VPM's
DR VN BRIMS, Thane
Programme: MMS (2022-24)
Fourth Semester Regular Examination May 2024

Course Name:	Operations Applications and Cases	**Course Code**	O405
Roll No.		**Marks**	**60**
Total No. of Questions	6	**Duration**	**3 Hours**
Total No. of printed pages	4	**Date**	30.05.2024

Course Outcome Statements:

CO1. DESCRIBE the Key Concepts and Definitions associated with operations Applications.
CO2. SUMMARIZE the features of various frameworks used in processes and operations of the product & service industry.
CO3. APPLY various techniques, tools & practices in different situations for executing the system in the best manner.
CO4. EXAMINE the concepts of operations using process analysis, MRP, Vendor selection, and vendor management for effective implementation.
CO5. EXPLAIN how what-if analysis is used to have an optimum solution.
CO6. SOLVE the real-time issues mentioned in Operations cases using the appropriate method.

Instructions: -

Q. No 1 (All Questions are Compulsory)

Q. No.		Questions	Marks	BL	CO
Q. 1		Case/Case-let Study (500-800 words)			
		Company X, a medium-sized manufacturing company specializing in automotive components, was facing challenges with its production process. The company's management recognized the need to improve efficiency and reduce lead times to stay competitive in the market. After conducting a thorough analysis, they decided to implement value stream mapping (VSM) to identify and eliminate waste in their production process. A cross-functional team was formed to conduct the VSM project, comprising production managers, line supervisors, and a lean consultant. The team began by mapping the current state of their production process, which involved receiving raw materials, machining, assembly, and shipping finished products. They used VSM tools such as process mapping, data collection, and value-added analysis to identify various areas of waste in the process. One of the key areas of waste identified was overproduction. The company was producing components in large batches, leading to excess inventory and longer lead times. Another area of waste was inefficient material flow, with products often waiting at different stages of the production process, leading to delays and increased handling. After analyzing the current state map, the team developed a future state map to redesign the production process. They implemented a pull-based production system, where components were produced based on customer demand rather than forecasted requirements. This helped reduce batch sizes and minimize excess inventory.			

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<tr><td></td><td></td><td>Additionally, the team improved communication and coordination between departments to ensure a smooth flow of materials and information. They also invested in training for employees to ensure they understood the new process and could implement it effectively.

The changes implemented by Company X had a significant impact on the business. Lead times were reduced by 30%, inventory levels decreased by 25%, and productivity increased by 20%. The employees were more engaged and satisfied with the new process, leading to a positive impact on company culture.

However, the implementation of the new process was not without challenges. There was initial resistance from some employees who were accustomed to the old ways of working. Additionally, there were challenges in coordinating the new process across different departments and ensuring that everyone was on board with the changes.

Overall, the VSM project at Company X was a success, leading to significant improvements in efficiency, productivity, and customer satisfaction. The company was able to stay competitive in the market and achieve its goal of continuous improvement in its production process.</td><td></td><td></td><td></td></tr>
<tr><td></td><td>a.</td><td>Analyze the implementation of a pull-based production system contribute to reducing waste in Company X's production process, and what specific changes were made to achieve this?</td><td>6</td><td>Level 4</td><td>CO4</td></tr>
<tr><td></td><td>b.</td><td>Assess the effectiveness of the communication and coordination improvements implemented by Company X. How did these changes impact the overall efficiency of the production process, and were there any unforeseen consequences or areas for further improvement identified during the implementation?</td><td>6</td><td>Level 5</td><td>CO5</td></tr>
<tr><td>Q. 2</td><td></td><td>Answer Any one from the following.</td><td></td><td></td><td></td></tr>
<tr><td></td><td>a.</td><td>Evaluate aggregate planning using the chase and the level strategy. Calculate and compare the total cost for both strategies.
Beginning Inventory: 25 units
Beginning Workforce: 10 workers
Production Rate: 12 units/worker/period
Regular Production Costs: $7/unit
Inventory Costs: $21/unit/period
Hiring Cost: $100/worker
Firing Cost: $80/worker
<table>
<tr><td>Period</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr>
<tr><td>Demand</td><td>90</td><td>70</td><td>100</td><td>80</td><td>110</td></tr>
</table></td><td>6</td><td>Level 5</td><td>CO5</td></tr>
<tr><td></td><td>b.</td><td>You have two mutually exclusive projects, Project C and Project D. The opportunity cost of capital is 10%. The projects have the following cash flows:
<table>
<tr><th>Year</th><th>Project C</th><th>Project D</th></tr>
<tr><td>0</td><td>-6000</td><td>2000</td></tr>
<tr><td>1</td><td>5000</td><td>2500</td></tr>
<tr><td>2</td><td>3000</td><td>3000</td></tr>
<tr><td>3</td><td>2000</td><td>5000</td></tr>
<tr><td>4</td><td>1500</td><td>-4000</td></tr>
</table></td><td>6</td><td>Level 5</td><td>CO5</td></tr>
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<tr><td></td><td></td><td>Calculate the NPV for each project. Based on the NPV rule, which project should you choose if Projects C and D are mutually exclusive?</td><td></td><td></td><td></td></tr>
<tr><td>Q. 3</td><td></td><td>Answer Any one from the following.</td><td></td><td></td><td></td></tr>
<tr><td></td><td>a.</td><td>Analyze the given components data and examine the plan order releases of all components:
Component P is made up of one Q, three R, and two S. Similarly, one R is made up of two S and four T.

