

Introduction to manufacturing system

- a) Discuss briefly the decision framework requirement for manufacturing system.
- b) What are the principles, which are to be considered when developing manufacturing system laws?
- c) Point out the principles to be considered when designing and analyzing manufacturing systems
- d) Point out the principles of manufacturing systems. Discuss briefly, how these principles are the mild stone for designing manufacturing system?
- e) Define the manufacturing system
- f) What are main types the types of manufacturing systems? On what bases they are compared?

Automation

- a) Define Automation
- b) What are the automation strategies? Point out the effect of each.
- c) What are the types of the automation? On what bases they are compared?
- d) Discuss briefly the main tasks of automation
- e) Discuss briefly the basic parameters required to design automation.
- f) What are the factors on which factory can be automated?
- g) What are the main tasks of manufacturing system to be automated?
- h) Briefly discuss the development of automation tools in manufacturing.

Performance measures

- a) Discuss briefly the mathematical models for performance measures which used to design and evaluate manufacturing system.
- b) Explain briefly how WIP and MLT cost can be evaluated.
- c) Define: MLT, PC, U, and WIP.
- d) What is meant by complexity function? Drives the equation for determine complexity function.

Modeling

- a) Differentiate between open network and closed network manufacturing systems.
- b) Give the steps for calculating the throughput for closed network manufacturing system with N workstations and M products.
- c) Why the calculation of the open network manufacturing system can be done on the bases of single station queue system?
- d) What is meant by effective arrival rate?

Automated storage/retrieval system

- a) Discuss briefly the AS/RS and carousel storage system. Differentiate between them.
- b) Discuss briefly the principle configurations of AS/AR systems.
- c) What is meant by AS/RS? Point out the types of AS/RS.
- d) What is the throughput rate of AS/RS)?
- e) Define an AS/RS
- f) Point out the basic components of an AS/RS.
- g) Provide a list of possible objectives that a company may want to achieve by automating its storage.

Conveyor

- a) On what bases conveyors are designed?
- b) Discuss briefly the conveyor system design principles.

Automated guided vehicles

- a) What are the types of AGV? Explain briefly the methods of guidance.
- b) Discuss briefly the function that must be performed to operate AGV system.
- c) Formulate the problem of routing of the AGV.
- d) Point out the considerations should be taken into account when the vehicle path is designed
- e) What are the steps for calculating the number of vehicles?
- f) What are the steps for determining the routing of the AGV?

Flow line systems

- a) Explain briefly the types of transfer mechanism of production flow line.
- b) What are the types of flow line configuration?
- c) What are the types of flow line analyses? And why breakdown analysis is important?
- d) Discuss briefly the concepts of the upper and lower boundary approaches for transfer line analysis.
- e) Discuss briefly the meaning of time dependent failure approach and operational dependent failure approach of flow line
- f) Why buffer storage in flow line system is used? How?
- g) On what basis the flow line can be analyzed?
- h) What is the equipment used which feed components to assembly machine automatically? Describe briefly the elements of this equipment.
- i) What are the types of equipment used for the assembly transfer system?
- j) What is the part delivery system? Discuss briefly its components.

Flexible manufacturing systems

- a) Discuss briefly the meaning of flexibility of the manufacturing system.
- b) What are the types of flexibility can be offered by FMS?
- c) List six types of Flexibilities could be provided by FMS.
- d) What basis criteria for testing flexibility?
- e) Why flexibility is an important issue in manufacturing? Point out the main types of flexibility?
- f) How the types of automation affect flexibility and productivity?
- g) What is FMS?
- h) Discuss briefly how the FMS can be classified.
- i) What are the configurations of FMS?
- j) Explain briefly the control functions of FMS.
- k) List the factors should be considered for planning a FMS.
- l) Explain briefly the strategic, tactical, operational planning.
- m) What are the types of planning problems for FMS? Discuss briefly one of them elaborating on the solution procedure.
- n) What are the guidelines for the design and operation of the MFS?
- o) Discuss briefly the type of part selection problems of FMS.
- p) Formulate the economic criterion for selecting part type for current assignment to a FMS.
- q) What does batching for FMS mean?
- r) Discuss briefly the types of batching problems of FMS.
- s) Formulate the batching problem
- t) Discuss briefly the factors should be considered when solving the loading problem.
- u) Discuss the loading issue on FMS pointing out the objectives of loading problem.
- v) Formulate the loading problem for FMS