ECA14- SAMPLE MCQ QUESTIONS

Unit 1 – MCQs

1. Introduction to Embedded Computing

Q1: Which of the following is NOT a characteristic of an embedded system?
A) Dedicated functionality
B) Real-time operation
C) High power consumption
D) Limited user interface

✅ **Answer:** C) High power consumption

Q2: Which of the following applications is an example of an embedded system?
A) Personal computer
B) Microwave oven controller
C) Web browser
D) Database management system

✅ **Answer:** B) Microwave oven controller

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2. Complex Systems and Microprocessors

Q3: Which component in an embedded system is responsible for executing program instructions?
A) Sensor
B) Actuator
C) Microcontroller
D) Power supply

✅ **Answer:** C) Microcontroller

Q4: Which of the following memory types is **non-volatile**?
A) RAM
B) DRAM
C) ROM
D) Cache

✅ **Answer:** C) ROM

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3. Embedded System Design Process

Q5: What is the first step in an embedded system design process?
A) System specification
B) Coding
C) Testing
D) Debugging

✅ **Answer:** A) System specification

Q6: Which of the following is the **main** constraint in embedded system design?
A) Power consumption
B) User interaction
C) High-speed performance
D) General-purpose computing

✅ **Answer:** A) Power consumption

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4. Formalisms for System Design

Q7: Which of the following formal models is **most suitable** for modeling real-time embedded systems?
A) Finite State Machines (FSM)
B) Data Flow Graphs (DFG)
C) Petri Nets
D) UML Diagrams

✅ **Answer:** C) Petri Nets

Q8: In an embedded system, a **real-time operating system (RTOS)** is mainly used to:
A) Improve power efficiency
B) Provide a predictable response time
C) Reduce hardware cost
D) Increase graphical user interface (GUI) performance

✅ **Answer:** B) Provide a predictable response time

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5. Design Examples

Q9: A **washing machine control system** is an example of which type of embedded system?
A) Hard real-time system
B) Soft real-time system
C) General-purpose system
D) Networked system

✅ **Answer:** B) Soft real-time system

Q10: In a digital camera, which component is primarily responsible for **image processing**?
A) ADC (Analog-to-Digital Converter)
B) DSP (Digital Signal Processor)
C) Flash memory
D) Power management unit

✅ **Answer:** B) DSP (Digital Signal Processor)

Question 1:
What is a primary characteristic of embedded systems? (CO1)

Option_a: High performance computing
Option_b: General-purpose processing
Option_c: Dedicated functionality
Option_d: Multi-tasking
Correct_option: Dedicated functionality

Question 2:
Which of the following is a typical application of embedded computing? (CO1)

Option_a: Personal computers
Option_b: Smartphones
Option_c: Washing machines
Option_d: Web servers
Correct_option: Washing machines

Question 3:
Which of the following is NOT a characteristic of embedded computing applications? (CO1)
Question 3:

Option_a: Real-time operation
Option_b: Resource constraints (memory, power, etc.)
Option_c: Complex user interfaces
Option_d: Dedicated functionality
Correct_option: Complex user interfaces

Question 4:
Embedded systems are designed to perform: (CO1)

Option_a: A variety of tasks
Option_b: One specific task
Option_c: Data processing

Option_d: Complex algorithms
Correct_option: One specific task

Question 5:
Which of the following is a key design constraint in embedded computing? (CO1)

Option_a: Large memory
Option_b: Long execution times
Option_c: Limited power and resources
Option_d: High-speed processors
Correct_option: Limited power and resources

Question 6:
Real-time performance in embedded systems means that: (CO1)

Option_a: Tasks are completed in order
Option_b: Tasks are completed with guaranteed deadlines
Option_c: The system performs efficiently under load
Option_d: The system can multitask
Correct_option: Tasks are completed with guaranteed deadlines

Question 7:
Which of the following is a typical feature of an embedded system's processor? (CO1)

Option_a: High processing power
Option_b: High clock speed
Option_c: Energy-efficient operation
Option_d: Multi-core design
Correct_option: Energy-efficient operation

Question 8:
Embedded systems often operate in environments with: (CO1)

Option_a: Unstable power supplies
Option_b: Stable temperatures
Option_c: High processing demands
Option_d: Frequent updates
Correct_option: Unstable power supplies

Question 9:
What is an example of an embedded system used in automotive applications? (CO1)

Option_a: GPS navigation system
Option_b: Web browser
Option_c: Operating system
Option_d: Email server
Correct_option: GPS navigation system

Question 10:
Which of the following is most commonly used to program embedded systems? (CO1)

Option_a: High-level programming languages (e.g., Java)
Option_b: Assembly languages
Option_c: SQL databases
Option_d: Cloud-based platforms
Correct_option: Assembly languages

Question 11:
Which of the following defines the "reliability" characteristic of embedded systems? (CO1)

Option_a: Ability to multitask
Option_b: Consistent performance without failure
Option_c: High-speed processing
Option_d: Ability to handle complex operations
Correct_option: Consistent performance without failure

Question 12:
Embedded computing applications are typically designed to be: (CO1)

Option_a: General-purpose
Option_b: Resource-intensive
Option_c: Task-specific
Option_d: Multi-user systems
Correct_option: Task-specific

Question 13:
Which factor is most critical for embedded systems to ensure energy efficiency? (CO1)

Option_a: High memory bandwidth
Option_b: Optimized power consumption
Option_c: High computational speed
Option_d: Complex user interfaces
Correct_option: Optimized power consumption

Question 14:
The main feature of embedded systems is that they: (CO1)

Option_a: Can be easily upgraded
Option_b: Perform specific functions within larger systems
Option_c: Require constant human interaction
Option_d: Have user interfaces
Correct_option: Perform specific functions within larger systems

Question 15:
Which of the following embedded system applications requires high reliability? (CO1)

Option_a: Home automation systems
Option_b: Personal computers
Option_c: Medical devices
Option_d: Desktop software
Correct_option: Medical devices

Question 16:
Which of the following is NOT a real-time characteristic of embedded systems? (CO1)

Option_a: Predictability of task completion
Option_b: Time-critical operations
Option_c: Ability to process multiple tasks simultaneously
Option_d: Meeting deadlines
Correct_option: Ability to process multiple tasks simultaneously

Question 17:
In embedded systems, hardware and software are: (CO1)

Option_a: Developed separately and can be easily swapped
Option_b: Typically tightly integrated and optimized together
Option_c: Often independent of one another
Option_d: Interchangeable with other systems
Correct_option: Typically tightly integrated and optimized together

Question 18:
Which is a common requirement for embedded systems in industrial applications? (CO1)

Option_a: High network connectivity
Option_b: High security and fault tolerance
Option_c: Complex user interfaces
Option_d: Large processing power
Correct_option: High security and fault tolerance

Question 19:
Which of the following best describes the interaction between embedded systems and their environment? (CO1)

Option_a: Continuous user input
Option_b: Automated control with minimal human interaction
Option_c: Complex data exchange
Option_d: Multi-user management
Correct_option: Automated control with minimal human interaction

Question 20
In embedded systems, what is meant by “real-time” processing?

Option_a: Processing tasks based on user inputs
Option_b: Processing data in a fixed and predictable time frame
Option_c: Multitasking with no set time frame
Option_d: Processing tasks only when the system is idle
Correct_option: Processing data in a fixed and predictable time frame

Question 21:
Which of the following is a major challenge in embedded computing system design? (CO1)

Option_a: High computational power
Option_b: Minimizing power consumption
Option_c: Maximizing user interface complexity
Option_d: Large memory storage
Correct_option: Minimizing power consumption

Question 22:
Which of the following is a significant design challenge for embedded systems regarding power? (CO1)

Option_a: Ensuring high clock speeds
Option_b: Managing power consumption effectively
Option_c: Optimizing processing time
Option_d: Increasing memory capacity
Correct_option: Managing power consumption effectively

Question 2
The integration of hardware and software in embedded systems poses which challenge? (CO1)

Option_a: Easy troubleshooting
Option_b: Resource management
Option_c: High-level language compatibility
Option_d: Complex debugging processes
Correct_option: Complex debugging processes

Question 24:
Which factor makes real-time performance a challenge in embedded systems? (CO1)

Option_a: Multi-user support
Option_b: Meeting strict timing constraints
Option_c: Complex user interfaces
Option_d: Availability of high-end processors
Correct_option: Meeting strict timing constraints

Question 25:
Which of the following is a common challenge in embedded system design regarding size and form factor? (CO1

Option_a: Ensuring large screen size
Option_b: Keeping the system's form factor compact
Option_c: Providing numerous connectivity options
Option_d: Maximizing input/output ports
Correct_option: Keeping the system's form factor compact

Question 26: START
What is a key challenge for embedded systems in automotive applications? (CO1)
Question 26: END

Option_a: Low-cost components
Option_b: Operating under extreme environmental conditions
Option_c: Complex software algorithms
Option_d: Long-term software updates
Correct_option: Operating under extreme environmental conditions

Question 27: START
Which of the following represents a challenge related to security in embedded system design? (CO1)
Question 27: END

Option_a: Enabling easy software updates
Option_b: Securing communication and data storage
Option_c: Maximizing clock speed

Option_d: Optimizing power efficiency
Correct_option: Securing communication and data storage

Question 28: START
In embedded system design, ensuring system reliability is critical due to: (CO1)
Question 28: END

Option_a: The need for fast processing
Option_b: The need for long-term, failure-free operation
Option_c: The ability to process multiple tasks at once
Option_d: A focus on visual interfaces
Correct_option: The need for long-term, failure-free operation

Question 29: START
The challenge of meeting tight resource constraints in embedded systems affects: (CO1)
Question 29: END

