Multiple choice Questions

1. Which of the following is Computer Integrated Manufacturing's objective?
a) Increase number of employees
b) Integration of different products
c) Integration of islands of automation
d) Segregation of manufacturing cells
View Answer

Answer: c
Explanation: Computer Integrated Manufacturing aims at achieving integration of islands of automation like flexible manufacturing systems, robotized work cells, etc. in industries. Effective and timely communication is required to achieve this objective.

2. Which of the following is a disadvantage of Computer Integrated Manufacturing?
a) Large no of workers requirement
b) High cost
c) Takes more time
d) Error-prone
View Answer

Answer: b
Explanation: Computer Integrated Manufacturing involves the use of computer systems and software packages. Their cost of purchase and set up is high. Maintenance of the system is also difficult and expensive.

3. Which among the following has the broadest scope in an organization?
a) CAM
b) CAPP
c) CAD
d) CIM
View Answer

Answer: d
Explanation: CAD stands for Computer-Aided Design. CAM stands for Computer-Aided Manufacturing. CAPP stands for Computer-Aided Process Planning. CAD, CAM, CAPP have limited scope in comparison to Computer Integrated Manufacturing. CIM includes CAD, CAM, CAPP, along with the business functions of an organization.

4. Computer Numerical Control machines use which type of computer?
a) Microcomputer
b) Supercomputer
c) Minicomputer
d) Mainframe computer
View Answer

Answer: c
Explanation: In the late 1960s, Numerical Control machines started using minicomputers and thus called Computer Numerical Control machines. In Computer Numerical Control paper tape and tape readers were replaced by the minicomputer.

5. Which is not an element of Computer Integrated Manufacturing?
a) Mining
b) Marketing
c) Warehousing
d) Product design
View Answer

Answer: a
Explanation: There are nine main elements of Computer Integrated Manufacturing. These are marketing, product design, planning, purchase, manufacturing engineering, factory automation hardware, warehousing, finance, and information management.

6. Which of the following belongs to the manufacturing equipment category of Computer Integrated Manufacturing hardware?
a) Plotters
b) Inspection machines
c) CAD/CAM systems
d) Barcode readers
View Answer

Answer: b
Explanation: Inspection machines, CNC machines, robotic work cells, flexible manufacturing systems, work handling & tool handling devices, storage devices, sensors, etc. are manufacturing equipment related hardware. CAD/CAM systems, plotters, and barcode readers are computer hardware.

7. Which is not among the ten strategies for automation and process improvement?
a) Manual operations
b) Online inspection
c) Simultaneous operations
d) Specialization of operations
View Answer

Answer: a
Explanation: There are ten strategies for automation and process improvement. These are – specialization of operations, combined operations, simultaneous operations, integration of operations, increased flexibility, improved material handling & storage, online inspection, process control & optimization, plant operations control, computer integrated manufacturing.

8. Which of the following functions comes under advanced automation functions?
a) Material handling
b) Welding
c) Error detection and recovery
d) Assembly
View Answer

Answer: c
Explanation: Safety monitoring, maintenance & repair diagnostics, error detection & recovery are examples of advanced automation functions. The purpose of these functions is to enhance the safety and performance of equipment.

9. Which of the following is a feature of flexible automation?
a) Flexibility to deal with product design
b) Similar to fixed automation
c) Use Numerical Control machine tools
d) Unable to deal with variations in product configuration
View Answer

Answer: a
Explanation: There is no requirement of a batch in flexible automation. A flexible automation system can produce mixes of product configurations continuously. There is no loss in production time for the changeover.

10. The central processing unit in CNC consists of which of the following parts?
a) Operating System Unit
b) Secondary memory
c) Arithmetic Logic Unit
d) Read Only Memory
View Answer

Answer: c
Explanation: Arithmetic Logic Unit performs various calculations, counting, and logical functions. Other parts of a CPU are the control section and immediate access memory. The control section retrieves data from memory and generates signals to activate other components in the machine control unit.

11. Which of the following software interprets an NC part program?
a) Machine interface software
b) Application software
c) Machine sequencing system
d) Operating system
View Answer

Answer: d
Explanation: Operating system software interprets part programs and generates control signals to drive machine tool axes. The editor, control program, and executive program are parts of operating system software.

