize the production rate for a given number of workstations. C. Tries to minimize the number of workstations for a given production rate. D. Attempts to load work into early workstations.	**2**	**CO1**
(d)	The objective of layout strategy is to: A. minimize cost. B. develop an effective and efficient layout that will meet the firm's competitive requirements. C. maximize flexibility. D. minimize space used. E. maximize worker satisfaction.	**2**	**CO1**
(e)	Johnson's sequencing rule is used to sequence	**2**	**CO1**

	A. several jobs through several work centers B. several jobs through one work center C. two jobs through several work centers D. several jobs through two work centers		
(f)	A self-service cafeteria is usually positioned as: A. Product layout B. Fixed-position layout C. Cell layout D. Process layout	**2**	**CO1**
(g)	Scheduling refers to specifying A. The sequence that jobs must be completed B. The due date for each job C. The start and completion times of jobs D. The makespan of each job	**2**	**CO1**
(h)	The Shortest Processing Time (SPT) rule A. Ensures that due dates are met B. Maximizes average flow-time C. Minimizes resource utilization D. Minimizes work in process inventory	**2**	**CO1**
(i)	A requirement of Johnson's two-resource sequencing rule is A. All jobs must begin at the same time B. Jobs must be processed through each work center in the same job sequence C. Only two jobs can be processed at a time through each work center D. Total processing time must be minimized	**2**	**CO1**
(j)	"The inability to satisfy the demand for an item" is the definition of a A. reorder point B. stockout C. lost sale D. backorder	**2**	**CO1**
SECTION B **4Qx5M= 20 Marks**			
	Attempt all questions, some questions has option, kindly attempt any one from the option		
Q2	The Circuit Town store's most popular item is six-packs of 9-volt batteries. About 150 packs are sold per day, following a normal distribution with a standard deviation of 16 packs. Batteries are ordered from an out-of-state distributor; lead	**5**	**CO2**

	time is normally distributed with an average of 5 days and a standard deviation of 1 day. To maintain a 95% service level, what ROP is appropriate? **OR** The john equipment company estimates its carrying cost at 15% and its ordering cost at $90 per order. The estimated annual requirement is 78,000 units at a price of $4 per unit. (i). What is the most economical no. of units to order? (ii). No. of orders to be placed in a year. (iii). About how often will an order need to be placed?		
Q3	Determine the reliability of the system shown below where lamp 2(backup of lamp 1), lamp 4(backup of lamp 3), lamp 5(backup of lamp 4), lamp 7(back up of lamp 6)  **OR** The product break down structure of a product X is as follows  Calculate the quantities of E, J and K for producing 500 units of X	**5**	**CO2**
Q4	A farm implements dealer is seeking a fourth warehouse location to complement three existing warehouses. There are three potential locations: Charlotte, Atlanta and Columbia. Charlotte would involve a fix cost of $4,000 per month and variable cost of $4 per unit. Atlanta would involve a fix cost of $3500 per month and variable cost of $5 per unit. Columbia would involve a fix cost of $5,000 per month and variable cost of $6 per unit. Use of Charlotte location would increase	**5**	**CO2**

<table>
<tr><td></td><td>system transportation cost by $19,000 per month. Atlanta by $22,000 per month and Columbia by by $18,000 per month. Which location will result in lowest cost to handle 800 units per month</td><td></td><td></td></tr>
<tr><td>Q5</td><td>Discuss the various types of layouts with example?</td><td>5</td><td>CO2</td></tr>
<tr><td colspan="4">SECTION-C
3Qx10M=30 Marks</td></tr>
<tr><td>Q</td><td>Attempt all questions, some questions has option, kindly attempt any one from the option</td><td></td><td></td></tr>
<tr><td>Q6</td><td>Alyssa’s Custom Cakes currently sells 5 Birthday, 2 Wedding and 3 Specialty Cakes each month for $50, $150 and $100 each respectively. It takes 90 minutes to produce a birthday cake, 240 minutes to produce a wedding cake and 60 minutes to produce specialty cakes. Alyssa’s current TFP is 1.25
A. Assuming each cake costs the same to make, what is the average cost to produce a cake
B. Calculate Alyssa’s labor productivity ratio in dollars per hour for each type of cake
C. Based solely on the labor productivity ratio, which cake should Alyssa try to sell the most
D. Based on your answer in part (a), is there a type of cake Alyssa should stop selling

OR

During the past 8 quarters, the Port of Baltimore has unloaded large quantities of grain from ships. The port’s operations manager wants to test the use of exponential smoothing to see how well the technique works in predicting tonnage unloaded. He guesses that the forecast of grain unloaded in the first quarter was 175 tons.