Option_a: Memory and processing speed
Option_b: Power consumption and processing speed
Option_c: Power consumption and size
Option_d: Memory and power consumption
Correct_option: Memory and power consumption

Question 30: START
Which of the following challenges in embedded systems relates to maintaining system performance over time? (CO1)
Question 30: END

Option_a: Software development complexity
Option_b: Long-term reliability and endurance
Option_c: High processing requirements
Option_d: Increasing the system size
Correct_option: Long-term reliability and endurance

Question 31: START
Which of the following is a challenge in embedded systems concerning software design? (CO1)
Question 31: END

Option_a: Creating complex user interfaces
Option_b: Efficiently managing memory and storage
Option_c: Handling multi-threading tasks
Option_d: Writing high-level code in popular languages
Correct_option: Efficiently managing memory and storage

Question 32: START
When designing embedded systems, managing communication between components can be challenging due to: (CO1)
Question 32: END

Option_a: Communication protocols compatibility
Option_b: High processing power needs
Option_c: Software update requirements
Option_d: Security threats
Correct_option: Communication protocols compatibility

Question 33: START
Which of the following presents a challenge for embedded systems in mobile devices? (CO1)
Question 33: END

Option_a: Excessive processing power
Option_b: Maintaining high performance with limited battery life
Option_c: Large memory requirements
Option_d: Complicated user interfaces
Correct_option: Maintaining high performance with limited battery life

Question 34: START
What is a key challenge in ensuring real-time operations in embedded systems? (CO1)
Question 34: END

Option_a: Large data storage capacity
Option_b: Meeting strict deadlines for task execution
Option_c: Complex hardware components
Option_d: High-speed internet access
Correct_option: Meeting strict deadlines for task execution

Question 35: START
Which challenge is associated with the long lifecycle of embedded systems? (CO1)
Question 35: END

Option_a: Frequent system updates
Option_b: Designing for long-term stability and support
Option_c: Short product cycles
Option_d: Rapid technological advancements
Correct_option: Designing for long-term stability and support

Question 36: START
What is the challenge of integrating IoT functionality in embedded systems? (CO1)

Question 36: END

Option_a: High cost of IoT devices
Option_b: Ensuring secure and reliable connectivity
Option_c: Low power consumption requirements
Option_d: Limited access to sensors
Correct_option: Ensuring secure and reliable connectivity

Question 37: START
Which of the following is a challenge when designing embedded systems for medical devices? (CO1)
Question 37: END

Option_a: Simplified interfaces for patients
Option_b: High-speed processing for diagnostics
Option_c: Ensuring compliance with regulatory standards
Option_d: Large system footprints
Correct_option: Ensuring compliance with regulatory standards

Question 38: START
Which of the following is a challenge when dealing with embedded systems for remote sensing? (CO1)
Question 38: END

Option_a: Overcoming long-range communication limitations
Option_b: Minimizing the size of hardware components
Option_c: Providing extensive local storage
Option_d: Designing for high energy consumption
Correct_option: Overcoming long-range communication limitations

Question 39: START
The need for low-cost components in embedded systems often leads to which challenge? (CO1)
Question 39: END

Option_a: Increased design complexity
Option_b: Reduced system size
Option_c: Higher power consumption
Option_d: Higher memory requirements
Correct_option: Increased design complexity

Question 40: START
A significant challenge in the design of embedded systems for consumer electronics is: (CO1)
Question 40: END

Option_a: Maximizing screen resolution
Option_b: Ensuring fast internet access
Option_c: Balancing cost and performance requirements
Option_d: Incorporating large memory sizes
Correct_option: Balancing cost and performance requirements

Question 41: START
Which of the following is an essential performance metric in embedded computing? (CO1)
Question 41: END

Option_a: Memory bandwidth
Option_b: System startup time
Option_c: User interface complexity
Option_d: Data transmission rate
Correct_option: Memory bandwidth

Question 42: START
In embedded computing, what does "throughput" refer to? (CO1)
Question 42: END

Option_a: Time taken to process a single task
Option_b: Amount of data processed per unit time
Option_c: Time to boot the system
Option_d: Power consumption over time
Correct_option: Amount of data processed per unit time

Question 43: START
Which factor most directly affects the performance of an embedded system? (CO1)
Question 43: END

Option_a: Processor clock speed
Option_b: User interface design
Option_c: System form factor
Option_d: External connectivity
Correct_option: Processor clock speed

Question 44: START
What is a common challenge to achieving high performance in embedded systems? (CO1)
Question 44: END

Option_a: Excessive power consumption
Option_b: Limited memory and resources
Option_c: Complex user interfaces
Option_d: High-speed networking
Correct_option: Limited memory and resources

Question 45: START
Which of the following can improve the performance of an embedded system? (CO1)
Question 45: END

Option_a: Increasing the size of the system
Option_b: Using a more powerful processor
Option_c: Reducing system reliability
Option_d: Adding more peripheral devices
Correct_option: Using a more powerful processor

Question 46: START
In embedded systems, what does "latency" refer to? (CO1)
Question 46: END

Option_a: Time taken for system startup
Option_b: Time taken for a signal or data to travel through the system
Option_c: Total power consumption
Option_d: Number of instructions processed per second
Correct_option: Time taken for a signal or data to travel through the system

Question 47: START
To achieve better performance, embedded systems often need to balance which two factors? (CO1)
Question 47: END

Option_a: Power consumption and memory size
Option_b: Processing speed and power consumption
Option_c: Size and performance
Option_d: Security and data throughput
Correct_option: Processing speed and power consumption

Question 48: START
Which of the following approaches is used to enhance the performance of embedded systems without increasing the hardware cost? (CO1)
Question 48: END

Option_a: Code optimization
Option_b: Increasing processor clock speed
Option_c: Expanding the memory capacity
Option_d: Increasing the number of input/output ports
Correct_option: Code optimization

Question 49: START
Which of the following types of embedded systems typically requires high performance?

(CO1)
Question 49: END

Option_a: Medical devices
Option_b: Smart home appliances
Option_c: Traffic lights
Option_d: Heating systems
Correct_option: Medical devices

Question 50: START
In embedded computing, the term "scalability" refers to: (CO1)
Question 50: END

Option_a: The ability to handle increased load or size
Option_b: The system’s ability to operate with multiple processors
Option_c: The speed at which tasks are completed
Option_d: The quality of user interface design
Correct_option: The ability to handle increased load or size

Question 51: START
What is the first step in the embedded system design process? (CO1)
Question 51: END

Option_a: System implementation
Option_b: Requirements analysis and specification
Option_c: System testing
Option_d: Hardware integration
Correct_option: Requirements analysis and specification

Question 52: START
Which document typically defines the user needs, constraints, and overall system objectives in embedded system design? (CO1)
Question 52: END

Option_a: Design specification
Option_b: System architecture document
Option_c: Requirement specification
Option_d: Test plan
Correct_option: Requirement specification

Question 53: START
The "conceptual design" phase in embedded system design focuses on: (CO1)
Question 53: END

Option_a: Implementing hardware components
Option_b: Defining high-level system architecture

Option_c: Writing application code
Option_d: System testing
Correct_option: Defining high-level system architecture

Question 54: START
What is the goal of the "system-level design" phase in embedded system development? (CO1)
Question 54: END

Option_a: Developing the hardware components
Option_b: Designing the system's software algorithms
Option_c: Mapping out the interaction between hardware and software
Option_d: Conducting unit tests
Correct_option: Mapping out the interaction between hardware and software

Question 55: START
During the "hardware design" phase of the embedded system design process, which of the following tasks is performed? (CO1)
Question 55: END

Option_a: Writing the system’s firmware
Option_b: Developing hardware components (e.g., microcontrollers)
Option_c: Designing the software interface
Option_d: Conducting system-level integration
Correct_option: Developing hardware components (e.g., microcontrollers)

Question 56: START
The main focus of the "software development" phase in embedded system design is to: (CO1)
Question 56: END

Option_a: Write and test the embedded software/firmware
Option_b: Define system requirements
Option_c: Design the hardware architecture
Option_d: Integrate hardware and software
Correct_option: Write and test the embedded software/firmware

Question 57: START
The "integration" phase of embedded system design focuses on: (CO1)
Question 57: END

Option_a: Combining hardware and software to create a working prototype
Option_b: Testing individual hardware components
Option_c: Defining system requirements and constraints

Option_d: Writing test cases for the software
Correct_option: Combining hardware and software to create a working prototype

Question 58: START
Which of the following is the primary goal of the "verification" phase in embedded system design? (CO1)
Question 58: END

Option_a: Ensuring the system meets specified design and functional requirements
Option_b: Finalizing the hardware components
Option_c: Optimizing the software for performance
Option_d: Writing detailed documentation
Correct_option: Ensuring the system meets specified design and functional requirements

Question 59: START
What is the primary goal during the "testing" phase of embedded system design? (CO1)
Question 59: END

Option_a: Verifying if the hardware works correctly
Option_b: Ensuring the system functions under real-world conditions
Option_c: Testing the software only
Option_d: Ensuring that the system is cost-effective
Correct_option: Ensuring the system functions under real-world conditions

Question 60: START
Which of the following is the main focus of the "maintenance" phase in embedded system design? (CO1)
Question 60: END

Option_a: Modifying and updating the system to accommodate new requirements
Option_b: Preparing the system for the release phase
Option_c: Initial hardware design
Option_d: Adding new features after deployment
Correct_option: Modifying and updating the system to accommodate new requirements

Question 61: START
The "hardware design" phase of embedded system design typically includes: (CO1)
Question 61: END

Option_a: Defining system specifications
Option_b: Designing and developing microcontrollers, sensors, and other hardware components
Option_c: Writing application code
Option_d: Creating software algorithms