12. Which of the following is not a basic component of the Numerical Control system?
a) Processing equipment
b) Part programmer
c) Machine control unit
d) Part program
View Answer

Answer: b
Explanation: A Numerical Control system has three basic components- a part program of instructions, machine control unit, and processing equipment. The person who prepares the part program is known as a part programmer.

13. Which of the following Numerical Control equipment needs the point to point control system?

a) NC drill press
b) NC cylindrical grinder
c) NC lathe
d) NC boring mill
View Answer

Answer: a
Explanation: NC lathe, NC boring mill, and NC cylindrical grinder need two-axis continuous path control. In a Numerical Control drill press, the turret position is programmed to apply different drill bits to the same work-piece during the machine cycle.

14. Which of the following work envelope belongs to the SCARA robotic configuration?
a) Hemisphere
b) Partial sphere
c) Cylindrical
d) Rectangular
View Answer

Answer: c
Explanation: The work envelope of a robot is 3D space within which the robot can manipulate its wrist end. A Cartesian coordinate robot has a rectangular solid work envelope. Articulated and polar configuration robots have partial sphere work envelopes.

15. Which of the following comes under the category of robot controllers?
a) Limited sequence control
b) Continuous sequence control
c) End to end control
d) Definite control
View Answer

Answer: a
Explanation: Robot controllers are classified as limited sequence control, playback with point-to-point control, playback with continuous path control, and intelligent control. Limited sequence control is used for simple tasks like pick and place operations.

16. What does outer rim in a CIM wheel represent?
a) Assembly functions
b) Upper management functions
c) Monitoring functions
d) Inspection functions
View Answer

Answer: b
Explanation: Outer rim in a CIM wheel depicts Upper management functions. Upper management functions are finance, strategic planning, marketing and manufacturing management & human resource management.

17. Computer Integrated Manufacturing is the integration of _____
a) Design and manufacturing functions
b) Management and design functions
c) Design, manufacturing and business functions

d) Manufacturing functions
View Answer

Answer: c
Explanation: Computer Integrated Manufacturing integrates the Design, Manufacturing, and Business functions of an organization. Manufacturing using computers comes under Computer-Aided Manufacturing. Designing comes under Computer-Aided Design and Computer-Aided Engineering.

18. Which of the following is Computer Integrated Manufacturing's objective?
a) Integration of islands of automation
b) Segregation of manufacturing cells
c) Increase number of employees
d) Integration of different products
View Answer

Answer: a
Explanation: Computer Integrated Manufacturing aims at achieving integration of islands of automation like flexible manufacturing systems, robotized work cells, etc. in industries. Effective and timely communication is required to achieve this objective.

19. Which association has given CIM wheel framework?
a) IEEE
b) CASA/SME
c) SPE
d) SAE
View Answer

Answer: b
Explanation: CASA is an association of the Society of Manufacturing Engineers (SME). IEEE is the Institute of Electrical and Electronics Engineers. SPE is the Society of Petroleum Engineers. SAE is the Society of Automotive Engineers.

20. Which of the following best defines Computer Integrated Manufacturing (CIM)?

a) The use of standalone automated machines in manufacturing
b) Integration of computer-aided design (CAD), computer-aided manufacturing (CAM), and other technologies
c) Manual production with minimal automation
d) Use of only CNC machines in production
Answer: b) Integration of computer-aided design (CAD), computer-aided manufacturing (CAM), and other technologies

21. Which of the following is NOT a key component of CIM?

a) CAD (Computer-Aided Design)
b) CAM (Computer-Aided Manufacturing)
c) JIT (Just-In-Time) Manufacturing
d) Manual assembly lines
Answer: d) Manual assembly lines

22. What is the primary goal of CIM?

a) To increase human labor in manufacturing
b) To integrate all manufacturing functions using computer systems
c) To eliminate automation from the production process
d) To produce only customized products
Answer: b) To integrate all manufacturing functions using computer systems

23. Which of the following technologies is commonly used in CIM?

a) Robotics
b) Artificial Intelligence
c) Automated Material Handling Systems
d) All of the above
Answer: d) All of the above

24. Which software is primarily used in CIM for product design?

a) ERP (Enterprise Resource Planning)
b) CAD (Computer-Aided Design)
c) SCADA (Supervisory Control and Data Acquisition)
d) None of the above
Answer: b) CAD (Computer-Aided Design)

