U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

January / February 2025 Semester End Main Examinations

Programme: B.E. **Semester: VI**

Branch: Industrial Engineering and Management **Duration: 3 hrs.**

Course Code: 22IM6PCLOM **Max Marks: 100**

Course: Lean and Operations Management

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

		UNIT - I	CO	PO	Marks
1	a)	Discuss the historical development of operations management and its significance in modern manufacturing industries.	CO1		**05**
	b)	Identify and explain the factors affecting productivity in a manufacturing environment.	CO1		**05**
	c)	Compare and contrast traditional manufacturing with lean manufacturing. Highlight the key principles and implications of lean manufacturing.	CO1 CO4	PO2	**10**
		OR			
2	a)	Discuss the 8 types of wastes with suitable examples in each case	CO1		**10**
	b)	What is an operational environment? Discuss the operational environment factors and their effect on business activity	CO1		**10**
		UNIT - II			
3	a)	Describe the objectives and uses of demand forecasting in operations management. Compare and contrast judgmental methods with time series methods.	CO2	PO2	**10**
	b)	Explain the concepts of Material Requirements Planning (MRP) and Capacity Requirements Planning (CRP).	CO3	PO2	**10**
		OR			
4	a)	Discuss the aggregate planning process in manufacturing. Describe one aggregate planning method and its application in a real-world scenario.	CO2	PO2	**10**
	b)	Compare and contrast the advantages and disadvantages of level production and chase demand strategies in aggregate planning.	CO3	PO2	**10**

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<tr><td></td><td></td><td></td><td>UNIT - III</td><td></td><td></td><td></td></tr>
<tr><td></td><td>5</td><td>a)</td><td>Define Production Activity Control (PAC). What are its main objectives and data requirements for effective scheduling?</td><td>CO1
CO3</td><td>PO3</td><td>05</td></tr>
<tr><td></td><td></td><td>b)</td><td>Describe the different types of schedules commonly used in job-shop scheduling.</td><td>CO2
CO3</td><td>PO2</td><td>05</td></tr>
<tr><td></td><td></td><td>c)</td><td>Determine the sequence that minimizes the total elapsed time in hours required to complete the following jobs on three machines, M1, M2, and M3, in the order of M1M2M3.
<table><tr><td></td><td>A</td><td>B</td><td>C</td><td>D</td><td>E</td></tr><tr><td>M1</td><td>5</td><td>7</td><td>6</td><td>9</td><td>5</td></tr><tr><td>M2</td><td>2</td><td>1</td><td>4</td><td>5</td><td>3</td></tr><tr><td>M3</td><td>3</td><td>7</td><td>5</td><td>6</td><td>7</td></tr></table></td><td>CO3</td><td>PO2</td><td>10</td></tr>
<tr><td></td><td></td><td></td><td>OR</td><td></td><td></td><td></td></tr>
<tr><td></td><td>6</td><td>a)</td><td>Outline the guidelines for effective scheduling in a production environment.</td><td>CO1</td><td>PO3</td><td>05</td></tr>
<tr><td></td><td></td><td>b)</td><td>Discuss the types of job-shop schedules and describe a heuristic procedure for scheduling two jobs on ‘m’ machines.</td><td>CO2</td><td>PO3</td><td>05</td></tr>
<tr><td></td><td></td><td>c)</td><td>We have five jobs that must be processed sequentially through two machines in the order AB. The processing times for each job on the respective machines are provided in the table below:
<table><tr><td>Job (j)</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr><tr><td>Machine A</td><td>10</td><td>2</td><td>18</td><td>6</td><td>20</td></tr><tr><td>Machine B</td><td>4</td><td>12</td><td>14</td><td>16</td><td>8</td></tr></table></td><td>CO3</td><td>PO3</td><td>10</td></tr>
<tr><td></td><td></td><td></td><td>UNIT - IV</td><td></td><td></td><td></td></tr>
<tr><td></td><td>7</td><td>a)</td><td>List the characteristics of Just-in-Time (JIT) operations. How does the pull method of materials flow contribute to lean manufacturing?</td><td>CO1
CO4</td><td>PO2</td><td>05</td></tr>
<tr><td></td><td></td><td>b)</td><td>What is visual control in lean manufacturing? Explain its role in a production environment.</td><td>CO1
CO4</td><td>PO2</td><td>05</td></tr>
<tr><td></td><td></td><td>c)</td><td>How do 5S principles contribute to workplace organization and efficiency? Explain</td><td>CO1</td><td>PO1</td><td>10</td></tr>
<tr><td></td><td></td><td></td><td>OR</td><td></td><td></td><td></td></tr>
<tr><td></td><td>8</td><td>a)</td><td>Discuss the features of Preventive and breakdown maintenance along with their advantages and disadvantages.</td><td>CO1</td><td></td><td>10</td></tr>
<tr><td></td><td></td><td>b)</td><td>What actions can be taken to identify root causes of a problem to better achieve KAIZEN. Discuss the benefits and limitations of Lean production.</td><td>CO1</td><td></td><td>10</td></tr>
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<tr><td></td><td></td><td></td><td>UNIT - V</td><td></td><td></td><td></td></tr>
<tr><td></td><td>9</td><td>a)</td><td>Discuss the five communication standards used to communicate employees.</td><td>CO1</td><td></td><td>10</td></tr>
<tr><td></td><td></td><td>b)</td><td>Discuss in brief about 7 quality management tools.</td><td>CO1</td><td></td><td>10</td></tr>
<tr><td></td><td></td><td></td><td>OR</td><td></td><td></td><td></td></tr>
<tr><td></td><td>10</td><td>a)</td><td>Discuss the application of Poke Yoke and Kanban systems in lean manufacturing.</td><td>CO1</td><td></td><td>05</td></tr>
<tr><td></td><td></td><td>b)</td><td>Discuss Total Productive Maintenance (TPM) objectives and key components in a manufacturing setting.</td><td>CO1</td><td></td><td>05</td></tr>
<tr><td></td><td></td><td>c)</td><td>M/s Woodland is engaged in producing leather goods. The manager is encountering production challenges, primarily due to an unorganized production line. Using the Ranked Positional Weight method, propose a balanced production line. Determine the required number of workstations and calculate the line efficiency given a cycle time of 12 minutes.
<table>
<tr><th>Element</th><th>T_e</th><th>Precedence</th></tr>
<tr><td>1</td><td>5</td><td>-</td></tr>
<tr><td>2</td><td>5</td><td>1</td></tr>
<tr><td>3</td><td>6</td><td>1</td></tr>
<tr><td>4</td><td>2</td><td>1</td></tr>
<tr><td>5</td><td>7</td><td>2,3</td></tr>
<tr><td>6</td><td>4</td><td>4</td></tr>
<tr><td>7</td><td>1</td><td>5</td></tr>
<tr><td>8</td><td>5</td><td>5</td></tr>
<tr><td>9</td><td>2</td><td>6</td></tr>
<tr><td>10</td><td>1</td><td>7</td></tr>
<tr><td>11</td><td>3</td><td>8,9</td></tr>
<tr><td>12</td><td>5</td><td>10,11</td></tr>
<tr><td>13</td><td>7</td><td>12</td></tr>
<tr><td>14</td><td>5</td><td>13</td></tr>
</table></td><td>CO3</td><td>PO3</td><td>10</td></tr>
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