Correct_option: Designing and developing microcontrollers, sensors, and other hardware components

Question 62: START
Which phase of embedded system design focuses on selecting the software development tools and environment? (CO1)
Question 62: END

Option_a: System-level design
Option_b: Software development
Option_c: Prototyping
Option_d: Testing
Correct_option: Software development

Question 63: START
What is the primary objective of the "prototyping" phase in embedded system design? (CO1)
Question 63: END

Option_a: Designing hardware components
Option_b: Building and testing a physical prototype of the system
Option_c: Developing and testing software algorithms
Option_d: Finalizing the system specifications
Correct_option: Building and testing a physical prototype of the system

Question 64: START
During which phase of embedded system design are design reviews typically conducted? (CO1)
Question 64: END

Option_a: Design specification
Option_b: Prototyping
Option_c: Conceptual design
Option_d: Integration
Correct_option: Design specification

Question 65: START
Which design tool is primarily used during the "hardware design" phase of embedded system development? (CO1)
Question 65: END

Option_a: IDE (Integrated Development Environment)
Option_b: PCB design software
Option_c: Simulation software
Option_d: Version control system
Correct_option: PCB design software

Question 66: START
Which testing type is commonly conducted in the "unit testing" phase of embedded system design? (CO1)
Question 66: END

Option_a: Testing individual components of hardware
Option_b: Testing the system with external inputs
Option_c: Testing individual software modules for correctness
Option_d: System-wide testing
Correct_option: Testing individual software modules for correctness

Question 67: START
In the "integration" phase of embedded system design, what is typically validated? (CO1)
Question 67: END

Option_a: Ensuring that hardware components are working individually
Option_b: Ensuring that hardware and software work together as expected
Option_c: Finalizing the software code
Option_d: Testing the software interfaces
Correct_option: Ensuring that hardware and software work together as expected

Question 68: START
Which of the following is a key activity during the "deployment" phase of the embedded system design process? (CO1)
Question 68: END

Option_a: Installing the embedded system in the field or customer environment
Option_b: Writing the software code
Option_c: Designing the system architecture
Option_d: Conducting unit tests
Correct_option: Installing the embedded system in the field or customer environment

Question 69: START
What is the primary goal of the "prototype testing" phase? (CO1)
Question 69: END

Option_a: Verifying the system design with the actual hardware and software implementation
Option_b: Writing detailed documentation
Option_c: Selecting hardware components
Option_d: Optimizing software performance
Correct_option: Verifying the system design with the actual hardware and software implementation

Question 70: START
What is the purpose of "system validation" in the embedded system design process? (CO1)
Question 70: END

Option_a: Verifying that the system meets user needs and requirements
Option_b: Testing individual components
Option_c: Defining the system specifications
Option_d: Deploying the system in the field
Correct_option: Verifying that the system meets user needs and requirements

Question 71: START
Which of the following is a key consideration when designing an embedded system architecture? (CO1)
Question 71: END

Option_a: Power consumption
Option_b: The programming language used
Option_c: The number of input/output ports
Option_d: User interface design
Correct_option: Power consumption

Question 72: START
What is the main advantage of using a microcontroller-based architecture in embedded systems? (CO1)
Question 72: END

Option_a: Increased processing power
Option_b: Lower cost and reduced size
Option_c: Enhanced memory capacity
Option_d: Easier software debugging
Correct_option: Lower cost and reduced size

Question 73: START
Which of the following components typically forms the core of an embedded system architecture? (CO1)
Question 73: END

Option_a: RAM
Option_b: Microprocessor or microcontroller
Option_c: Display screen
Option_d: User interface
Correct_option: Microprocessor or microcontroller

Question 74: START
In an embedded system architecture, what is the purpose of an interrupt controller? (CO1)
Question 74: END

Option_a: To manage data storage
Option_b: To handle communication with peripherals
Option_c: To prioritize and manage interrupts from different sources
Option_d: To control power consumption
Correct_option: To prioritize and manage interrupts from different sources

Question 75: START
What role does memory play in embedded system architecture design? (CO1)
Question 75: END

Option_a: It stores the operating system
Option_b: It stores the firmware and data
Option_c: It enhances system clock speed
Option_d: It allows wireless communication
Correct_option: It stores the firmware and data

Question 76: START
What is a key difference between RISC (Reduced Instruction Set Computing) and CISC (Complex Instruction Set Computing) in embedded system architecture? (CO1)
Question 76: END

Option_a: RISC has a larger number of instructions than CISC
Option_b: CISC uses simpler instructions than RISC
Option_c: RISC processors are typically more energy-efficient
Option_d: CISC processors require less memory than RISC
Correct_option: RISC processors are typically more energy-efficient

Question 77: START
Which of the following is a common communication protocol used in embedded systems for inter-device communication? (CO1)
Question 77: END

Option_a: HTTP
Option_b: SPI (Serial Peripheral Interface)
Option_c: FTP
Option_d: SMTP
Correct_option: SPI (Serial Peripheral Interface)

Question 78: START
Which factor is most crucial when designing the architecture for a real-time embedded

system? (CO1)
Question 78: END

Option_a: The size of the memory
Option_b: The real-time response requirements
Option_c: The type of software programming language
Option_d: The complexity of the user interface
Correct_option: The real-time response requirements

Question 79: START
In embedded system design, which of the following architectural features is critical for achieving low power consumption? (CO1)
Question 79: END

Option_a: High clock speed
Option_b: Power management techniques such as sleep modes
Option_c: Large memory capacity
Option_d: Complex input/output peripherals
Correct_option: Power management techniques such as sleep modes

Question 80: START
What is the significance of selecting a suitable bus architecture in embedded systems? (CO1)
Question 80: END

Option_a: It improves the system’s communication speed and efficiency
Option_b: It enhances the visual display of the system
Option_c: It decreases the system’s processing power
Option_d: It reduces the amount of memory required
Correct_option: It improves the system’s communication speed and efficiency

Question 81: START
Which of the following is the primary purpose of using formal methods in embedded system design? (CO1)
Question 81: END

Option_a: To reduce the system's power consumption
Option_b: To mathematically verify the correctness and reliability of the system
Option_c: To increase the system’s clock speed
Option_d: To improve the system’s user interface
Correct_option: To mathematically verify the correctness and reliability of the system

Question 82: START
Which formalism is often used for specifying the behavior of a system using finite state machines (FSMs)? (CO1)
Question 82: END

Option_a: Temporal logic
Option_b: Automata theory
Option_c: Petri nets
Option_d: Signal-flow diagrams
Correct_option: Automata theory

Question 83: START
Which of the following formal methods is used to describe the logical relationships between variables in a system design? (CO1)
Question 83: END

Option_a: State transition diagrams
Option_b: Algebraic specification
Option_c: Process calculi
Option_d: Harel diagrams
Correct_option: Algebraic specification

Question 84: START
What is the advantage of using temporal logic in embedded system design? (CO1)
Question 84: END

Option_a: It defines the system's inputs and outputs
Option_b: It specifies the timing constraints and order of events
Option_c: It models the system's physical components
Option_d: It simplifies the coding process
Correct_option: It specifies the timing constraints and order of events

Question 85: START
Which formal method is commonly used for modeling concurrency and parallelism in embedded system design? (CO1)
Question 85: END

Option_a: Finite state machines
Option_b: Petri nets
Option_c: UML (Unified Modeling Language)
Option_d: Synchronous dataflow graphs
Correct_option: Petri nets

Question 86: START
Which of the following formal techniques is based on the mathematical abstraction of events and transitions? (CO1)
Question 86: END

Option_a: UML state diagrams
Option_b: Model checking

Option_c: Finite state machines
Option_d: Data flow diagrams
Correct_option: Finite state machines

Question 87: START
Which formalism focuses on the interaction and communication between various components in an embedded system? (CO1)
Question 87: END

Option_a: Petri nets
Option_b: State transition diagrams
Option_c: Synchronous data flow
Option_d: Signal flow diagrams
Correct_option: Petri nets

Question 88: START
In the context of formal methods, what does "model checking" aim to achieve? (CO1)
Question 88: END

Option_a: Verifying the system's performance in terms of speed
Option_b: Validating that the system satisfies specified properties or constraints
Option_c: Generating code for the system
Option_d: Designing the system's architecture
Correct_option: Validating that the system satisfies specified properties or constraints

Question 89: START
Which formal method allows for the verification of real-time properties, such as deadlines and timing constraints, in embedded systems? (CO1)
Question 89: END

Option_a: Timed automata
Option_b: Finite state machines
Option_c: Data flow analysis
Option_d: Modal logic
Correct_option: Timed automata

Question 90: START
What is the role of “abstraction” in formal system design? (CO1)
Question 90: END

Option_a: To hide unnecessary details and focus on essential system behaviors
Option_b: To define the physical components of the system
Option_c: To define the system’s hardware interface

Option_d: To optimize the system’s energy usage
Correct_option: To hide unnecessary details and focus on essential system behaviors

Question 91: START
Which formalism is best suited for describing the flow of data through a system and ensuring that data dependencies are met? (CO1)
Question 91: END

Option_a: Synchronous data flow (SDF)
Option_b: Finite state machines
Option_c: Petri nets
Option_d: Timed automata
Correct_option: Synchronous data flow (SDF)

Question 92: START
Which formalism is used to describe systems where different components interact through message passing and synchronization? (CO1)
Question 92: END

Option_a: Process algebra
Option_b: UML sequence diagrams
Option_c: Data flow models
Option_d: Finite state machines
Correct_option: Process algebra

Question 93: START
What is the primary function of "state transition diagrams" in embedded system design? (CO1)
Question 93: END

