SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES
(AUTONOMOUS)

QUESTION BANK

Year / Semester: II B.Tech IV Semester **Regulation: R23**

Subject and Code: Industrial Management & 23ESC244T

SYLLABUS

UNIT– I: INTRODUCTION:

Definition of industrial engineering (I.E), development, applications, role of an industrial engineer, differences between production management and industrial engineering, quantitative tools of IE and productivity measurement. concepts of management, importance, functions of management, scientific management, Taylor's principles, theory X and theory Y, Fayol's principles of management.

PLANT LAYOUT: Factors governing plant location, types of production layouts, advantages and disadvantages of process layout and product layout, applications, quantitative techniques for optimal design of layouts, plant maintenance, preventive and breakdown maintenance.

UNIT–II: WORK STUDY:
Importance, types of production, applications, work study, method study and time study, work sampling, PMTS, micro-motion study, rating techniques, MTM, work factor system, principles of Ergonomics, flow process charts, string diagrams and Therbligs.

UNIT–III: STATISTICAL QUALITY CONTROL:

Quality control, Queuing assurance and its importance, SQC, attribute sampling inspection with single and double sampling, Control charts – X and R –charts X and S charts and their applications, numerical examples.

TOTAL QUALITY MANAGEMENT: zero defect concept, quality circles, implementation, applications, ISO quality systems. Six Sigma–definition, basic concepts

UNIT– IV: FINANCIAL MANAGEMENT:

Scope and nature of financial management, Sources of finance, Ratio analysis, Management of working capital, estimation of working capital requirements, stock management, Cost accounting and control, budget and budgetary control, Capital budgeting – Nature of Investment Decisions – Investment Evaluation criteria- NPV, IRR, PI, Payback Period, and ARR, numerical problems.

UNIT–V: HUMAN RESOURCE MANAGEMENT:

Concept of human resource management, personnel management and industrial relations, functions of personnel management, Job-evaluation, its importance and types, merit rating, quantitative methods, wage incentive plans, and types.

VALUE ANALYSIS: Value engineering, implementation procedure, enterprise resource planning and supply chain management.

Prepared by Mr. Praveen A S

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Text Books:

1. O.P Khanna, Industrial Engineering and Management, Dhanpat Rai Publications (P) Ltd, 2018.
2. Mart and Telsang, Industrial Engineering and Production Management, S.Chand & Company Ltd. New Delhi, 2006.

Reference Books:

1. Bhattacharya DK, Industrial Management, S.Chand, publishers, 2010.
2. J.G Monks, Operations Management, 3/e, McGraw Hill Publishers1987.
3. T.R. Banga, S.C.Sharma, N. K. Agarwal, Industrial Engineering and Management Science, Khanna Publishers, 2008.
4. Koontz O'Donnell, Principles of Management, 4/e, McGraw Hill Publishers, 1968.
5. R.C.Gupta, Statistical Quality Control, Khanna Publishers, 1998.
6. NVS Raju, Industrial Engineering and Management, 1/e, Cengage India Private Limited, 2013.

Online Learning Sources

- https://onlinecourses.nptel.ac.in/noc21_me15/preview
- https://onlinecourses.nptel.ac.in/noc20_mg43/preview
- https://www.edx.org/learn/industrial-engineering
- https://youtube.com/playlist?list=PL299B5CC87110A6E7&si=TghLCbEobuxjEaXi
- https://youtube.com/playlist?list=PLbjTnjt5Gkl0z3OHOGK5RB9mvNYvnImW&si=oaX_5RG69hS3v2ll

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Max Marks: 10

S.No.	CO	Questions	BT
Unit I: (INTRODUCTION & PLANT LAYOUT)			
1	1	Define Industrial Engineering (I.E.) and trace its historical development.	L1
2	1	Evaluate the role and responsibilities of an Industrial Engineer in a modern manufacturing facility.	L2
3	1	Distinguish between Production Management and Industrial Engineering.	L4
4	1	Discuss the concept of Productivity and its measurement.	L2
5	1	Critically examine F.W. Taylor's Principles of Scientific Management.	L2
6	1	Compare and contrast Douglas McGregor's Theory X and Theory Y.	L4
7	1	Elaborate on Henri Fayol's 14 Principles of Management.	L2
8	1	Analyze the factors governing Plant Location and Layout design.	L4
9	1	Compare Product Layout and Process Layout in detail.	L4
10	1	a. Discuss the importance of Plant Maintenance in an industrial setup. b. Differentiate between Preventive Maintenance and Breakdown Maintenance.	L2, L4