1- Find the exponential smoothing forecasted values from quarters 1- 8 at a = 0.10
2- Compute the MSE, MAD, and MAPE for the Port of Baltimore forecasted values.
<table><tr><td>Quarter</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></tr><tr><td>Actual Tonnage unloaded</td><td>180</td><td>168</td><td>159</td><td>175</td><td>190</td><td>205</td><td>180</td><td>182</td></tr></table></td><td>10</td><td>CO3</td></tr>
<tr><td>Q7</td><td>In a manufacturing firm, a worker can make 3 units of a product daily.
Hiring cost: Rs 3000
Layoff cost: Rs 4000
Current employee strength: 40
Aggregate demand is as follows:
<table><tr><td></td><td>June</td><td>July</td><td>August</td><td>September</td></tr><tr><td>Demand</td><td>3170</td><td>3000</td><td>2900</td><td>2660</td></tr><tr><td>Working Days</td><td>24</td><td>25</td><td>23</td><td>24</td></tr></table></td><td>10</td><td>CO3</td></tr>
</table>

<table>
<tr><td></td><td>Generate a production plan by following varying workforce level strategy.</td><td></td><td></td></tr>
<tr><td>Q8</td><td>Using the information contained in the table shown do each of the following
<table>
<tr><th>Task</th><th>Immediate Predecessor</th><th>Task Time</th></tr>
<tr><td>a</td><td>-</td><td>0.2</td></tr>
<tr><td>b</td><td>a</td><td>0.2</td></tr>
<tr><td>c</td><td>-</td><td>0.8</td></tr>
<tr><td>d</td><td>c</td><td>0.6</td></tr>
<tr><td>e</td><td>b</td><td>0.3</td></tr>
<tr><td>f</td><td>d, e</td><td>1.0</td></tr>
<tr><td>g</td><td>f</td><td>0.4</td></tr>
<tr><td>h</td><td>g</td><td>0.3</td></tr>
</table>
1. Draw a precedence diagram
2. Assuming an 8 hour workday, compute the cycle time required to obtain an output of 400 units per day
3. Determine the minimum number of workstations required
4. Calculate efficiency</td><td>10</td><td>CO3</td></tr>
<tr><td colspan="4">SECTION-D
2Qx15M= 30 Marks</td></tr>
<tr><td></td><td>Attempt both questions in this section, each question has an option either complete the numerical or answer the case study</td><td></td><td></td></tr>
<tr><td>Q9</td><td>(a) Discuss decision theory & its importance in business?

(b) A semiconductor manufacturer wants to produce microprocessors, he has three options: (i) Purchase sophisticated CAD system (ii) to hire and train additional staff (iii) do not produce because the market may be either favorable or unfavorable.
In case of favorable conditions, sales would be 25,000 processors per year and the selling price is Rs. 100 per unit.
In case of unfavorable conditions, sales would be 8,000 processors per year and the selling price is Rs. 100 per unit.
Cost of CAD equipment is Rs 500,000. Cost of hiring and training additional staff Rs 375,000.
In case CAD is used, cost price will be Rs. 40 and In case CAD is not used, cost price will be Rs. 50
Probability of favorable condition is .4 for both scenarios
Probability of unfavorable condition is .6 for both scenarios
Use Decision Tree approach for arriving at a decision about the profitable option

OR</td><td>15</td><td>CO4</td></tr>
</table>

<table>
<tr><td></td><td>Imagine that you have been appointed by your organization/government to select a location for setting up a school/community center/bank/manufacturing plant in your district. What factors will be considered for selecting the location? Explain with examples</td><td></td><td></td></tr>
<tr><td>Q10</td><td>Apply the three popular sequencing rules (i) FCFS (ii) SPT and (iii) EDD to these five jobs mentioned below and what interpretation you can draw from the results
<table>
<tr><th>Job</th><th>Job work(Processing) time (Days)</th><th>Job Due Date(Days)</th></tr>
<tr><td>A</td><td>6</td><td>8</td></tr>
<tr><td>B</td><td>2</td><td>6</td></tr>
<tr><td>C</td><td>8</td><td>18</td></tr>
<tr><td>D</td><td>3</td><td>15</td></tr>
<tr><td>E</td><td>9</td><td>23</td></tr>
</table></td><td>15</td><td>CO4</td></tr>
</table>