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COIMBATORE – 641035



**19MCE304- DESIGN OF EMBEDDED SYSTEMS**

**MULTIPLE CHOICE QUESTIONS**

1. What defines an embedded system?

- A) It always includes a graphical user interface (GUI).
- B) It is a combination of hardware and software designed for a specific function.
- C) It requires internet connectivity to function.
- D) It must be powered by solar energy.

Answer: B) It is a combination of hardware and software designed for a specific function.

2. Which of the following is NOT a characteristic of embedded systems?

- A) Real-time operation
- B) General-purpose computing
- C) Limited resources (e.g., memory, processing power)
- D) Deterministic behavior

Answer: B) General-purpose computing

3. Which component is typically considered the "brain" of an embedded system?

- A) Microcontroller
- B) Memory module
- C) Power supply unit
- D) Display screen

Answer: A) Microcontroller

4. Which programming language is commonly used for embedded system development due to its efficiency and direct hardware control?

- A) Python
- B) Java
- C) C
- D) JavaScript

Answer: C) C

5. What is firmware in the context of embedded systems?

- A) Hardware components integrated into the system
- B) Software that provides user interfaces
- C) Permanent software programmed into a read-only memory
- D) Memory used for temporary data storage

Answer: C) Permanent software programmed into a read-only memory

6. Which type of memory in an embedded system is typically used for storing program instructions and data that can be modified during operation?

- A) ROM (Read-Only Memory)
- B) RAM (Random Access Memory)
- C) Flash memory
- D) Cache memory

Answer: B) RAM (Random Access Memory)

7. What is the primary role of sensors in embedded systems?

- A) To provide visual output
- B) To collect data from the environment
- C) To execute mathematical operations
- D) To store large amounts of data

Answer: B) To collect data from the environment

8. Which bus architecture is commonly used to connect peripheral devices to a microcontroller in embedded systems?

- A) PCI (Peripheral Component Interconnect)
- B) USB (Universal Serial Bus)
- C) I2C (Inter-Integrated Circuit)
- D) HDMI (High-Definition Multimedia Interface)

Answer: C) I2C (Inter-Integrated Circuit)

9. Which of the following is NOT a common communication protocol used in embedded systems?

- A) SPI (Serial Peripheral Interface)
- B) TCP/IP (Transmission Control Protocol/Internet Protocol)
- C) HTTP (Hypertext Transfer Protocol)
- D) CAN (Controller Area Network)

Answer: C) HTTP (Hypertext Transfer Protocol)

10. What does DMA (Direct Memory Access) enable in embedded systems?

- A) Allows devices to directly access main memory without CPU intervention
- B) Provides digital audio outputs
- C) Enables wireless communication
- D) Controls display screen resolutions

Answer: A) Allows devices to directly access main memory without CPU intervention

11. Which technique is used to conserve power consumption in battery-operated embedded systems?

- A) Increasing clock speed
- B) Using DMA for all data transfers
- C) Employing low-power modes
- D) Adding more peripherals

Answer: C) Employing low-power modes

12. What is a characteristic of real-time operating systems (RTOS) used in embedded systems?

- A) They prioritize general-purpose computing tasks.
- B) They can be easily installed on any computer.
- C) They provide deterministic response times to events.
- D) They do not support multitasking.

Answer: C) They provide deterministic response times to events.

13. Which of the following is an example of an embedded system application in the automotive industry?

- A) Video game console
- B) Smart thermostat
- C) Engine control unit
- D) Home security system

Answer: C) Engine control unit

14. What role does watchdog timer serve in embedded systems?

- A) Monitors the temperature of the system

- B) Provides real-time clock functions
- C) Resets the system if it detects a fault or hang-up
- D) Controls the display brightness

Answer: C) Resets the system if it detects a fault or hang-up

15. Which development tool is essential for debugging and analyzing software behavior in embedded systems?

- A) Oscilloscope
- B) Multimeter
- C) Logic analyzer
- D) Spectrum analyzer

Answer: C) Logic analyzer

16. Which of the following best defines the architecture of an embedded system?

- A) The physical dimensions and layout of the system
- B) The arrangement of hardware components and their interconnections
- C) The programming languages used for development
- D) The user interface design principles employed