25. In CIM, which system is used for controlling and monitoring production processes?

a) SCADA
b) FMS (Flexible Manufacturing System)
c) PLC (Programmable Logic Controller)
d) None of the above
Answer: a) SCADA

26. What is an advantage of CIM?

a) Increased production time
b) Higher flexibility and automation
c) Increased dependency on human workers
d) Increased waste production
Answer: b) Higher flexibility and automation

27. What role does ERP (Enterprise Resource Planning) play in CIM?

a) Controlling robotic arms
b) Managing business processes such as inventory, scheduling, and supply chain
c) Designing mechanical parts
d) Handling only the financial aspects of production
Answer: b) Managing business processes such as inventory, scheduling, and supply chain

28. What does FMS (Flexible Manufacturing System) provide in CIM?

a) Flexibility in production with the ability to handle different product types
b) A rigid production line for a single product
c) Elimination of all manual labor
d) None of the above
Answer: a) Flexibility in production with the ability to handle different product types

29. Which of the following is a challenge in implementing CIM?

a) High initial investment
b) Increased errors in manufacturing
c) Lower product quality
d) Reduced efficiency
Answer: a) High initial investment

30. What does CASA in CASA/SME stand for?
a) Computers and Automated Systems Association
b) Computers and Automotive Systems Association
c) Computers and Accessories Systems Association
d) Computers and Automobile Systems Association
Answer: a
Explanation: CASA/SME stands for Computers and Automated Systems Association of the Society of Manufacturing Engineers. CASA is a group of manufacturing professionals formed by the Society of Manufacturing Engineers in 1975. CASA/SME gave the idea of a CIM wheel to clarify the meaning of Computer Integrated Manufacturing.

31. What does outer rim in a CIM wheel represent?
a) Monitoring functions
b) Inspection functions
c) Assembly functions
d) Upper management functions

Answer: d
Explanation: Outer rim in a CIM wheel depicts Upper management functions. Upper management functions are finance, strategic planning, marketing and manufacturing management & human resource management.

32. The central core in a CIM wheel is _____
a) Integrated systems architecture
b) Integrated communications architecture
c) Integrated applications architecture
d) Integrated business architecture

Answer: a
Explanation: Integrated systems architecture handles common manufacturing data. It is related to information resource management and communications.

33. Which of the following activities comes under Factory Automation?
a) Finance
b) Scheduling
c) Material handling
d) Documentation

Answer: c
Explanation: Material handling comes under factory automation. Scheduling is concerned with manufacturing planning and control. Documentation belongs to the product/process category. Finance belongs to management.

34. CIM wheel inner rim does not have which of the following category?
a) Factory automation
b) Strategic planning
c) Product/process
d) Manufacturing planning and control

Answer: b
Explanation: Product/process, manufacturing planning, and factory automation involve various activities of manufacturing. They are a part of the Inner Rim. Strategic planning belongs to the Outer Rim and is related to upper management.

35. Inspection test comes under which category in a CIM wheel?
a) Marketing
b) Design
c) Factory automation
d) Analysis and simulation

Answer: c
Explanation: Design, analysis, and simulation belong to a product/process category. The Product/process category is part of the inner rim. Marketing is a management function.

36. Which among the following has the broadest scope in an organization?
a) CAD
b) CIM
c) CAM
d) CAPP

Answer: b
Explanation: CAD stands for Computer-Aided Design. CAM stands for Computer-Aided Manufacturing. CAPP stands for Computer-Aided Process Planning. CAD, CAM, CAPP have limited scope in comparison to Computer Integrated Manufacturing. CIM includes CAD, CAM, CAPP, along with the business functions of an organization.

37. Which among the following played a significant role in the development of Computer Numerical Control?
a) Steel industry
b) Agriculture industry
c) Aerospace industry
d) Textiles industry
View Answer

Answer: c
Explanation: There was a need to make sophisticated aircraft and satellite launch vehicles after the second world war. The manufacturing technology available during the late 1940s was not able to meet those challenges. Thus, the US Air Force approached the Massachusetts Institute of Technology to develop control technology for machine tools.

