**1. Which of the following best describes an embedded system?**

A) A general-purpose computer system  
B) A hardware-software co-designed system for specific tasks  
C) A system only consisting of hardware components  
D) A system used exclusively for real-time operations  
**Answer:** B

**2. What is the role of a microcontroller in an embedded system?**

A) To act as a general-purpose CPU  
B) To provide external interfaces for communication  
C) To control the specific functionality of the system  
D) To replace external sensors and actuators  
**Answer:** C

**3. Which memory type is generally used for storing firmware in embedded systems?**

A) RAM  
B) EEPROM  
C) ROM  
D) Flash Memory  
**Answer:** D

**4. Real-time embedded systems are characterized by:**

A) High processing power requirements  
B) Ability to respond within a defined time constraint  
C) Minimal hardware components  
D) Extensive multitasking capability  
**Answer:** B

**5. Which communication protocol is widely used in automotive embedded systems?**

A) Ethernet  
B) UART  
C) CAN (Controller Area Network)  
D) SPI  
**Answer:** C

**6. What is the main advantage of using an RTOS (Real-Time Operating System) in embedded systems?**

A) Improved system boot time  
B) Guaranteed task scheduling within deadlines  
C) Reduced power consumption  
D) Elimination of hardware components  
**Answer:** B

**7. Which of the following is NOT an example of an embedded system?**

A) Washing machine controller  
B) Smart thermostat  
C) Web server on a PC  
D) Industrial robotic arm  
**Answer:** C

**8. What is the purpose of watchdog timers in embedded systems?**

A) To manage data storage  
B) To reset the system in case of malfunction  
C) To control power supply voltage levels  
D) To monitor the system clock  
**Answer:** B

**9. In embedded systems, interrupt handling is crucial for:**

A) Sequential execution of code  
B) Saving power in low-power modes  
C) Responding promptly to external or internal events  
D) Increasing overall system complexity  
**Answer:** C

**10. Which of the following is a low-power communication protocol often used in IoT-based embedded systems?**

A) TCP/IP  
B) Bluetooth Low Energy (BLE)  
C) RS-232  
D) HDMI  
**Answer:** B

### 11. Which bus is commonly used in embedded systems for interfacing peripherals?

A) USB  
B) I2C  
C) HDMI  
D) SATA  
**Answer:** B

### 12. In embedded systems, what is "polling"?

A) Continuously checking the status of a device  
B) Sending data to multiple devices simultaneously  
C) Interrupt-driven task management  
D) Dynamic memory allocation  
**Answer:** A

### 13. What is the typical role of a ****bootloader**** in an embedded system?

A) Perform system diagnostics  
B) Manage memory allocation for tasks  
C) Initialize hardware and load the main application code  
D) Provide debugging tools  
**Answer:** C

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

A) Highly specialized functionality  
B) High power consumption  
C) Real-time performance  
D) Low resource requirements  
**Answer:** B

### 15. The term ****"in-circuit debugging"**** refers to:

A) Testing a circuit without removing components  
B) Debugging while the device is powered off  
C) Debugging software using simulation  
D) Debugging software directly on the hardware  
**Answer:** D

### 16. ARM processors are commonly used in embedded systems because:

A) They have high power consumption  
B) They are designed for specific operating systems only  
C) They are energy-efficient and scalable  
D) They lack hardware-level security features  
**Answer:** C

### 17. What is a key disadvantage of using polling instead of interrupts?

A) Higher complexity in implementation  
B) Reduced system responsiveness  
C) Increased hardware requirements  
D) Incompatibility with embedded processors  
**Answer:** B

### 18. Which of these is an example of a real-time embedded system?

A) Digital camera  
B) Smartwatch  
C) Heart rate monitor in a pacemaker  
D) Video game console  
**Answer:** C

### 19. Which hardware component is responsible for handling multiple peripherals in an embedded system?

A) CPU  
B) Peripheral Interface Controller  
C) Timer module  
D) Interrupt controller  
**Answer:** D

### 20. DMA (Direct Memory Access) is used in embedded systems to:

A) Reduce CPU load during data transfers  
B) Increase the speed of ALU operations  
C) Access multiple memory locations simultaneously  
D) Manage power consumption in peripherals  
**Answer:** A