Option_a: To represent the system’s timing constraints
Option_b: To model the system’s behavior based on states and transitions
Option_c: To model data flow between components
Option_d: To describe the system’s hardware components
Correct_option: To model the system’s behavior based on states and transitions

Question 94: START
Which formalism is suitable for verifying if a system adheres to a set of temporal properties such as safety and liveness? (CO1)
Question 94: END

Option_a: Model checking
Option_b: Data flow analysis
Option_c: Petri nets

Option_d: Structured analysis
Correct_option: Model checking

Question 95: START
Which formal method is based on describing a system's behavior using a set of rules and logical propositions? (CO1)
Question 95: END

Option_a: Algebraic specification
Option_b: Finite state machines
Option_c: Process calculi
Option_d: UML modeling
Correct_option: Algebraic specification

Question 96: START
What does the "control flow" in system design represent in formal system modeling? (CO1)
Question 96: END

Option_a: The order in which events or processes are executed
Option_b: The flow of data through the system
Option_c: The system's power consumption
Option_d: The design constraints of the system
Correct_option: The order in which events or processes are executed

Question 97: START
Which formalism uses graphs to model the flow of tokens (events) between places and transitions, often used to represent systems with concurrency? (CO1)
Question 97: END

Option_a: Petri nets
Option_b: Finite state machines
Option_c: State transition diagrams
Option_d: Timed automata
Correct_option: Petri nets

Question 98: START
In embedded system design, which formal method is widely used to model and verify communication protocols? (CO1)
Question 98: END

Option_a: Petri nets
Option_b: UML sequence diagrams
Option_c: Timed automata
Option_d: Data flow analysis
Correct_option: Petri nets

Question 99: START
In formal system design, what is the purpose of "refinement" in the process of moving from an abstract specification to a concrete system? (CO1)
Question 99: END

Option_a: To increase the system’s performance
Option_b: To break down abstract models into more detailed and implementable models
Option_c: To ensure the system’s hardware is compatible
Option_d: To simplify the software code
Correct_option: To break down abstract models into more detailed and implementable models

Question 100: START
Which formal method is specifically designed to model systems where communication between components occurs synchronously? (CO1)
Question 100: END

Option_a: Synchronous data flow (SDF)
Option_b: Timed automata
Option_c: Finite state machines
Option_d: Data flow models
Correct_option: Synchronous data flow (SDF)

Question 101: START
What is the purpose of structural diagrams in UML (Unified Modeling Language)? (CO1)
Question 101: END

Option_a: To show the system’s dynamic behavior
Option_b: To define system interactions and communication
Option_c: To describe the static structure of a system
Option_d: To model the system's activities and workflows
Correct_option: To describe the static structure of a system

Question 102: START
Which UML diagram is primarily used for representing the static structure of a system by showing classes, objects, and their relationships? (CO1)
Question 102: END

Option_a: Use case diagram
Option_b: Class diagram
Option_c: Sequence diagram
Option_d: Activity diagram
Correct_option: Class diagram

Question 103: START
In a UML class diagram, what does an association relationship represent between two classes? (CO1)
Question 103: END

Option_a: A relationship where one class is dependent on another class
Option_b: A relationship representing inheritance
Option_c: A relationship indicating an object’s life cycle
Option_d: A relationship where objects of one class are related to objects of another class
Correct_option: A relationship where objects of one class are related to objects of another class

Question 104: START
What does the "multiplicity" notation in UML class diagrams signify? (CO1)
Question 104: END

Option_a: The access level of an attribute or method
Option_b: The number of instances that can be associated with a class
Option_c: The number of methods in a class
Option_d: The type of inheritance used between classes
Correct_option: The number of instances that can be associated with a class

Question 105: START
In UML, what is the role of the "component diagram"? (CO1)
Question 105: END

Option_a: To depict the system's dynamic behavior
Option_b: To show the physical components and their relationships in a system
Option_c: To show the sequence of actions in the system
Option_d: To model the internal structure of an individual class
Correct_option: To show the physical components and their relationships in a system

Question 106: START
Which UML diagram describes how the system is divided into components and the relationships between these components? (CO1)
Question 106: END

Option_a: Class diagram
Option_b: Component diagram
Option_c: Deployment diagram
Option_d: Activity diagram
Correct_option: Component diagram

Question 107: START
What is the purpose of a UML "deployment diagram"? (CO1)
Question 107: END

Option_a: To describe the flow of data through the system
Option_b: To show the relationships between system components and the hardware on which they run
Option_c: To model system behaviors in a sequence of events
Option_d: To represent the system's user interface
Correct_option: To show the relationships between system components and the hardware on which they run

Question 108: START
In a UML class diagram, which notation is used to represent inheritance between two classes? (CO1)
Question 108: END

Option_a: A solid line with a triangle at the subclass end
Option_b: A dashed line with a triangle at the subclass end
Option_c: A solid line with no arrow
Option_d: A dashed line with no arrow
Correct_option: A solid line with a triangle at the subclass end

Question 109: START
What is represented by an interface in a UML class diagram? (CO1)
Question 109: END

Option_a: A concrete class that implements methods
Option_b: A class that contains no implementation and only defines method signatures
Option_c: A type of class that cannot be subclassed
Option_d: A class that manages interactions between components
Correct_option: A class that contains no implementation and only defines method signatures

Question 110: START
Which UML diagram would you use to represent the relationship between objects in terms of their runtime interaction within the system? (CO1)
Question 110: END

Option_a: Class diagram
Option_b: Sequence diagram
Option_c: State machine diagram
Option_d: Activity diagram
Correct_option: Sequence diagram

Question 111: START
What is the primary purpose of behavioral diagrams in UML? (CO1)
Question 111: END

Option_a: To describe the static structure of a system
Option_b: To represent the dynamic behavior of a system
Option_c: To model the components and their relationships
Option_d: To represent the system's physical architecture
Correct_option: To represent the dynamic behavior of a system

Question 112: START
Which UML diagram is used to show the sequence of actions or events that occur in a system? (CO1)
Question 112: END

Option_a: Class diagram
Option_b: Activity diagram
Option_c: Use case diagram
Option_d: Sequence diagram
Correct_option: Sequence diagram

Question 113: START
In a UML sequence diagram, what do vertical lifelines represent? (CO1)
Question 113: END

Option_a: The timeline for each object or participant in the interaction
Option_b: The flow of data between objects
Option_c: The state of an object during an interaction
Option_d: The relationships between objects
Correct_option: The timeline for each object or participant in the interaction

Question 114: START
What is the purpose of a UML state machine diagram? (CO1)
Question 114: END

Option_a: To model the flow of data in the system
Option_b: To represent the system's behavior in response to external events
Option_c: To show how objects interact with each other
Option_d: To describe the system's use cases and actors
Correct_option: To represent the system's behavior in response to external events

Question 115: START
Which UML diagram is best suited for representing the flow of control or data within a process or workflow? (CO1)
Question 115: END

Option_a: Use case diagram
Option_b: Activity diagram
Option_c: Component diagram
Option_d: Class diagram
Correct_option: Activity diagram

Question 116: START
Which of the following is true about UML use case diagrams? (CO1)
Question 116: END

Option_a: They describe the internal workings of a system
Option_b: They show the interactions between users and the system
Option_c: They represent the system's data flow
Option_d: They model the sequence of actions in a system
Correct_option: They show the interactions between users and the system

Question 117: START
In a UML activity diagram, what do decision nodes represent? (CO1)
Question 117: END

Option_a: Points where a system transitions between states
Option_b: Points where the flow of control splits based on conditions
Option_c: Points where actions are executed in parallel
Option_d: Points where new objects are created
Correct_option: Points where the flow of control splits based on conditions

Question 118: START
What is the role of "guards" in a UML state machine diagram? (CO1)
Question 118: END

Option_a: To define the conditions under which a transition occurs
Option_b: To represent the actions that occur during a state
Option_c: To show the sequence of states in the system
Option_d: To represent the events that trigger a state change
Correct_option: To define the conditions under which a transition occurs

Question 119: START
In UML, which diagram is typically used to show how the system behaves during specific interactions, including messages passed between objects? (CO1)
Question 119: END

Option_a: Sequence diagram
Option_b: State machine diagram
Option_c: Activity diagram

Option_d: Component diagram
Correct_option: Sequence diagram

Question 120: START
In a UML activity diagram, what is the purpose of swimlanes? (CO1)
Question 120: END

Option_a: To define the flow of actions in a particular system state
Option_b: To group activities based on the roles or responsibilities of the actors
Option_c: To show the system's input and output
Option_d: To represent the sequence of events in a process
Correct_option: To group activities based on the roles or responsibilities of the actors

Question 121: START
What is the primary function of a model train controller in an embedded system? (CO1)
Question 121: END

Option_a: To control the speed and direction of the train
Option_b: To track the location of the train
Option_c: To monitor fuel levels in the model train
Option_d: To handle the communication between the train and the controller
Correct_option: To control the speed and direction of the train

Question 122: START
Which of the following components is commonly used to regulate the speed of a model train in an embedded system? (CO1)
Question 122: END

Option_a: Servo motor
Option_b: DC motor with pulse-width modulation (PWM) control
Option_c: Stepper motor
Option_d: Induction motor
Correct_option: DC motor with pulse-width modulation (PWM) control

Question 123: START
In a model train controller, how is the direction of the train typically controlled? (CO1)
Question 123: END

Option_a: By reversing the polarity of the track voltage
Option_b: By changing the motor's internal components
Option_c: By adjusting the frequency of the control signal
Option_d: By switching the lights on and off
Correct_option: By reversing the polarity of the track voltage

Question 124: START
What role does a microcontroller play in a model train controller system? (CO1)
Question 124: END