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S.No.	CO	Questions	BT
Unit II: (WORK STUDY)			
1	2	Explain the importance of Work Study in modern industries. How does it help in increasing productivity and reducing costs?	L2
2	2	Elaborate on the systematic steps involved in Method Study.	L2
3	2	Discuss the various charts and diagrams used in Method Study, specifically focusing on Flow Process Charts and String Diagrams	L2
4	2	Describe the procedure for conducting a Time Study. How do you calculate Standard Time using observed time, rating factors, and allowances?	L2
5	2	Discuss the fundamental principles of Ergonomics in designing a workspace. How does human-machine interaction affect work efficiency?	L2
6	2	Explain the concept of Predetermined Motion Time Systems (PMTS).	L2
7	2	Explain about the various types of performance rating techniques.	L2
8	2	Explain about the Work Factor System as a technique for work measurement.	L2
9	2	What is Micro-motion study? Explain its significance and the role of Simo Charts in analyzing high-speed repetitive tasks.	L2
10	2	What are all the process chart symbols. Illustrate a flow process chart with a case study.	L3

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<table>
<tr><th>S.No.</th><th>CO</th><th>Questions</th><th>BT</th></tr>
<tr><td colspan="4">Unit III: (STATISTICAL QUALITY CONTROL)</td></tr>
<tr><td>1</td><td>3</td><td>Explain the importance of Statistical Quality Control (SQC) in manufacturing. Discuss how it helps in reducing waste and improving product reliability.</td><td>L2</td></tr>
<tr><td>2</td><td>3</td><td>A hospital emergency department is monitoring the time required to admit a patient using X and R charts. Below Table presents summary data for 20 subgroups of two patients each (time is in minutes).
(a) Use these data to determine the control limits for the X and R control charts for this patient admitting process.
(b) Plot the preliminary data from the first 20 samples on the control charts. Is this process in statistical control?
<table>
<tr><th>Subgroup</th><th>$\bar{x}$</th><th>R</th><th>Subgroup</th><th>$\bar{x}$</th><th>R</th></tr>
<tr><td>1</td><td>8.3</td><td>2</td><td>11</td><td>8.8</td><td>3</td></tr>
<tr><td>2</td><td>8.1</td><td>3</td><td>12</td><td>9.1</td><td>5</td></tr>
<tr><td>3</td><td>7.9</td><td>1</td><td>13</td><td>5.9</td><td>3</td></tr>
<tr><td>4</td><td>6.3</td><td>5</td><td>14</td><td>9.0</td><td>6</td></tr>
<tr><td>5</td><td>8.5</td><td>3</td><td>15</td><td>6.4</td><td>3</td></tr>
<tr><td>6</td><td>7.5</td><td>4</td><td>16</td><td>7.3</td><td>3</td></tr>
<tr><td>7</td><td>8.0</td><td>3</td><td>17</td><td>5.3</td><td>2</td></tr>
<tr><td>8</td><td>7.4</td><td>2</td><td>18</td><td>7.6</td><td>4</td></tr>
<tr><td>9</td><td>6.4</td><td>2</td><td>19</td><td>8.1</td><td>3</td></tr>
<tr><td>10</td><td>7.5</td><td>4</td><td>20</td><td>8.0</td><td>2</td></tr>
</table></td><td>L3</td></tr>
</table>

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3	3	**A hard-bake process is used in conjunction with photolithography in semiconductor manufacturing. Establish statistical control of the flow width of the resist in this process using X and R charts.**	L3

Flow Width Measurements (microns) for the Hard-Bake Process

Sample Number	Wafers				
	1	2	3	4	5
1	1.3235	1.4128	1.6744	1.4573	1.6914
2	1.4314	1.3592	1.6075	1.4666	1.6109
3	1.4284	1.4871	1.4932	1.4324	1.5674
4	1.5028	1.6352	1.3841	1.2831	1.5507
5	1.5604	1.2735	1.5265	1.4363	1.6441
6	1.5955	1.5451	1.3574	1.3281	1.4198
7	1.6274	1.5064	1.8366	1.4177	1.5144
8	1.4190	1.4303	1.6637	1.6067	1.5519
9	1.3884	1.7277	1.5355	1.5176	1.3688
10	1.4039	1.6697	1.5089	1.4627	1.5220
11	1.4158	1.7667	1.4278	1.5928	1.4181
12	1.5821	1.3355	1.5777	1.3908	1.7559
13	1.2856	1.4106	1.4447	1.6398	1.1928
14	1.4951	1.4036	1.5893	1.6458	1.4969
15	1.3589	1.2863	1.5996	1.2497	1.5471
16	1.5747	1.5301	1.5171	1.1839	1.8662
17	1.3680	1.7269	1.3957	1.5014	1.4449
18	1.4163	1.3864	1.3057	1.6210	1.5573
19	1.5796	1.4185	1.6541	1.5116	1.7247
20	1.7106	1.4412	1.2361	1.3820	1.7601
21	1.4371	1.5051	1.3485	1.5670	1.4880
22	1.4738	1.5936	1.6583	1.4973	1.4720
23	1.5917	1.4333	1.5551	1.5295	1.6866
24	1.6399	1.5243	1.5705	1.5563	1.5530
25	1.5797	1.3663	1.6240	1.3732	1.6887

