

IV B.Tech. I Semester Regular Examinations, November -2005
AUTOMATION IN MANUFACTURE
(Common to Mechanical Engineering and Production Engineering)
Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

1. (a) What are the basic elements of an automated system. Explain in detail.
(b) What are the functions of an advanced automation system. [8+8]
2. Analyse a two-stage transfer line with no internal storage. [16]
3. (a) What is partial automation? Why is it preferred?
(b) Analyse the performance of a partially automated production line with suitable assumptions. [8+8]
4. (a) What are the functions of a material storage system?
(b) Explain the various measures used to assess the performance of a storage system. [8+8]
5. (a) Design a suitable material handling system for the assembly of a car in a factory.
(b) Explain the concept of adaptive control and its types. [8+8]
6. (a) Draw a pneumatic circuit to control a double acting cylinder using separate switches.
(b) What are the applications of automated production lines? [8+8]
7. Explain any two of the following:
(a) Business process Re-engineering
(b) Automated guided vehicle systems
(c) Automated storage and Retrieval systems. [8+8]
8. Explain any two of the following:
(a) Rapid prototyping and its methods
(b) Flexible assembly lines
(c) Automation in machine tools. [8+8]

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1. (a) What is the USA principle in Automation. Explain?
(b) What are the ten strategies used for Automation and production systems. Explain briefly. [6+10]
2. (a) What are the control functions in an automated production line. Explain.
(b) What are the applications of automated production lines? [8+8]
3. (a) What are the difficulties observed in an automated assembly?
(b) Explain the rules used to facilitate automated assembly? [8+8]
4. (a) What are the types of AGVs and their applications?
(b) Explain the various types of conveyors used for material transport. [8+8]
5. (a) Explain the concept of Automated storage and retrieval systems (AS/RS) technology?
(b) Differentiate between Adaptive control with optimization (ACO) and with constraints (ACC). [8+8]
6. Analyse a two stage transfer line with no internal storage. [16]
7. Explain any two of the following:
(a) Concurrent engineering
(b) Components of a pneumatic circuit and their functions
(c) Levels of automation in factory operations. [8+8]
8. Explain any two of the following:
(a) Business process Re-engineering
(b) Automation in machine tools
(c) Factories of the future. [8+8]

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1. (a) What are the reasons for Automation?
(b) Explain the types of Automation in production systems and mention their characteristic features? [8+8]
2. (a) Explain various workpart transfer mechanisms.
(b) What is a storage buffer? Why is it required on an automated production line? [8+8]
3. (a) What is line balancing? Explain various line balancing methods.
(b) How do you improve line balancing? [10+6]
4. Explain the considerations in material handling system design. [16]
5. (a) What are the objectives for automating a companys storage operations?
(b) What are applications of Automated storage and retrieval systems (AS/RS) technology? [8+8]
6. (a) Explain the need for adaptive control?
(b) Explain the concept of adaptive control with constraints with an example. [6+10]
7. Explain any two of the following:
(a) Rapid prototyping methods
(b) Flexible assembly lines
(c) Automated guided vehicle system. [8+8]
8. Explain any two of the following:
(a) Concurrent engineering
(b) 5/2 Directional control valve with a sketch
(c) Automation in machine tools. [8+8]

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1. (a) Define Automation. State the reasons for Automation.
(b) Distinguish Between
 - i. Automation and computer Aided manufacturing
 - ii. Job production and Batch production(c) Define an AGV system? Classify types of AGVS
(d) State the principles of material handling. [4+4+4+4]
2. (a) How the automated flow lines (AFL) are controlled. State the applications of AFL.
(b) Write short notes on:
 - i. Pallet fixtures
 - ii. Rotary indexing machine
 - iii. Transfer machine. [7+9]
3. (a) Explain transfer lines with storage buffers.
(b) What is line Balancing? Explain Ranked positional weights method. [8+8]
4. (a) Explain different types of conveyors and state their applications.
(b) Analyse a Closed-loop conveyor system and state the principles of KWO. [8+8]
5. (a) Define Adaptive control. Explain the functions of adaptive control.
(b) Explain Adaptive control constraints system for **machining process and state their applications.** **[8+8]**
6. (a) Explain vehicle guidance and Routing technology in AGV system.
(b) The AGV layout under consideration is the Simple loop shown in figure 1 in which loads are picked up by the vehicles automatically at the load station and delivered to the unload station for drop-off. Distances are given on the layout. The system must be capable of making 50-deliveries/hr. The vehicle velocity is 50m/min. Pick-up and Drop-off times are 1.0 min, 0.75 min respectively. Determine
 - i. No of vehicles required to satisfy the delivery demand.
 - ii. Handling system efficiency. [6+10]

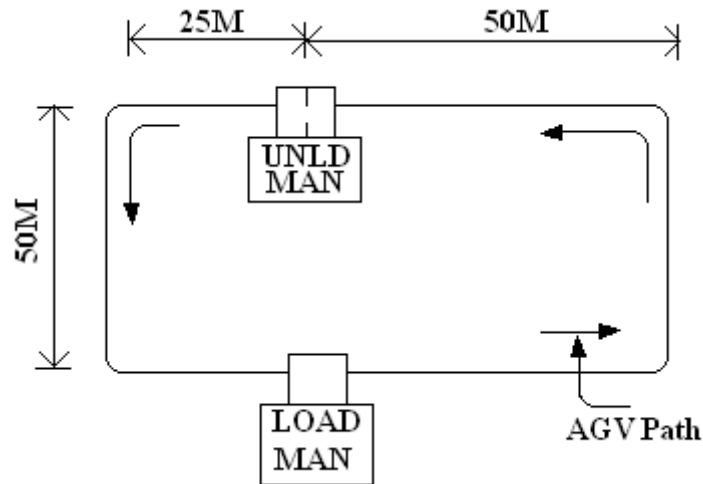


Figure 1:

7. (a) Differentiate Between conventional engineering and concurrent engineering.
 (b) Explain How Business process Re-engineering will reduce the manufacturing lead time. [8+8]
8. Write short notes on the following:
 - (a) Software configuration of BPRE
 - (b) Techniques of rapid proto typing
 - (c) Partial automation
 - (d) Automation in machine tools. [4+4+4+4]