Option_a: It processes sensor data and controls the train's behavior
Option_b: It generates the track's electrical power
Option_c: It acts as the physical interface between the user and the train
Option_d: It stores the train's location data
Correct_option: It processes sensor data and controls the train's behavior

Question 125: START
Which sensor is typically used in a model train controller to detect the position of the train on the track? (CO1)
Question 125: END

Option_a: Ultrasonic sensor
Option_b: Optical sensor or Hall effect sensor
Option_c: Temperature sensor
Option_d: Infrared sensor
Correct_option: Optical sensor or Hall effect sensor

Question 126: START
What is the primary advantage of using pulse-width modulation (PWM) to control the speed of a model train? (CO1)
Question 126: END

Option_a: It allows for precise speed control while minimizing power loss
Option_b: It increases the train's overall weight
Option_c: It improves the aesthetics of the model train
Option_d: It maximizes the range of motion of the train's motor
Correct_option: It allows for precise speed control while minimizing power loss

Question 127: START
How does a model train controller use feedback from sensors to adjust the train's behavior? (CO1)
Question 127: END

Option_a: By using sensor data to dynamically adjust the train's speed and direction
Option_b: By using sensor data to control the train’s communication with other systems
Option_c: By analyzing sensor data to control the train’s lights
Option_d: By using sensor data to control the train’s fuel efficiency
Correct_option: By using sensor data to dynamically adjust the train's speed and direction

Question 128: START
In a model train system, what is the role of a DCC (Digital Command Control) decoder? (CO1)
Question 128: END

Option_a: To convert digital signals into analog signals for controlling the train
Option_b: To manage the track's power distribution
Option_c: To control the train's speed, direction, and functions via digital signals
Option_d: To provide wireless communication between the controller and train
Correct_option: To control the train's speed, direction, and functions via digital signals

Question 129: START
Which of the following is a typical feature of a model train controller with wireless capabilities? (CO1)
Question 129: END

Option_a: It can control multiple trains simultaneously
Option_b: It generates the track's power for running the trains
Option_c: It requires direct physical contact with the train for control
Option_d: It automatically adjusts the track layout
Correct_option: It can control multiple trains simultaneously

Question 130: START
Which communication protocol is most commonly used for wireless control of model trains in embedded systems? (CO1)
Question 130: END

Option_a: Bluetooth
Option_b: Zigbee
Option_c: Wi-Fi
Option_d: CAN bus
Correct_option: Bluetooth

Question 131: START
Which component in a model train controller system is responsible for converting digital signals to control voltages for the motor? (CO1)
Question 131: END

Option_a: Power supply
Option_b: Motor driver
Option_c: Voltage regulator
Option_d: Current sensor
Correct_option: Motor driver

Question 132: START
What feature does a model train controller use to simulate real-world train behavior, such as

gradual acceleration and deceleration? (CO1)
Question 132: END

Option_a: PWM control with smoothing algorithms
Option_b: Direct voltage control
Option_c: Frequency modulation control
Option_d: Pulse-rate modulation
Correct_option: PWM control with smoothing algorithms

Question 133: START
In a model train control system, how is automatic braking typically achieved? (CO1)
Question 133: END

Option_a: By reducing power to the motor and applying reverse polarity
Option_b: By increasing the voltage to the motor
Option_c: By engaging a mechanical brake system
Option_d: By increasing the track's magnetic field
Correct_option: By reducing power to the motor and applying reverse polarity

Question 134: START
What type of embedded system is most commonly used for the development of a model train controller? (CO1)
Question 134: END

Option_a: Microcontroller-based embedded systems
Option_b: FPGA-based systems
Option_c: Analog circuit-based systems
Option_d: Hybrid systems with cloud computing
Correct_option: Microcontroller-based embedded systems

Question 135: START
Which of the following is a common safety feature in model train controllers? (CO1)
Question 135: END

Option_a: Overcurrent protection
Option_b: Autonomous route planning
Option_c: Battery-saving mode
Option_d: Automated speed regulation
Correct_option: Overcurrent protection

Question 136: START
How can a model train controller be programmed to handle multiple trains running on the same track? (CO1)
Question 136: END

Option_a: By assigning unique addresses to each train and controlling them separately
Option_b: By using a single control signal for all trains
Option_c: By programming the trains to automatically adjust their speed
Option_d: By using separate tracks for each train
Correct_option: By assigning unique addresses to each train and controlling them separately

Question 137: START
What is the advantage of using a PID (Proportional-Integral-Derivative) controller in a model train controller system? (CO1)
Question 137: END

Option_a: It provides precise control of the train's speed and position
Option_b: It reduces the train’s power consumption
Option_c: It eliminates the need for sensors
Option_d: It automatically adjusts the train’s track layout
Correct_option: It provides precise control of the train's speed and position

Question 138: START
Which type of motor is most commonly used in model train controllers for controlling the movement of the train? (CO1)
Question 138: END

Option_a: DC motor
Option_b: Stepper motor
Option_c: Brushless DC motor
Option_d: Synchronous motor
Correct_option: DC motor

Question 139: START
In a model train controller system, how can the train’s lights and sounds be controlled? (CO1)
Question 139: END

Option_a: Using digital signals sent through the DCC decoder
Option_b: By manually adjusting the control voltage
Option_c: By adjusting the PWM frequency
Option_d: Using an analog voltage control system
Correct_option: Using digital signals sent through the DCC decoder

Question 140: START
How can a model train controller simulate realistic train sounds, such as the whistle or horn? (CO1)
Question 140: END

Option_a: By using a digital sound module that plays pre-recorded sounds
Option_b: By controlling the motor speed
Option_c: By using a mechanical horn built into the train
Option_d: By altering the frequency of the control signal
Correct_option: By using a digital sound module that plays pre-recorded sounds

UNIT-2 SAMPLE QUESTIONS

Question 1: START
Which of the following is the correct syntax for a label in assembly language? (CO1)
Question 1: END

Option_a: LABEL:
Option_b: LABEL[]
Option_c: LABEL
Option_d: LABEL<>
Correct_option: LABEL:

Question 2: START
Which of the following instructions is used for moving data in assembly language? (CO2)
Question 2: END

Option_a: MOV
Option_b: ADD
Option_c: SUB
Option_d: JMP
Correct_option: MOV

Question 3: START
Which register holds the address of the next instruction to execute? (CO3)
Question 3: END

Option_a: Stack Pointer
Option_b: Program Counter
Option_c: Data Register
Option_d: Base Register
Correct_option: Program Counter

Question 4: START
What does the MOV instruction do in assembly language? (CO2)
Question 4: END

Option_a: Performs arithmetic operation
Option_b: Moves data between registers or memory locations
Option_c: Jumps to a specific memory address
Option_d: Compares two registers
Correct_option: Moves data between registers or memory locations

Question 5: START
Which addressing mode directly specifies the operand in the instruction? (CO4)
Question 5: END

Option_a: Direct Addressing
Option_b: Indirect Addressing
Option_c: Indexed Addressing
Option_d: Immediate Addressing
Correct_option: Immediate Addressing

Question 6: START
In which addressing mode is the operand address stored in a register? (CO4)
Question 6: END

Option_a: Direct Addressing
Option_b: Indirect Addressing
Option_c: Indexed Addressing
Option_d: Register Addressing
Correct_option: Indirect Addressing

Question 7: START
Which of the following is the correct instruction for adding two registers in assembly language? (CO1)
Question 7: END

Option_a: ADD R1, R2
Option_b: MOV R1, R2
Option_c: SUB R1, R2
Option_d: MUL R1, R2
Correct_option: ADD R1, R2

Question 8: START
What does the 'JMP' instruction do in assembly language? (CO1)
Question 8: END

Option_a: Moves data between registers
Option_b: Jumps to a specific memory location
Option_c: Adds two numbers
Option_d: Compares two registers
Correct_option: Jumps to a specific memory location

Question 9: START
Which of the following is an example of a 16-bit register in most microprocessors? (CO2)
Question 9: END

Option_a: AX
Option_b: AL

Option_c: AH
Option_d: SP
Correct_option: AX

Question 10: START
Which of the following is used to store the results of arithmetic operations? (CO3)
Question 10: END

Option_a: Status Register
Option_b: Data Register
Option_c: Stack Pointer
Option_d: Program Counter
Correct_option: Data Register

Question 11: START
What is the role of the Stack Pointer (SP) in assembly language programming? (CO4)
Question 11: END

Option_a: Holds the address of the next instruction
Option_b: Points to the top of the stack
Option_c: Stores the result of the last operation
Option_d: Points to the program's entry point
Correct_option: Points to the top of the stack

Question 12: START
Which of the following is an example of an indexed addressing mode? (CO4)
Question 12: END

Option_a: MOV R1, [R2]
Option_b: MOV R1, #5
Option_c: MOV R1, [R2 + #10]
Option_d: MOV R1, #R2
Correct_option: MOV R1, [R2 + #10]

Question 13: START
Which of the following tools is used to translate assembly code into machine code? (CO5)
Question 13: END

Option_a: Debugger
Option_b: Simulator
Option_c: Assembler
Option_d: IDE
Correct_option: Assembler

Question 14: START
Which of the following is an example of a display interfacing technique in embedded

systems? (CO5)
Question 14: END

Option_a: LED
Option_b: LCD
Option_c: Both a and b
Option_d: None of the above
Correct_option: Both a and b

Question 15: START
Which register is commonly used to hold a memory address in assembly language? (CO3)
Question 15: END

Option_a: Stack Pointer
Option_b: Address Register
Option_c: Program Counter
Option_d: Data Register
Correct_option: Address Register

Question 16: START
Which of the following instructions in assembly language is used to compare two registers? (CO2)
Question 16: END