Gross Requirements of P:
<table><tr><td>Period</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>Gross Requirement</td><td>20</td><td>25</td><td>30</td><td>20</td><td>35</td><td>30</td><td>40</td><td>45</td></tr></table>Lead times, Lot Sizes & On-hand inventory of components:
<table><tr><td>Item</td><td>Lead Time</td><td>Lot Size</td><td>On hand Inventory</td><td>Scheduled Receipt</td></tr><tr><td>P</td><td>1</td><td>L4L</td><td>10</td><td>20 in Period 1</td></tr><tr><td>Q</td><td>1</td><td>10</td><td>15</td><td>10 in Period 4</td></tr><tr><td>R</td><td>1</td><td>100</td><td>100</td><td>None</td></tr><tr><td>S</td><td>2</td><td>80</td><td>150</td><td>None</td></tr><tr><td>T</td><td>2</td><td>50</td><td>120</td><td>None</td></tr></table></td><td>6</td><td>Level 4</td><td>CO4</td></tr>
<tr><td></td><td>b.</td><td>ABC Electronics Store stocks wireless headphones. Recently, the store was given a quantity discount schedule for the headphones:
<table><tr><td>Discount Number</td><td>Discount Quantity</td><td>Discount</td><td>Discount Cost</td></tr><tr><td>1</td><td>0 to 1999</td><td>0%</td><td>$50</td></tr><tr><td>2</td><td>2000 to 3999</td><td>3%</td><td>$48.50</td></tr><tr><td>3</td><td>4000 and over</td><td>5%</td><td>$47.50</td></tr></table>Thus, the normal cost for the headphones is $50.00. For orders between 2,000 and 3,999 units, the unit cost is $48.50, and for orders of 4,000 or more units, the unit cost is $47.50. Furthermore, the ordering cost is $100 per order, the annual demand is 10,000 wireless headphones, and the inventory carrying charge as a percentage of cost, I, is 15%, or 0.15. Analyze and examine the order quantity which will minimize the total cost.</td><td>6</td><td>Level 4</td><td>CO4</td></tr>
<tr><td>Q. 4</td><td></td><td>Answer Any two from the following.</td><td></td><td></td><td></td></tr>
<tr><td></td><td>a.</td><td>A small bakery specializes in making custom cakes. The bakery's production process involves several steps: receiving orders, gathering ingredients, mixing, baking, cooling, decorating, packaging, and delivering the cakes. Recently, the bakery has experienced delays in fulfilling orders, which has led to customer complaints. The manager suspects that there are inefficiencies in the production process and wants to identify and eliminate these bottlenecks to improve overall productivity and customer satisfaction.
Given the scenario of a small bakery experiencing delays in fulfilling custom cake orders, draw a Flow Process Chart to identify inefficiencies in the production process. Your chart should illustrate the sequence of operations, transportation, storage, and</td><td>6</td><td>Level 3</td><td>CO3</td></tr>
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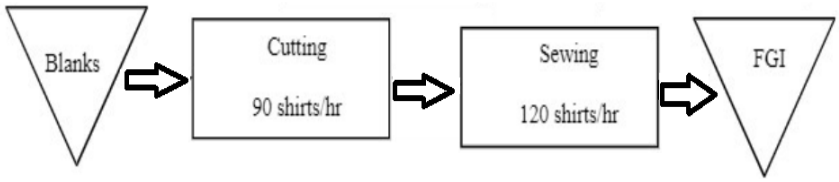
		inspections involved from receiving an order to delivering the cake. Use this chart to **identify** potential bottlenecks and suggest improvements to streamline the process.			
	b.	A technology company is looking to switch its software development partner because the current partner has been inconsistent with meeting project deadlines and delivering quality code. The company needs to ensure that the new partner will be reliable and able to meet their high standards. Given the scenario of a technology company seeking to change its software development partner due to inconsistent project delivery and quality issues, **apply** a set of criteria that could be used to evaluate potential new partners. Suggest ways to improve the development capabilities of the selected partner to ensure better project outcomes in this context.	**6**	**Level 3**	**CO3**
	c.	Imagine that you are the Head Administrator for an MBA Institution. The prospective student must meet all requirements and eligibility criteria for admission. As the Head Administrator, identify the processes that should be converted into an automated admission system. (Assuming current process is on paper process)	**6**	**Level 3**	**CO3**
Q. 5		Answer **Any two** from the following.			
	a.	**Explain** the key components and functions of a Material Requirement Planning (MRP) system. Discuss how an effective MRP system can improve inventory management, production scheduling, and overall operational efficiency in a manufacturing company.	**6**	**Level 2**	**CO2**
	b.	**Explain** the various lot-sizing techniques used in inventory management. Discuss the advantages and disadvantages of at least three different lot-sizing methods and how they impact production scheduling and inventory costs.	**6**	**Level 2**	**CO2**
	c.	Practice Process Analysis Questions Consider this process for the manufacturing of clothes for Zara. Blanks stored in raw material inventory are cut and then sewed and put in finished goods inventory. There is no buffer between cutting and sewing:  If buffer with a capacity of 200 is placed between cutting and sewing, **Explain** the outcome of this situation with respect to following statements: i. Once the process starts functioning, the inventory in this buffer will increase until it hits 200 and then stay at that level. ii. The capacity of this process will increase. The throughput time in this system will increase.	**6**	**Level 2**	**CO2**
Q. 6		Answer **Any two** from the following.			
	a.	**How** do MTBF and MTTR impact the overall availability of a system or equipment?	**6**	**Level 1**	**CO1**
	b.	**What** is the 5S methodology, and how does it contribute to workplace organization and efficiency?	**6**	**Level 1**	**CO1**
	c.	**How** does work study contribute to improving productivity and efficiency in organizations?	**6**	**Level 1**	**CO1**