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<table>
<tr>
<td>4</td>
<td>3</td>
<td>
Construct and interpret x bar and s charts using the piston ring inside diameter measurements from the below Table

Inside Diameter Measurements (mm) for Automobile Engine Piston Rings
<table>
<tr><th>Sample Number</th><th colspan="5">Observations</th><th>$\bar{x}_i$</th><th>s_i</th></tr>
<tr><td>1</td><td>74.030</td><td>74.002</td><td>74.019</td><td>73.992</td><td>74.008</td><td>74.010</td><td>0.0148</td></tr>
<tr><td>2</td><td>73.995</td><td>73.992</td><td>74.001</td><td>74.011</td><td>74.004</td><td>74.001</td><td>0.0075</td></tr>
<tr><td>3</td><td>73.988</td><td>74.024</td><td>74.021</td><td>74.005</td><td>74.002</td><td>74.008</td><td>0.0147</td></tr>
<tr><td>4</td><td>74.002</td><td>73.996</td><td>73.993</td><td>74.015</td><td>74.009</td><td>74.003</td><td>0.0091</td></tr>
<tr><td>5</td><td>73.992</td><td>74.007</td><td>74.015</td><td>73.989</td><td>74.014</td><td>74.003</td><td>0.0122</td></tr>
<tr><td>6</td><td>74.009</td><td>73.994</td><td>73.997</td><td>73.985</td><td>73.993</td><td>73.996</td><td>0.0087</td></tr>
<tr><td>7</td><td>73.995</td><td>74.006</td><td>73.994</td><td>74.000</td><td>74.005</td><td>74.000</td><td>0.0055</td></tr>
<tr><td>8</td><td>73.985</td><td>74.003</td><td>73.993</td><td>74.015</td><td>73.988</td><td>73.997</td><td>0.0123</td></tr>
<tr><td>9</td><td>74.008</td><td>73.995</td><td>74.009</td><td>74.005</td><td>74.004</td><td>74.004</td><td>0.0055</td></tr>
<tr><td>10</td><td>73.998</td><td>74.000</td><td>73.990</td><td>74.007</td><td>73.995</td><td>73.998</td><td>0.0063</td></tr>
<tr><td>11</td><td>73.994</td><td>73.998</td><td>73.994</td><td>73.995</td><td>73.990</td><td>73.994</td><td>0.0029</td></tr>
<tr><td>12</td><td>74.004</td><td>74.000</td><td>74.007</td><td>74.000</td><td>73.996</td><td>74.001</td><td>0.0042</td></tr>
<tr><td>13</td><td>73.983</td><td>74.002</td><td>73.998</td><td>73.997</td><td>74.012</td><td>73.998</td><td>0.0105</td></tr>
<tr><td>14</td><td>74.006</td><td>73.967</td><td>73.994</td><td>74.000</td><td>73.984</td><td>73.990</td><td>0.0153</td></tr>
<tr><td>15</td><td>74.012</td><td>74.014</td><td>73.998</td><td>73.999</td><td>74.007</td><td>74.006</td><td>0.0073</td></tr>
<tr><td>16</td><td>74.000</td><td>73.984</td><td>74.005</td><td>73.998</td><td>73.996</td><td>73.997</td><td>0.0078</td></tr>
<tr><td>17</td><td>73.994</td><td>74.012</td><td>73.986</td><td>74.005</td><td>74.007</td><td>74.001</td><td>0.0106</td></tr>
<tr><td>18</td><td>74.006</td><td>74.010</td><td>74.018</td><td>74.003</td><td>74.000</td><td>74.007</td><td>0.0070</td></tr>
<tr><td>19</td><td>73.984</td><td>74.002</td><td>74.003</td><td>74.005</td><td>73.997</td><td>73.998</td><td>0.0085</td></tr>
<tr><td>20</td><td>74.000</td><td>74.010</td><td>74.013</td><td>74.020</td><td>74.003</td><td>74.009</td><td>0.0080</td></tr>
<tr><td>21</td><td>73.982</td><td>74.001</td><td>74.015</td><td>74.005</td><td>73.996</td><td>74.000</td><td>0.0122</td></tr>
<tr><td>22</td><td>74.004</td><td>73.999</td><td>73.990</td><td>74.006</td><td>74.009</td><td>74.002</td><td>0.0074</td></tr>
<tr><td>23</td><td>74.010</td><td>73.989</td><td>73.990</td><td>74.009</td><td>74.014</td><td>74.002</td><td>0.0119</td></tr>
<tr><td>24</td><td>74.015</td><td>74.008</td><td>73.993</td><td>74.000</td><td>74.010</td><td>74.005</td><td>0.0087</td></tr>
<tr><td>25</td><td>73.982</td><td>73.984</td><td>73.995</td><td>74.017</td><td>74.013</td><td>73.998</td><td>0.0162</td></tr>
</table>
</td>
<td>L3</td>
</tr>
<tr>
<td>5</td>
<td>3</td>
<td>
Control charts for X and S are maintained on a quality characteristic. The sample size is n=4. After 30 samples, we obtain