Option_a: CMP
Option_b: ADD
Option_c: MOV
Option_d: JMP
Correct_option: CMP

Question 17: START
Which addressing mode uses an immediate constant value as the operand? (CO4)
Question 17: END

Option_a: Direct Addressing
Option_b: Indirect Addressing
Option_c: Indexed Addressing
Option_d: Immediate Addressing
Correct_option: Immediate Addressing

Question 18: START
In embedded systems, which of the following is necessary for interfacing with external hardware components like sensors? (CO5)
Question 18: END

Option_a: Interfacing circuit
Option_b: Proper I/O ports

Option_c: A microcontroller or microprocessor
Option_d: All of the above
Correct_option: All of the above

Question 19: START
Which type of instruction would be used to repeat a process until a condition is met in assembly language? (CO2)
Question 19: END

Option_a: JMP
Option_b: LOOP
Option_c: CALL
Option_d: RET
Correct_option: LOOP

Question 20: START
What does the 'CALL' instruction do in assembly language? (CO1)
Question 20: END

Option_a: Jump to a specific address and store the return address
Option_b: Compare two registers
Option_c: Add two numbers
Option_d: Move data between registers
Correct_option: Jump to a specific address and store the return address

Question 21: START
Which of the following is used to perform an arithmetic addition of two registers in assembly language? (CO2)
Question 21: END

Option_a: ADD
Option_b: SUB
Option_c: MUL
Option_d: DIV
Correct_option: ADD

Question 22: START
What is the primary function of a microcontroller in embedded systems? (CO5)
Question 22: END

Option_a: Store large amounts of data
Option_b: Control the execution of hardware peripherals
Option_c: Provide network connectivity
Option_d: Process high-level applications
Correct_option: Control the execution of hardware peripherals

Question 23: START
Which register holds the return address in a subroutine call? (CO3)
Question 23: END

Option_a: Stack Pointer
Option_b: Program Counter
Option_c: Base Register
Option_d: Link Register
Correct_option: Link Register

Question 24: START
In assembly, which of the following instructions is used for conditional branching? (CO2)
Question 24: END

Option_a: CMP
Option_b: JZ
Option_c: MOV
Option_d: JMP
Correct_option: JZ

Question 25: START
What is the role of the Instruction Pointer (IP) in an embedded system? (CO3)
Question 25: END

Option_a: Holds the address of the next instruction
Option_b: Stores the result of arithmetic operations
Option_c: Stores the status flags
Option_d: Points to the top of the stack
Correct_option: Holds the address of the next instruction

Question 26: START
Which addressing mode calculates the operand address by adding an index to a base address? (CO4)
Question 26: END

Option_a: Direct Addressing
Option_b: Indirect Addressing
Option_c: Indexed Addressing
Option_d: Immediate Addressing
Correct_option: Indexed Addressing

Question 27: START
Which of the following is true about an assembler? (CO5)
Question 27: END

Option_a: It converts high-level language code to machine code
Option_b: It translates assembly language to machine code

Option_c: It debugs assembly programs
Option_d: It simulates program execution
Correct_option: It translates assembly language to machine code

Question 28: START
Which of the following is an example of indirect addressing mode in assembly language? (CO4)
Question 28: END

Option_a: MOV R1, [R2]
Option_b: MOV R1, #10
Option_c: MOV R1, R2
Option_d: MOV R1, [10]
Correct_option: MOV R1, [R2]

Question 29: START
Which instruction is used to subtract one register from another in assembly? (CO2)
Question 29: END

Option_a: SUB
Option_b: ADD
Option_c: MOV
Option_d: CMP
Correct_option: SUB

Question 30: START
What is the purpose of the 'RET' instruction in assembly language? (CO1)
Question 30: END

Option_a: Return from a subroutine
Option_b: Jump to a specific memory address
Option_c: Compare two registers
Option_d: Move data between registers
Correct_option: Return from a subroutine

Question 31: START
Which of the following is used to store the temporary result of an operation in embedded systems? (CO3)
Question 31: END

Option_a: Data Register
Option_b: Address Register
Option_c: Program Counter
Option_d: Stack Pointer
Correct_option: Data Register

Question 32: START
In assembly language, what does the instruction 'NOP' do? (CO1)
Question 32: END

Option_a: Stops program execution
Option_b: No operation, used for timing or alignment
Option_c: Executes an arithmetic operation
Option_d: None of the above
Correct_option: No operation, used for timing or alignment

Question 33: START
Which of the following instructions would be used to jump to a specific memory address in assembly language? (CO2)
Question 33: END

Option_a: CALL
Option_b: JUMP
Option_c: JMP
Option_d: MOV
Correct_option: JMP

Question 34: START
Which of the following is the correct syntax for a jump instruction with a condition in assembly language? (CO2)
Question 34: END

Option_a: JMP C
Option_b: JE label
Option_c: CALL label
Option_d: MOV label
Correct_option: JE label

Question 35: START
In assembly, which addressing mode is used when the operand is specified directly in the instruction? (CO4)
Question 35: END

Option_a: Immediate Addressing
Option_b: Direct Addressing
Option_c: Indirect Addressing
Option_d: Indexed Addressing
Correct_option: Immediate Addressing

Question 36: START
Which instruction is used to perform bitwise AND operation between two registers? (CO2)
Question 36: END

Option_a: AND
Option_b: OR
Option_c: XOR
Option_d: NOT
Correct_option: AND

Question 37: START
Which of the following is true about a debugger? (CO5)
Question 37: END

Option_a: It simulates the execution of assembly programs
Option_b: It helps identify and fix errors in assembly code
Option_c: It converts high-level language into machine code
Option_d: It is used to store data in memory
Correct_option: It helps identify and fix errors in assembly code

Question 38: START
Which of the following registers stores the result of the last arithmetic operation? (CO3)
Question 38: END

Option_a: Program Counter
Option_b: Status Register
Option_c: Data Register
Option_d: Stack Pointer
Correct_option: Status Register

Question 39: START
Which instruction is used to clear a register in assembly language? (CO2)
Question 39: END

Option_a: CLR
Option_b: MOV
Option_c: CMP
Option_d: ADD
Correct_option: CLR

Question 40: START
In embedded systems, which of the following is used to convert assembly language into machine code? (CO5)
Question 40: END

Option_a: Assembler
Option_b: Debugger
Option_c: Simulator
Option_d: IDE
Correct_option: Assembler

Question 41: START
Which of the following is the primary function of an embedded system? (CO5)
Question 41: END

Option_a: Process high-level applications
Option_b: Perform specific tasks or operations
Option_c: Store large amounts of data
Option_d: Handle general-purpose computing
Correct_option: Perform specific tasks or operations

Question 42: START
Which of the following addressing modes involves using a memory address held in a register as the operand? (CO4)
Question 42: END

Option_a: Immediate Addressing
Option_b: Direct Addressing
Option_c: Indirect Addressing
Option_d: Indexed Addressing
Correct_option: Indirect Addressing

Question 43: START
In assembly language, which of the following instructions is used to execute a logical OR operation between two registers? (CO2)
Question 43: END

Option_a: OR
Option_b: AND
Option_c: XOR
Option_d: NOT
Correct_option: OR

Question 44: START
Which register is used for storing the address of the next instruction to be executed in most microprocessors? (CO3)
Question 44: END

Option_a: Stack Pointer
Option_b: Program Counter
Option_c: Data Register
Option_d: Status Register
Correct_option: Program Counter

Question 45: START
Which of the following instructions is used to subtract two values in assembly language?

(CO2)
Question 45: END

Option_a: SUB
Option_b: ADD
Option_c: MOV
Option_d: CMP
Correct_option: SUB

Question 46: START
Which of the following is a tool used to simulate assembly language program execution? (CO5)
Question 46: END

Option_a: Debugger
Option_b: Simulator
Option_c: Assembler
Option_d: IDE
Correct_option: Simulator

Question 47: START
In assembly, what does the instruction 'PUSH' do? (CO1)
Question 47: END

Option_a: Pushes a value onto the stack
Option_b: Pops a value from the stack
Option_c: Adds two registers
Option_d: Subtracts two registers
Correct_option: Pushes a value onto the stack

Question 48: START
Which of the following is used to perform an exclusive OR operation between two registers? (CO2)
Question 48: END

Option_a: XOR
Option_b: OR
Option_c: AND
Option_d: NOT
Correct_option: XOR

Question 49: START
Which of the following is true about an embedded system's microcontroller? (CO5)
Question 49: END

Option_a: It requires an external processor to function
Option_b: It contains a CPU, memory, and input/output peripherals on a single chip

Option_c: It is used only for data storage
Option_d: It performs only mathematical operations
Correct_option: It contains a CPU, memory, and input/output peripherals on a single chip

Question 50: START
What is the main role of a debugger in assembly language programming? (CO5)
Question 50: END

Option_a: To convert assembly language into machine code
Option_b: To identify and correct errors in assembly programs
Option_c: To simulate program execution
Option_d: To store data in memory
Correct_option: To identify and correct errors in assembly programs

Question 51: START
Which of the following instructions is used to test a condition or compare two values in assembly language? (CO2)
Question 51: END

Option_a: CMP
Option_b: MOV
Option_c: ADD
Option_d: JMP
Correct_option: CMP

Question 52: START
In an assembly language program, what is the function of the 'NOP' instruction? (CO1)
Question 52: END

Option_a: No operation, used for timing or alignment
Option_b: Adds two registers
Option_c: Moves data between registers
Option_d: Jumps to a specified memory address
Correct_option: No operation, used for timing or alignment

Question 53: START
What is the purpose of the 'MOV' instruction in assembly language? (CO2)
Question 53: END

Option_a: Move data between memory and registers
Option_b: Add two registers
Option_c: Jump to a specific memory address
Option_d: Perform a bitwise operation
Correct_option: Move data between memory and registers

