BME515B

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Model Question Paper 2022-23 (CBCS Scheme)
Fifth Semester B.E. Degree Examination (Mechanical Engineering)
AUTOMATION IN MANUFACTURING

TIME: 03 Hours **Max. Marks: 100**

Note: 01. Answer any FIVE full questions, choosing at least ONE question from each MODULE

<table>
<tr><th colspan="3">Module -1</th><th>Bloom's Taxonomy Level</th><th>Marks</th><th>CO</th></tr>
<tr><td>Q.01</td><td>a</td><td>What is an Automation? Explain with block diagram, manufacturing support systems in automation.</td><td>L2</td><td>10</td><td>CO1</td></tr>
<tr><td></td><td>b</td><td>A certain part is routed through six machines in a batch production plant. The setup and operation time' for each machine arc given in the table below, the batch size is 100 and the average nonoperation time per machine is 12 hr. Determine: (a) manufacturing lead time and (b) production rate for operation.
<table>
<tr><th>Machine</th><th>Setup time (hrs)</th><th>Operation time (min)</th></tr>
<tr><td>1</td><td>4</td><td>5</td></tr>
<tr><td>2</td><td>2</td><td>3.5</td></tr>
<tr><td>3</td><td>8</td><td>10</td></tr>
<tr><td>4</td><td>3</td><td>1.9</td></tr>
<tr><td>5</td><td>3</td><td>4.1</td></tr>
<tr><td>6</td><td>4</td><td>2.5</td></tr>
</table></td><td>L3</td><td>10</td><td>CO1</td></tr>
<tr><td colspan="6">OR</td></tr>
<tr><td>Q.02</td><td>a</td><td>Explain the ten strategies in automation</td><td>L2</td><td>10</td><td>CO1</td></tr>
<tr><td></td><td>b</td><td>An average of 20 new orders is started through a certain factory each month, on average, an order consists of 50 parts to be processed through 10 machines in the factory, The operation time per machine for each part = 15 mins. The nonoperation time per order at each machine averages 8 hr. and the required setup lime per order = 4 hr. There are 25 machines in the factory, 80% of which are operational at any time (the other 20% are in repair or maintenance). The plant operates 160 hr/month.
a) What is the manufacturing lead time for an average order?
b) Production Rate
c) What is the plant capacity (on monthly basis)
d) What is the utilization of the plant?
e) Determine the average level of work-in-process in the plant.
f) WIP Ratio
g) TIP Ratio.</td><td>L3</td><td>10</td><td>CO1</td></tr>
<tr><td colspan="3">Module-2</td><td></td><td></td><td></td></tr>
<tr><td>Q.03</td><td>a</td><td>What is Line balancing? Explain its objectives.</td><td>L2</td><td>10</td><td>CO2</td></tr>
<tr><td></td><td>b</td><td>Explain the following terms in line balancing.
i) Bottleneck ii) Workstation Process Time
iii) Cycle time iv) Balance delay</td><td>L3</td><td>10</td><td>CO2</td></tr>
<tr><td colspan="6">OR</td></tr>
<tr><td>Q.04</td><td>a</td><td>Explain the methods of line balancing in automation.</td><td>L2</td><td>10</td><td>CO2</td></tr>
<tr><td></td><td>b</td><td>With a neat sketch, explain the parts feeding device.</td><td>L3</td><td>10</td><td>CO2</td></tr>
</table>

Module-3					
Q. 05	**a**	Describe the following automated guided vehicle system with the help of simple sketch: (i) Driverless automated guided train (ii) Unit load carrier.	**L2**	**10**	**CO2**
	b	What is MRP? Explain its inputs and outputs. List the benefits of MRP.	**L3**	**10**	**CO2**
OR					
Q. 06	**a**	Explain with a neat sketch vehicle guidance and routing.	**L2**	**10**	**CO2**
	b	Explain the applications of robots in material handling, assembly and inspection.	**L3**	**10**	**CO2**
Module-4					
Q. 07	**a**	What is machine vision? Explain the functions of machine vision.	**L2**	**10**	**CO3**
	b	Explain the construction and operation of CMM.	**L3**	**10**	**CO3**
OR					
Q. 08	**a**	Explain shop floor control and automatic identification techniques	**L2**	**10**	**CO3**
	b	Differentiate between contact and non-contact type inspection techniques.	**L3**	**10**	**CO3**
Module-5					
Q. 09	**a**	What is additive manufacturing? Explain the basic principles of additive manufacturing.	**L2**	**10**	**CO4**
	b	Explain with the neat sketch, the slicing CAD models for additive manufacturing.	**L3**	**10**	**CO4**
OR					
Q. 10	**a**	Explain the recent trends in manufacturing.	**L2**	**10**	**CO4**
	b	Discuss the future of automated factory.	**L3**	**10**	**CO4**