$\sum_{i=1}^{30} \bar{x}_i = 12,870$ and $\sum_{i=1}^{30} s_i = 410$

(a) Find the three-sigma limits for the X and S chart.

(b) Assuming that both charts exhibit control, estimate the parameters σ.
</td>
<td>L3, L3</td>
</tr>
<tr>
<td>6</td>
<td>3</td>
<td>Define Total Quality Management (TQM). Explain its fundamental pillars and why "continuous improvement" is vital to its success.</td>
<td>L2</td>
</tr>
<tr>
<td>7</td>
<td>3</td>
<td>Elaborate on the basic concepts of Six Sigma. Explain the DMAIC (Define, Measure, Analyze, Improve, Control) cycle in detail.</td>
<td>L2</td>
</tr>
</table>

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8	**3**	**Discuss the ISO quality systems. How does obtaining ISO certification benefit a company's international trade and customer trust?**	**L2**
9	**3**	**Describe the evolution of quality from inspection to Total Quality Management.**	**L1**
10	**3**	**Differentiate between the concepts of quality control, quality assurance, and TQM**	**L4**

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S.No.	CO	Questions	BT
Unit IV: (FINANCIAL MANAGEMENT)			
1	4	**Define Financial Management. Discuss its nature and scope of the financial management**	**L1**
2	4	**Explain the various types of financial ratios help stakeholders evaluate the financial performance of a company.**	**L2**
3	4	**Explain the various long-term and short-term sources of finance available to a modern business enterprise.**	**L2**
4	4	**a. Explain about the three principle elements of cost in an organization.** **b. Give the importance of cost accounting for an organization.**	**L2, L2**
5	4	**What are all the various types of overhead cost in costing?. Explain it in detail about each overhead cost.**	**L2**
6	4	**Define Working Capital. Discuss in detail about various working capital on the basis of periodicity of requirement.**	**L2**
7	4	**What is Budgetary Control? Identify the essential steps involved in the preparation and implementation of a budgetary control system in an organization.**	**L2**
8	4	**Define Break even analysis. Explain the scope of Break-even chart with necessary diagram.**	**L2**
9	4	**Explain about the various types of budgets used in an organization. State its limitations.**	**L2**
10	4	**Illustrate the importance of Stock Management (Inventory Management). Explain how a firm can balance the costs of holding inventory against the risks of stock-outs.**	**L2**

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Unit V: (HUMAN RESOURCE MANAGEMENT)			
1	5	**Define Human Resource Management (HRM). Explain its core concepts and discuss how it differs from traditional Personnel Management.**	L2
2	5	**Explain various functions of personnel management.**	L2
3	5	**Explain the concept of Job Evaluation. Detail its significance in determining the relative worth of different roles within an organization.**	L2
4	5	**Discuss the various types/methods of Job Evaluation. Provide a brief overview of both qualitative (Ranking, Grading) and quantitative (Point Rating) methods.**	L2
5	5	**What is Merit Rating? Differentiate it from Job Evaluation and explain its role in employee development and promotion.**	L2
6	5	**Explain the concept of Wage Incentive Plans. What are the fundamental characteristics of an effective incentive scheme?**	L2
7	5	**Define Value Engineering. Explain the systematic procedure involved in implementing Value Engineering in a production environment.**	L2
8	5	**What is Enterprise Resource Planning (ERP)? Explain its core components and how it integrates various departments of a business into a single system.**	L2
9	5	**Discuss the importance of Supply Chain Management (SCM). Explain how an efficient SCM contributes to the competitive advantage of a firm.**	L2
10	5	**Explain the synergy between ERP and Supply Chain Management. How does ERP software facilitate smoother supply chain operations?**	L2

Note: L1-Remembering, L2-Understanding, L3-Applying, L4-Analyzing, L5-Evaluating, and L6-Creating

Prepared by Mr. Praveen A S