Question 54: START
Which of the following is an example of a 32-bit register? (CO3)
Question 54: END

Option_a: AX
Option_b: EAX
Option_c: AH
Option_d: AL
Correct_option: EAX

Question 55: START
Which of the following registers typically holds the operand during an arithmetic operation? (CO3)
Question 55: END

Option_a: Program Counter
Option_b: Stack Pointer
Option_c: Data Register
Option_d: Status Register
Correct_option: Data Register

Question 56: START
Which of the following instructions in assembly language is used to jump to a label unconditionally? (CO2)
Question 56: END

Option_a: JMP
Option_b: JE
Option_c: CALL
Option_d: JNE
Correct_option: JMP

Question 57: START
Which addressing mode uses a register to hold the address of the operand in assembly language? (CO4)
Question 57: END

Option_a: Direct Addressing
Option_b: Indirect Addressing
Option_c: Indexed Addressing
Option_d: Register Addressing
Correct_option: Register Addressing

Question 58: START
In assembly language, what does the instruction 'POP' do? (CO1)
Question 58: END

Option_a: Removes a value from the stack
Option_b: Adds a value to the stack
Option_c: Moves data between registers
Option_d: Performs a bitwise operation
Correct_option: Removes a value from the stack

Question 59: START
Which of the following tools is used to identify errors in assembly code? (CO5)
Question 59: END

Option_a: Debugger
Option_b: Simulator
Option_c: Assembler
Option_d: Compiler
Correct_option: Debugger

Question 60: START
Which of the following is true about the status register in embedded systems? (CO3)
Question 60: END

Option_a: It stores the program counter
Option_b: It holds the address of the next instruction
Option_c: It contains flags that indicate the result of the last operation
Option_d: It stores the current operand
Correct_option: It contains flags that indicate the result of the last operation

Question 61: START
Which of the following addressing modes uses a constant value embedded directly in the instruction? (CO4)
Question 61: END

Option_a: Direct Addressing
Option_b: Immediate Addressing
Option_c: Indirect Addressing
Option_d: Indexed Addressing
Correct_option: Immediate Addressing

Question 62: START
Which of the following registers holds the address of the top element of the stack? (CO3)
Question 62: END

Option_a: Stack Pointer
Option_b: Program Counter
Option_c: Data Register
Option_d: Status Register
Correct_option: Stack Pointer

Question 63: START
Which of the following instructions is used to move data between memory and registers in assembly language? (CO2)
Question 63: END

Option_a: MOV
Option_b: ADD
Option_c: SUB
Option_d: CMP
Correct_option: MOV

Question 64: START
What is the function of the 'CALL' instruction in assembly language? (CO1)
Question 64: END

Option_a: Calls a subroutine
Option_b: Compares two registers
Option_c: Jumps to a specified address
Option_d: Pops a value from the stack
Correct_option: Calls a subroutine

Question 65: START
Which of the following operations is performed by the 'INC' instruction in assembly language? (CO2)
Question 65: END

Option_a: Increment the value in a register
Option_b: Decrement the value in a register
Option_c: Compare two values
Option_d: Move data between registers
Correct_option: Increment the value in a register

Question 66: START
Which of the following is an example of a 16-bit register in assembly language? (CO3)
Question 66: END

Option_a: EAX
Option_b: AX
Option_c: RDX
Option_d: EDX
Correct_option: AX

Question 67: START
Which of the following instructions is used for unconditional branching in assembly language? (CO2)
Question 67: END

Option_a: JMP
Option_b: JE
Option_c: JNE
Option_d: CALL
Correct_option: JMP

Question 68: START
Which of the following instructions is used to add an immediate value to a register in assembly language? (CO2)
Question 68: END

Option_a: ADD
Option_b: MOV
Option_c: INC
Option_d: SUB
Correct_option: ADD

Question 69: START
What is the purpose of the 'JNE' instruction in assembly language? (CO2)
Question 69: END

Option_a: Jump if not equal
Option_b: Jump if equal
Option_c: Jump if zero
Option_d: Jump unconditionally
Correct_option: Jump if not equal

Question 70: START
Which addressing mode uses a register combined with an immediate value to calculate the operand address? (CO4)
Question 70: END

Option_a: Immediate Addressing
Option_b: Indirect Addressing
Option_c: Indexed Addressing
Option_d: Register Indirect Addressing
Correct_option: Indexed Addressing

Question 71: START
Which of the following instructions is used to compare two values in assembly language? (CO2)
Question 71: END

Option_a: CMP
Option_b: ADD
Option_c: MOV

Option_d: MOVZ
Correct_option: CMP

Question 72: START
Which of the following registers is responsible for holding the address of the current instruction to be executed? (CO3)
Question 72: END

Option_a: Stack Pointer
Option_b: Program Counter
Option_c: Base Register
Option_d: Data Register
Correct_option: Program Counter

Question 73: START
Which instruction in assembly language is used to perform a bitwise NOT operation on a register? (CO2)
Question 73: END

Option_a: NOT
Option_b: AND
Option_c: OR
Option_d: XOR
Correct_option: NOT

Question 74: START
Which addressing mode calculates the operand address by adding the contents of a register to a constant value? (CO4)
Question 74: END

Option_a: Immediate Addressing
Option_b: Indexed Addressing
Option_c: Indirect Addressing
Option_d: Direct Addressing
Correct_option: Indexed Addressing

Question 75: START
Which instruction in assembly is used to store a register's value to memory? (CO1)
Question 75: END

Option_a: MOV
Option_b: PUSH
Option_c: POP
Option_d: STOR
Correct_option: MOV

Question 76: START
Which of the following tools is used to test and debug assembly programs? (CO5)
Question 76: END

Option_a: Compiler
Option_b: Assembler
Option_c: Debugger
Option_d: Simulator
Correct_option: Debugger

Question 77: START
Which of the following instructions is used to perform an arithmetic shift right in assembly? (CO2)
Question 77: END

Option_a: ASR
Option_b: LSR
Option_c: ROR
Option_d: LSL
Correct_option: ASR

Question 78: START
In assembly, which of the following is used to perform a logical shift left operation? (CO2)
Question 78: END

Option_a: ASL
Option_b: LSR
Option_c: LSL
Option_d: ROR
Correct_option: LSL

Question 79: START
Which of the following instructions is used to perform a conditional jump if the zero flag is set? (CO2)
Question 79: END

Option_a: JZ
Option_b: JNZ
Option_c: JG
Option_d: JGE
Correct_option: JZ

Question 80: START
What does the 'CALL' instruction in assembly do? (CO1)
Question 80: END

Option_a: Calls a subroutine and saves the return address

Option_b: Jump to the end of a program
Option_c: Compare two registers
Option_d: Moves data between registers
Correct_option: Calls a subroutine and saves the return address

Question 81: START
Which of the following is the correct syntax for a data label in assembly? (CO1)
Question 81: END

Option_a: DATA:
Option_b: .DATA
Option_c: DATA[]
Option_d: .DATA[]
Correct_option: .DATA

Question 82: START
In assembly language, which of the following instructions is used to move data from a memory address to a register? (CO2)
Question 82: END

Option_a: MOV
Option_b: ADD
Option_c: PUSH
Option_d: POP
Correct_option: MOV

Question 83: START
Which of the following assembly language instructions is used for signed multiplication? (CO2)
Question 83: END

Option_a: MUL
Option_b: IMUL
Option_c: DIV
Option_d: SUB
Correct_option: IMUL

Question 84: START
What is the main purpose of the status flags in the status register of a microcontroller? (CO3)
Question 84: END

Option_a: Indicate the result of an arithmetic operation
Option_b: Store the address of the next instruction
Option_c: Store data temporarily
Option_d: Enable interrupts
Correct_option: Indicate the result of an arithmetic operation

Question 85: START
Which of the following is an example of direct addressing mode in assembly? (CO4)
Question 85: END

Option_a: MOV R1, [R2]
Option_b: MOV R1, #10
Option_c: MOV R1, 10
Option_d: MOV R1, 0x1000
Correct_option: MOV R1, 10

Question 86: START
Which of the following registers is used to store the return address when a subroutine is called? (CO3)
Question 86: END

Option_a: Stack Pointer
Option_b: Program Counter
Option_c: Link Register
Option_d: Data Register
Correct_option: Link Register

Question 87: START
Which of the following instructions in assembly is used to increment the value in a register by 1? (CO2)
Question 87: END

Option_a: INC
Option_b: DEC
Option_c: ADD
Option_d: SUB
Correct_option: INC

Question 88: START
Which addressing mode in assembly uses the contents of a register to determine the memory address of the operand? (CO4)
Question 88: END

Option_a: Direct Addressing
Option_b: Indirect Addressing
Option_c: Indexed Addressing
Option_d: Register Addressing
Correct_option: Indirect Addressing

Question 89: START
Which of the following is used to convert assembly language code into machine code? (CO5)
Question 89: END

Option_a: Assembler
Option_b: Debugger
Option_c: Compiler
Option_d: Simulator
Correct_option: Assembler

Question 90: START
Which of the following instructions is used to perform an arithmetic addition of two registers in assembly language? (CO2)
Question 90: END

Option_a: ADD
Option_b: MOV
Option_c: INC
Option_d: SUB
Correct_option: ADD

Question 91: START
Which of the following instructions is used to perform an arithmetic subtraction in assembly language? (CO2)
Question 91: END

Option_a: SUB
Option_b: ADD
Option_c: INC
Option_d: CMP
Correct_option: SUB

Question 92: START
Which of the following instructions is used for logical AND operation between two registers in assembly language? (CO2)
Question 92: END

