Code No: D5210 **R09**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.Tech II - Semester Examinations, March/April 2011
AUTOMATION IN MANUFACTURING
(DESIGN FOR MANUFACTURING)

Time: 3hours **Max. Marks: 60**

Answer any five questions
All questions carry equal marks
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1. a) Explain various reasons for Automation of Manufacturing Systems.
   b) What is meant by Automation Migration strategy? Explain it with a suitable diagram. [6+6]

2. a) Discuss the mathematical models for the following performance measures.
   i) Production rate
   ii) Production capacity
   iii) Work in progress.
   b) A part produced in certain batch manufacturing plant is to be processed through on average six machines. 20 new batching of party are launched each week. Average operation line is 6 min. Average set up time is 5hr. batch size 25 party, and average non operation time per batch is 10 hr/machine. These are 18 machines, operates 70 production hrs/week. Scrap rate is negligible. Determine
   i) MLT for an average part. ii) Plant capacity
   iii) Plant utilization. [6+6]

3.a) Compare manual and automated methods of production in terms direct labour material and over head costs.
   b) With a block diagram, explain various levels of automation. [6+6]

4. Briefly explain ranked position weights method of line balancing with suitable example. [12]

5.a) State important factors to be considered for the design of assembly line
   b) Analyze the single model assembly lines for the following performance measures
   i) Production rate
   ii) Time efficiency
   iii) The number of workers. [6+6]

6.a) Define the terms [12]
   i) Repositioning efficiency
   ii) Balance delay.
b) The following table defines the precedence relationships and element terms for new model toy

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i) Construct the precedence diagram for this job
ii) If the ideal cycle time = 1.1min. repositioning time 0.1 min and up time proportion is assumed to be 1.0, what is the theoretical minimum number of work station required to minimize the balance delay under the assumption that there will be one worker per station?
iii) Using RPW method, assign work elements to stations and compute balance delay.

Work element No	Te(min)	Immediate predcessory
1	0.5	-
2	0.3	1
3	0.8	1
4	0.2	2
5	0.1	2
6	0.6	3
7	0.4	4,5
8	0.5	3,5
9	0.3	7,8
10	0.6	6,9

7.a) What are the benefits of automated production lines.
b) Explain various reasons for using the storage buffers on the automated production lines. [6+6]

8. a) What are the different types of automated material handling systems and describe their functions.

b) Briefly discuss about transfer lines. [8+4]

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