Answer: B) The arrangement of hardware components and their interconnections

17. What typically serves as the central processing unit (CPU) in embedded systems?

- A) Graphics processing unit (GPU)
- B) Microcontroller
- C) Random Access Memory (RAM)
- D) Network Interface Card (NIC)

Answer: B) Microcontroller

18. Which of the following is a key characteristic of embedded system architectures?

- A) High availability of resources (e.g., memory, processing power)
- B) Heavy reliance on cloud computing
- C) Real-time operation and responsiveness
- D) Support for general-purpose applications

Answer: C) Real-time operation and responsiveness

19. What role does firmware play in embedded system architecture?

- A) Provides user interfaces for interaction
- B) Stores large volumes of data permanently
- C) Implements low-level control over hardware components
- D) Manages high-level application logic

Answer: C) Implements low-level control over hardware components

20. Which memory type in embedded systems is used for storing program instructions that can be modified during runtime?

- A) Read-Only Memory (ROM)
- B) Flash Memory
- C) Random Access Memory (RAM)
- D) Electrically Erasable Programmable Read-Only Memory (EEPROM)

Answer: C) Random Access Memory (RAM)

21. Which bus architecture is commonly used for communication between the CPU and peripheral devices in embedded systems?

- A) USB (Universal Serial Bus)
- B) PCI (Peripheral Component Interconnect)
- C) I2C (Inter-Integrated Circuit)
- D) HDMI (High-Definition Multimedia Interface)

Answer: C) I2C (Inter-Integrated Circuit)

22. What is the primary role of Real-Time Operating Systems (RTOS) in embedded system architecture?

- A) Provide support for multitasking and general-purpose applications
- B) Ensure deterministic response times to events and tasks
- C) Manage user interface interactions
- D) Optimize power consumption

Answer: B) Ensure deterministic response times to events and tasks

23. Which of the following is NOT typically a feature of Real-Time Operating Systems (RTOS) in embedded systems?

- A) Priority-based scheduling

- B) Multitasking capabilities
- C) Support for complex graphical user interfaces (GUIs)
- D) Deterministic execution times

Answer: C) Support for complex graphical user interfaces (GUIs)

24. What is the main purpose of watchdog timers in embedded system architecture?

- A) Monitor and maintain system temperature
- B) Provide accurate real-time clock functions
- C) Reset the system in case of software or hardware failures
- D) Control display screen brightness

Answer: C) Reset the system in case of software or hardware failures

25. Which communication protocol is commonly used for short-range communication between embedded systems and peripherals like sensors and actuators?

- A) Ethernet
- B) Bluetooth
- C) Wi-Fi
- D) LTE

Answer: B) Bluetooth

26. What role does Direct Memory Access (DMA) play in embedded system architecture?

- A) Allows peripherals to directly access the main memory without CPU intervention
- B) Enhances graphics rendering capabilities
- C) Provides wireless communication functionalities
- D) Facilitates video streaming

Answer: A) Allows peripherals to directly access the main memory without CPU intervention

27. Which of the following is an example of an embedded system application in the aerospace industry?

- A) Home automation system
- B) Mobile phone
- C) Flight control system
- D) Personal computer

Answer: C) Flight control system

28. What does Flash Memory primarily store in embedded systems?

- A) Program instructions that rarely change
- B) Temporary data during runtime
- C) Real-time sensor data
- D) Graphic images and multimedia content

Answer: A) Program instructions that rarely change

29. What is the essential function of an Analog-to-Digital Converter (ADC) in embedded system architecture?

- A) Convert digital signals into analog signals
- B) Convert analog signals from sensors into digital data
- C) Facilitate wireless communication
- D) Provide real-time clock functionalities

Answer: B) Convert analog signals from sensors into digital data

30. Which development tool is crucial for debugging and analyzing software behavior in embedded system architecture?

- A) Oscilloscope
- B) Multimeter
- C) Logic analyzer
- D) Spectrum analyzer

Answer: C) Logic analyzer