

1. Which one of the following statements about fixed automation is incorrect

- A) **most suitable for batch production**
- B) high production rates
- C) relatively inflexible in accommodating product variety
- D) high initial investment for custom-engineered equipment

2. Interpolator in a CNC machine

- A) controls spindle speed
- B) coordinates axes movements**
- C) operates tool changer
- D) commands canned cycle

3. Which of the following situations is FALSE about manual labor is preferred over automation?

- A) The task is technologically too difficult to automate.
- B) Long product life cycle.**
- C) Customized product.
- D) To cope with ups and downs in demand.

4. Which of the following statements is FALSE about automation?

- A) Automation can be defined as the technology by which a process or procedure is accomplished without human assistance.
- B) Main advantages of automated manufacturing systems are easy management of process improvements and initial investment.**
- C) Safety monitoring in an automated system involves the use of sensors to track the system operation and identify conditions and events that are unsafe or potentially unsafe.
- D) A program of instructions is a set of commands that specify the sequence of steps in the work cycle and the details of each step.

5. What are some of the realities mentioned that modern manufacturing enterprises cope with

- I. Local/international outsourcing
- II. Globalization
- III. The need for operational efficiency
- IV. Contract manufacturing

I, II, III, IV

6. Which of the following statements is FALSE about AGV?

- A) Some types of the vehicles follow electromagnetic signals emitted by the guide wires in the floor.
- B) Zone control to implement a blocking system for traffic control.
- C) The power mechanism for transporting materials is contained in the fixed path using chains, belts, rollers or other mechanical devices.**
- D) It used to move palletized loads along predetermined routes.

7. Which of the following parts is not a component of ROBOT?

- A) Manipulator
- B) Controller
- C) End-effector
- D) Switch box**

8. There are some problems with the manufacturing time. Which factor is the bottleneck?

- A) The number of machines
- B) The number of set-up workers.
- C) Batch size
- D) Operation time**

9. Which of the following statements is FALSE about material handling systems?

- A) recirculating conveyor is a closed-loop conveyor that allows parts or loads to remain on the return loop for one or more revolutions.
- B) Zone control to implement a blocking system is a traffic control method for AGV systems.
- C) Continuous conveyor is a conveyor that moves with stop-and-go motion.**
- D) A conveyor is a mechanical apparatus for moving items or bulk materials, usually inside a facility.

10. Which of the following statements is FALSE?

- A) A production system consists of two main parts: Factory Equipment and Manufacturing Support Systems
- B) Some examples of manufacturing support systems: Product design, quality control, production planning, sales, R&D, and inventory control.
- C) A production system is a subset of the manufacturing stem.**
- D) A manufacturing system is a logical grouping of equipment in the factory and the worker(s) who operate(s) it

11. ... is a reliability metric that indicates the proportion of time that a piece of equipment is up and working properly.

- A) Efficiency
- B) Availability**
- C) Productivity
- D) Traffic factor

12. Which of the following statements is FALSE ?

- A) If customer lead time is less than manufacturing lead time then firms can use make to stock strategy.
- B) If manufacturing lead time is less than customer lead time then finns can use make to order strategy.
- C) Customer lead time is very short for assemble to order strategy.
- D) Manufacturing lead time is very short for an engineer-to-order strategy.**

13. ... control of the multiple machine tools by a single (mainframe) computer through direct connection and in real time.

- A) Numerical Control
- B) Direct Numerical Control**
- C) Computer Numerical Control
- D) none of above

14. Which of the following statements is FALSE about ROBOT?

- A) The arm consists of rigid links connected by movable joints.
- B) A servo robot is a closed-loop system which allows for feedback which affects the output of the system.
- C) The robot can be programmed by recording actual manual motion or by creating a sequential list of instructions.
- D) The actuator may have four, five, or even six joints (degrees of freedom).**

15. Which of the following statements is FALSE?

- A) The features of flexible automation are high production rates, and relatively inflexible in accommodating product variety**
- B) Fixed automation is a system in which the sequence of processing (or assembly) operations is fixed by the equipment configuration.
- C) In programmable automation, the production equipment is designed with the capability to change the sequence of operations to accommodate different product configurations.
- D) A flexible automated system is capable of producing a variety of parts (or products) with virtually no time lost for changeovers from one-part style to the next.

16. Which one of the following principles is not one of the main principles of the U.S.A?

- A) Value chain analysis
- B) Cloud Technology**
- C) Lean Manufacturing
- D) Automation migration strategy

What is the difference between Group Technology, Cellular Manufacturing, and FMS?

GT groups similar parts to standardize work; CM arranges machines into cells to make those part families; FMS is a highly automated, computer-controlled cell that flexibly switches among parts.

Performance measures for storage systems?

- Space utilization (storage density, % of cubic capacity used)
- Throughput (transactions/orders picked per hour)
- Average cycle/retrieval time (putaway + pick time per load)
- Inventory accuracy (record vs. physical count, % correct)

- **Bottleneck** is the slowest workstation in a production line, and therefore it limits the pace of the entire line.