38. When was the Numerical Control first demonstrated?
a) 1952
b) 1960
c) 1966

d) 1969
View Answer

Answer: a
Explanation: In 1952 Numerical Control was demonstrated at Massachusetts Institute of Technology USA for the first time. A Numerical Control machine used paper tape and tape reader. Paper tape and tape readers were considered unreliable and error-prone.

39. Which type of computer did Direct Numerical Computer use?
a) Minicomputer
b) Mainframe computer
c) Microcomputer
d) Supercomputer
View Answer

Answer: b
Explanation: By the mid-1960s mainframe computers were used to control a group of Numerical Control machines which was called Direct Numerical Control. In Direct Numerical Control computer eliminated tape reader to transfer program data to the machine controller.

40. Computer Numerical Control machines use which type of computer?
a) Minicomputer
b) Mainframe computer
c) Microcomputer
d) Supercomputer
View Answer

Answer: a
Explanation: In the late 1960s, Numerical Control machines started using minicomputers and thus called Computer Numerical Control machines. In Computer Numerical Control paper tape and tape readers were replaced by the minicomputer.

41. _____ is known as the father of Numerical Control.
a) Blaise Pascal
b) John E. Parker
c) John Robinson Pierce
d) John T. Parsons
View Answer

Answer: d
Explanation: John T. Parsons received the Joseph Marie Jacquard Award for his outstanding contribution as the father of Numerical Control. He worked with the Massachusetts Institute of Technology. He directed the development of the first Numerical Control milling machine.

42. When did George C. Devol get patent for his robotic device "Programmed Article Transfer"?
a) 1952
b) 1954
c) 1961

d) 1962
View Answer

Answer: c
Explanation: The US patent for "Programmed Article Transfer" was granted in 1961. George C. Devol made the device for parts handling. Later the first industrial robot based on programmed article transfer was manufactured.

43. What was the name of the first industrial robot?
a) Fanuc
b) Unimate
c) Sophia
d) KITTX
View Answer

Answer: b
Explanation: Unimate was the first industrial robot employed at General Motors plant in New Jersey for unloading a die-casting machine. George C. Devol and Joseph Engelberger worked together for the production of Unimate.

44. Who has the most significant role in the evolution of Programmable Logic Controller (PLC)?
a) John E. Parker
b) George Schwenk
c) Sam Hoff
d) Richard Morley
View Answer

Answer: d
Explanation: On 1st January 1968, Richard Morley wrote the specifications of a programmable controller. He started working on that idea with his team at Bedford Associates. Later the team incorporated a new company and developed the first programmable controller model 084. It was named 084 because it was the 84th project of Bedford Associates.

45. What was the abbreviation of the Modular Digital Controller?
a) MODICON
b) MDC
c) MODICO
d) MDCON
View Answer

Answer: a
Explanation: Richard Morley and his team decided to start a new company. MODICON was incorporated in October 1968 and worked with Bedford Associates to develop the programmable controller 084. Bedford Associates got dissolved after the success of MODICON. In 1977 MODICON was sold to Gould.

46. Which device did industries use before the introduction of Programmable Logic Controller?
a) Microprocessor

b) Relays
c) Expert system
d) Artificial Intelligence
View Answer

Answer: b
Explanation: Before the invention of Programmable Logic Controller, relays were used to control machines. Relays work on the principle of an electromagnet. The electromagnet used to push or pull a bar attached with switch contact. That was called the electromechanical method of control.

47. Which of the following is CIM hardware?
a) Database management system
b) Flexible manufacturing system
c) Simulation program
d) Network management program
View Answer

Answer: b
Explanation: Flexible Manufacturing System comprises machine tools, automated equipment, etc. and thus it is hardware. The database management system, simulation program, and network management program are software.

48. Which of the following is a disadvantage of Computer Integrated Manufacturing?
a) High cost
b) Error-prone
c) Large no of workers requirement
d) Takes more time
View Answer

Answer: a
Explanation: Computer Integrated Manufacturing involves the use of computer systems and software packages. Their cost of purchase and set up is high. Maintenance of the system is also difficult and expensive.

49. Modems are CIM Software.
a) True
b) False
View Answer

Answer: b
Explanation: Modem is a hardware device. It is the short form of modulator-demodulator. A modem modulates and demodulates the signal. It enables the computer to send and receive data through a cable connection or telephone line.

