U.S.N.										

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

Autonomous Institute Affiliated to VTU

July 2023 Semester End Main Examinations

Programme: B.E. **Semester: VI**
Branch: Industrial Engineering and Management **Duration: 3 hrs.**
Course Code: 20IM6DCLOM **Max Marks: 100**
Course: Lean and Operations Management **Date: 12.07.2023**

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)		Identify and explain the characteristics that differentiates between Manufacturing operation and service operations	*CO2*	*PO11*	**10**
	b)		Enumerate and describe the principal factors that influences productivity rate with relevant examples	*CO1*	-	**10**
			UNIT - II			
2	a)		Historical demand for a product is: Month / Demand January 12 February 11 March 15 April 12 May 16 June 15 i. Using a weighted moving average with weights of 0.60, 0.30 and 0.10, find the July forecast. ii. Using single exponential smoothing with α = 0.2 and June forecast = 13, find the July forecast. Make suitable assumptions.	*CO2*	*PO1*	**08**
	b)		State the conditions under which Delphi method is used and at least three disadvantages resulting from its use.	*CO3*	*PO2*	**06**
			Examine the issues that must be addressed in developing an acceptable aggregate plan using a level strategy with i. Constant workforce level ii. Constant output rate	*CO4*	*PO3*	**06**

<table>
<tr><td></td><td></td><td></td><td colspan="1">OR</td><td></td><td></td><td></td></tr>
<tr><td></td><td>3</td><td>a)</td><td>Explain the key inputs of an MRP system with the block diagram</td><td>CO4</td><td>PO3</td><td>06</td></tr>
<tr><td></td><td></td><td>b)</td><td>Enumerate the key functions of Master Production Schedule.</td><td>CO4</td><td>PO3</td><td>04</td></tr>
<tr><td></td><td></td><td>c)</td><td>A lathe manufacturer had noted the sales invoices from January to August and noticed the sales during each month as 10, 11, 10, 11, 14, 15, 14 and 15 units respectively. What would be his estimate of sales for September?
a. If he has followed 4 month weighted moving average (with weights 0.4, 0.3, 0.2 and 0.1)
If he has followed simple exponential smoothing with $\alpha = 0.2$ and his estimated sales for January is 11.</td><td>CO3</td><td>PO2</td><td>10</td></tr>
<tr><td></td><td></td><td></td><td>UNIT - III</td><td></td><td></td><td></td></tr>
<tr><td></td><td>4</td><td>a)</td><td>The following data pertains to a manufacturing activity.
<table>
<tr><th>Job, j</th><th>Processing time, t_j</th><th>Weight W_j</th></tr>
<tr><td>1</td><td>7</td><td>1</td></tr>
<tr><td>2</td><td>18</td><td>2</td></tr>
<tr><td>3</td><td>6</td><td>1</td></tr>
<tr><td>4</td><td>8</td><td>2</td></tr>
<tr><td>5</td><td>12</td><td>3</td></tr>
</table>
Determine the sequence which will minimize the weighted mean flow time of the problem. Also find the weighted mean flow time.</td><td>CO3</td><td>PO2</td><td>10</td></tr>
<tr><td></td><td></td><td>b)</td><td>Consider the following 3 machines and 5 jobs flow shop problem. Check whether Johnsons rule can be extended to this problem. If so what is the optimum schedule and the corresponding make span?
<table>
<tr><th>Job, j</th><th>Machine 1</th><th>Machine 2</th><th>Machine 3</th></tr>
<tr><td>1</td><td>11</td><td>10</td><td>12</td></tr>
<tr><td>2</td><td>13</td><td>8</td><td>20</td></tr>
<tr><td>3</td><td>15</td><td>6</td><td>15</td></tr>
<tr><td>4</td><td>12</td><td>7</td><td>19</td></tr>
<tr><td>5</td><td>20</td><td>9</td><td>7</td></tr>
</table></td><td>CO2</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>5</td><td>a)</td><td>Consider the following single machining scheduling problem:
<table>
<tr><td>Job (j)</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr>
<tr><td>Processing time (tj)</td><td>10</td><td>8</td><td>8</td><td>7</td><td>12</td><td>15</td></tr>
<tr><td>Due date (dj)</td><td>15</td><td>10</td><td>12</td><td>11</td><td>18</td><td>25</td></tr>
</table>
Determine the sequence which will minimize the maximum lateness (Lmax). Also, determine Lmax with respect to the optimal sequence.</td><td>CO3</td><td>PO2</td><td>08</td></tr>
</table>

		b)	Consider the following two machines and six jobs flow shop-scheduling problem. Using Johnson's algorithm, obtain the optimal sequence, which will minimize the makespan. Job | Machine 1 | Machine 2 1 | 5 | 4 2 | 2 | 3 3 | 13 | 14 4 | 10 | 1 5 | 8 | 9 6 | 12 | 11	*CO2*	*PO1*	**08**
		c)	Write a brief note on CDS Heuristics in scheduling	*CO1*	-	**04**
			UNIT - IV			
	6	a)	Compare and contrast between Push and pull method of material flow with suitable examples	*CO3*	*PO2*	**10**
		b)	Explain in brief about the following i. Uniform workstation loads ii. Kaizen iii. Standardized components iv. Line flows	*CO1*	-	**10**
			UNIT - V			
	7	a)	With examples examine the 5S principles as applied to a shop floor of a production unit	*CO3*	*PO2*	**10**
		b)	Write short notes on the following i. Poke- t6Yoke ii. 2 Bin Kanban system iii. Value stream Mapping iv. Line Balancing	*CO2*	*PO1*	**10**

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