Name: **Enrolment No:**	UPES

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2018

Course: Lean Manufacturing **Semester: III**
Programme: MBA(Core)-Operations **CC: LSCM 8018**
Time: 03 hrs. **Max. Marks: 100**
Instructions: All sections are compulsory

SECTION A (20 Marks) **Attempt all question in this section**			
1.(A)	Write the full form of the following	**(1*2=2 marks)**	
(i)	SPC	**1**	**CO1**
(ii)	OEE	**1**	**C03**
(B)	**Explain the following**	**(3*3=9 marks)**	
(i)	Poka yoke	**3**	**C01**
(ii)	CpK	**3**	**C02**
(iii)	Takt time	**3**	**C02**
(iv)	Cycle time	**3**	**C02**
(v)	VSM	**3**	**C01**
(vi)	One piece flow	**3**	**C01**
SECTION B (20 Marks) **Attempt any 4 question, each question carries 5 marks only**		**(5*4=20 marks**	
2 (a)	Calculate the takt time when a plant runs for two ten hours shifts & each shift includes a 30-minute meal & two ten minutes' break. The normal work schedule if 5 days per week & have nine holidays in a year. The customer has a contractual agreement to purchase 500,000 units per year.	**5**	**C02**
(b)	Compare lean principles with TPS principles?	**5**	**C02**
(c)	What do you understand by 5s & explain it with example?	**5**	**C03**
(d)	Define littles law & explain it with example?	**5**	**C03**
(e)	Compare lean enterprise vs traditional mass production?	**5**	**C01**
SECTION-C (30 marks) **Attempt any 3 question, each question carries 10 marks**		**(10*3=30 marks)**	
3(a)	Explain the following (i)value stream mapping (ii)spaghetti diagram (iii) Zeta cell time study?	**10**	**C05**
(b)	Discuss the seven deadly wastes/sins?	**10**	**C02**

<table>
<tr><td>(c)</td><td>The ABC Masala company has to process four items A, B, C & D on five machines:- I, II, III, IV & V. Processing times are given in the following table. Find the sequence that minimizes the total elapsed time & also the idle time for each machine
<table>
<tr><th></th><th>I</th><th>II</th><th>III</th><th>IV</th><th>V</th></tr>
<tr><td>A</td><td>7</td><td>5</td><td>2</td><td>3</td><td>9</td></tr>
<tr><td>B</td><td>6</td><td>6</td><td>4</td><td>5</td><td>10</td></tr>
<tr><td>C</td><td>5</td><td>4</td><td>5</td><td>6</td><td>8</td></tr>
<tr><td>D</td><td>8</td><td>3</td><td>3</td><td>2</td><td>6</td></tr>
</table></td><td>10</td><td>C03</td></tr>
<tr><td>(d)</td><td>Discuss the various diagnostics tools used for Lean strategy implementation?</td><td>10</td><td>C05</td></tr>
<tr><td colspan="4">SECTION-D(30 marks)
Attempt the following situation</td></tr>
<tr><td>4(a)</td><td>A projector manufacturing company exports projector, calculate the cycle, buffer & safety stock for the company when their daily shipment is 1400 units per day, assume takt time as 1 minute. The time the Kanban cards are in planning is 24 hours, and the delivery time(due to material handler’s frequency) is 3 hours. In any typical queue they have 14 hours of demand in front of the order. Assuming safety factor as 0.03, also the average production is 1400 units for a month & standard deviation is 59.0 & average demand for a month is 1400 units & standard deviation for demand is 208.0. For a 99% on time delivery the acceptable value for one sided test(Z score= 2.33). Also calculate the number of kanban required when the kanban container size is 50 units.</td><td>15</td><td>C04</td></tr>
<tr><td>(b)</td><td>Calculate the OEE for 31st March 2018, where a plant runs for two shift of 12 hours each everyday & each shift has a break of 30 min. for meal & two tea break of 15 min. each. The scheduled preventive maintenance is half hour each day. The unscheduled downtime was 1.5 hour on 31st March 2018. The design cycle time is 30 seconds per piece & the total production was 2020 pieces with 50 rejected pieces on that particular day. Also calculate the various losses.</td><td>(15)</td><td>C03</td></tr>
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