50. Which is not an element of Computer Integrated Manufacturing?
a) Marketing
b) Mining
c) Product design
d) Warehousing
View Answer

Answer: b

Explanation: There are nine main elements of Computer Integrated Manufacturing. These are marketing, product design, planning, purchase, manufacturing engineering, factory automation hardware, warehousing, finance, and information management.

51. Information management involves _____
a) Manufacturing system integration
b) Accounting
c) Realization of the receipts
d) Fund allocation
View Answer

Answer: a

Explanation: Information management involves database management, communication, manufacturing system integration, master production scheduling, and management information systems. Realization of receipts, fund allocation, accounting, etc. are functions of the finance department.

52. Which is one of the functions of the marketing department?
a) Master production scheduling
b) Cash flow control
c) Investment planning
d) Product need identification
View Answer

Answer: d

Explanation: The function of the marketing department is to identify the need and specifications of a product. The marketing department decides the marketing strategy and projection of manufacturing quantities. It also assesses the economic viability of the product.

53. Which of the following comes under factory automation hardware?
a) Simulation program
b) Manually operated machine tools
c) Automated inspection system
d) Database management system
View Answer

Answer: c

Explanation: Factory automation hardware consists of Computer Numerical Control machine tools, flexible manufacturing system, robots, automated inspection systems, etc. Thus, factory automation hardware consists of Computer-controlled equipment.

54. Product design consists of which of the following activities?
a) CNC programming
b) Geometric Modelling
c) Storage of raw material
d) Production scheduling
View Answer

Answer: b

Explanation: In the product design geometric model of the proposed product is prepared

through Computer-Aided design software. The cost of production and available manufacturing technology are constraints in the product design process.

55. Which department is responsible for the procurement of materials?
a) Planning
b) Marketing
c) Purchase department
d) Manufacturing engineering
View Answer

Answer: c
Explanation: Purchase department place the purchase orders & follow up, receive items, ensure vendor product quality, supply items to store and ensure timely delivery of items. The planning department is responsible for making the production plan. The marketing department is responsible for product need identification, deciding specification, etc. and manufacturing engineering is responsible for production.

56. Which element of Computer Integrated Manufacturing involves CNC programming, simulation, and Computer-Aided scheduling?
a) Manufacturing engineering
b) Planning
c) Finance
d) Factory automation hardware
View Answer

Answer: a
Explanation: In Computer Integrated Manufacturing, manufacturing engineering involves CNC programming, simulation, and Computer-Aided scheduling of production activity. The objective of the manufacturing department is to ensure continuous production and meet the market demand.

57. What is the function of the warehousing department?
a) Production
b) Accounting
c) Storage and retrieval of items
d) Placing purchase order
View Answer

Answer: c
Explanation: Warehousing includes storage and retrieval of raw materials, components, and finished products. It also involves the shipment of products. Production is a manufacturing engineering function. Accounting comes under finance. Purchase department places the purchase order.

58. Which is not a function of finance?
a) Working capital management
b) Production planning
c) Investment planning
d) Cash flow control planning
View Answer

Answer: b
Explanation: Production planning is the responsibility of the planning department. Finance deals with money management. Planning for investment, working capital, cash flow control, accounting, allocation of funds, and realization of receipts are the duties of the finance department.

59. Which of the following belongs to the manufacturing equipment category of Computer Integrated Manufacturing hardware?
a) CAD/CAM systems
b) Barcode readers
c) Plotters
d) Inspection machines
View Answer

Answer: d
Explanation: Inspection machines, CNC machines, robotic work cells, flexible manufacturing systems, work handling & tool handling devices, storage devices, sensors, etc. are manufacturing equipment related hardware. CAD/CAM systems, plotters, and barcode readers are computer hardware.

60. What is the correct order of different levels of integration of Computer Integrated Manufacturing in an industry from the bottom to top?
a) Application integration, physical integration, business integration
b) Business integration, physical integration, application integration
c) Physical integration, application integration, business integration
d) Business integration, application integration, physical integration
View Answer

Answer: c
Explanation: Physical integration is the interconnection of physical systems which is the first requirement to be fulfilled. Application integration is the next level which includes communication between application users and system. The highest level of integration is business integration which involves management and operational activities of a firm.