Option_a: AND
Option_b: OR
Option_c: XOR
Option_d: NOT
Correct_option: AND

Question 93: START
Which of the following instructions in assembly is used to compare two registers? (CO2)
Question 93: END

Option_a: CMP
Option_b: MOV
Option_c: ADD

Option_d: SUB
Correct_option: CMP

Question 94: START
Which of the following addressing modes uses a register to hold the operand's address directly? (CO4)
Question 94: END

Option_a: Immediate Addressing
Option_b: Register Addressing
Option_c: Indirect Addressing
Option_d: Indexed Addressing
Correct_option: Register Addressing

Question 95: START
What does the 'RET' instruction do in assembly language? (CO1)
Question 95: END

Option_a: Return from a subroutine
Option_b: Perform an addition
Option_c: Jump to a specific address
Option_d: Increment a register
Correct_option: Return from a subroutine

Question 96: START
Which of the following instructions is used to jump to a specific memory address in assembly language? (CO2)
Question 96: END

Option_a: JMP
Option_b: CALL
Option_c: JE
Option_d: JNE
Correct_option: JMP

Question 97: START
Which of the following is an example of an indexed addressing mode? (CO4)
Question 97: END

Option_a: MOV R1, [R2 + #10]
Option_b: MOV R1, [R2]
Option_c: MOV R1, #10
Option_d: MOV R1, [R2 + R3]
Correct_option: MOV R1, [R2 + #10]

Question 98: START
Which of the following is an example of indirect addressing mode? (CO4)
Question 98: END

Option_a: MOV R1, [R2]
Option_b: MOV R1, #10
Option_c: MOV R1, [R2 + #10]
Option_d: MOV R1, 10
Correct_option: MOV R1, [R2]

Question 99: START
Which of the following instructions is used to divide the value in one register by another in assembly language? (CO2)
Question 99: END

Option_a: DIV
Option_b: MUL
Option_c: MOD
Option_d: CMP
Correct_option: DIV

Question 100: START
Which of the following is used to describe the overall architecture and behavior of a microcontroller? (CO5)
Question 100: END

Option_a: Assembly Language
Option_b: Instruction Set Architecture (ISA)
Option_c: Debugger
Option_d: Simulator
Correct_option: Instruction Set Architecture (ISA)

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2 MARKS
Question 1: START
Which of the following assembly language instructions is used to move data from a register to a memory location? (CO2)
Question 1: END

Option_a: MOV
Option_b: PUSH
Option_c: POP
Option_d: MOVZ
correct_option: MOV

Question 2: START
The amount of ROM needed to implement a 3-bit multiplier is (CO1)
Question 2: END

Option_a: 346 Bits
Option_b: 12 Bits
Option_c: 10 Bits
Option_d: 384 Bits
correct_option: 384 Bits

Question 3: START
Which of the following addressing modes uses a register to hold the memory address of the operand? (CO4)
Question 3: END

Option_a: Direct Addressing
Option_b: Indirect Addressing
Option_c: Immediate Addressing
Option_d: Register Indirect Addressing
correct_option: Indirect Addressing

Question 4: START
Which of the following is an example of indexed addressing mode? (CO4)
Question 4: END

Option_a: MOV R1, [R2 + #10]
Option_b: MOV R1, [R2]
Option_c: MOV R1, #10
Option_d: MOV R1, [R3]
correct_option: MOV R1, [R2 + #10]

Question 5: START
Which instruction is used to perform a bitwise OR operation between two registers in assembly language? (CO2)
Question 5: END

Option_a: OR
Option_b: AND
Option_c: XOR
Option_d: NOT
correct_option: OR

Question 6: START
Which of the following instructions is used to check the zero flag in assembly? (CO3)
Question 6: END

Option_a: CMP

Option_b: MOV
Option_c: JE
Option_d: JMP
correct_option: CMP

Question 7: START
What is the primary purpose of an assembler in embedded systems? (CO5)
Question 7: END

Option_a: Convert high-level code to machine code
Option_b: Convert assembly language to machine code
Option_c: Debug assembly code
Option_d: Simulate the execution of assembly code
correct_option: Convert assembly language to machine code

Question 8: START
Which of the following is a common debugging tool for embedded systems? (CO5)
Question 8: END

Option_a: Assembler
Option_b: Debugger
Option_c: Simulator
Option_d: Compiler
correct_option: Debugger

Question 9: START
Which of the following addressing modes directly embeds the operand value in the instruction itself? (CO4)
Question 9: END

Option_a: Direct Addressing
Option_b: Immediate Addressing
Option_c: Indexed Addressing
Option_d: Indirect Addressing
correct_option: Immediate Addressing

Question 10: START
Which of the following is used to perform a signed multiplication in assembly language? (CO2)
Question 10: END

Option_a: MUL
Option_b: IMUL
Option_c: DIV
Option_d: ADD
correct_option: IMUL

Question 11: START
Which of the following tools allows the simulation of assembly code execution on embedded systems? (CO5)
Question 11: END

Option_a: IDE
Option_b: Compiler
Option_c: Debugger
Option_d: Simulator
correct_option: Simulator

Question 12: START
What does the 'PUSH' instruction do in assembly language? (CO1)
Question 12: END

Option_a: Saves data to the stack
Option_b: Moves data between registers
Option_c: Loads data into a register
Option_d: Performs a subtraction operation
correct_option: Saves data to the stack

Question 13: START
Which of the following registers typically holds the address of the next instruction to be executed? (CO3)
Question 13: END

Option_a: Program Counter
Option_b: Stack Pointer
Option_c: Status Register
Option_d: Base Register
correct_option: Program Counter

Question 14: START
What is the purpose of the 'MOV' instruction in assembly? (CO2)
Question 14: END

Option_a: To move data from one memory location to another
Option_b: To perform an arithmetic operation
Option_c: To compare two values
Option_d: To jump to a different part of the program
correct_option: To move data from one memory location to another

Question 15: START
Which of the following instructions is used to subtract two values in assembly language? (CO2)
Question 15: END

Option_a: ADD
Option_b: SUB
Option_c: INC
Option_d: CMP
correct_option: SUB

Question 16: START
Which of the following assembly instructions is used to compare two values? (CO2)
Question 16: END

Option_a: CMP
Option_b: MOV
Option_c: ADD
Option_d: SUB
correct_option: CMP

Question 17: START
Which of the following is a common instruction used for loop operations in assembly language? (CO3)
Question 17: END

Option_a: LOOP
Option_b: JMP
Option_c: CALL
Option_d: RET
correct_option: LOOP

Question 18: START
Which of the following is the correct syntax for defining data in assembly? (CO1)
Question 18: END

Option_a: .DATA
Option_b: DATA
Option_c: .TEXT
Option_d: DEFINE
correct_option: .DATA

Question 19: START
Which of the following addressing modes allows access to a value by adding a constant to a register? (CO4)
Question 19: END

Option_a: Indexed Addressing
Option_b: Immediate Addressing
Option_c: Register Addressing

Option_d: Indirect Addressing
correct_option: Indexed Addressing

Question 20: START
Which of the following operations can be performed using the 'XOR' instruction in assembly language? (CO2)
Question 20: END

Option_a: Exclusive OR operation
Option_b: Logical AND operation
Option_c: Arithmetic addition
Option_d: Bitwise NOT operation
correct_option: Exclusive OR operation

Question 21: START
Which of the following is a characteristic of the 'MOV' instruction in assembly? (CO2)
Question 21: END

Option_a: It transfers data between registers
Option_b: It performs arithmetic operations
Option_c: It compares two values
Option_d: It jumps to a specific memory address
correct_option: It transfers data between registers

Question 22: START
What is the effect of the 'NOP' instruction in assembly language? (CO1)
Question 22: END

Option_a: No operation (does nothing)
Option_b: Subtracts two values
Option_c: Jumps to a specific address
Option_d: Adds two values
correct_option: No operation (does nothing)

Question 23: START
Which of the following is an example of indirect addressing mode? (CO4)
Question 23: END
Option_a: MOV R1, [R2]
Option_b: MOV R1, #10
Option_c: MOV R1, [R2 + #10]
Option_d: MOV R1, 10
correct_option: MOV R1, [R2]

Question 24: START
Which assembly language instruction is used for an arithmetic shift right? (CO2)
Question 24: END

Option_a: ASR
Option_b: LSR
Option_c: LSL
Option_d: ROR
correct_option: ASR

Question 25: START
Which of the following registers is used for holding the top address of the stack? (CO3)
Question 25: END

Option_a: Stack Pointer
Option_b: Base Register
Option_c: Program Counter
Option_d: Data Register
correct_option: Stack Pointer

Question 26: START
Which of the following instructions is used to push a value onto the stack? (CO1)
Question 26: END

Option_a: PUSH
Option_b: POP
Option_c: MOV
Option_d: RET
correct_option: PUSH

Question 27: START
Which of the following addressing modes uses a constant value in the instruction itself? (CO4)
Question 27: END

Option_a: Immediate Addressing
Option_b: Indirect Addressing
Option_c: Register Addressing
Option_d: Direct Addressing
correct_option: Immediate Addressing

Question 28: START
Which instruction is used to call a subroutine in assembly language? (CO2)
Question 28: END

Option_a: CALL
Option_b: RET
Option_c: JMP
Option_d: MOV
correct_option: CALL

Question 29: START
Which of the following is the correct syntax for a label in assembly language? (CO1)
Question 29: END

Option_a: LABEL:
Option_b: LABEL[]
Option_c: LABEL
Option_d: LABEL<>
correct_option: LABEL:

Question 30: START
Which of the following registers stores the result of arithmetic operations in assembly language? (CO3)
Question 30: END

Option_a: Status Register
Option_b: Data Register
Option_c: Accumulator
Option_d: Stack Pointer
correct_option: Accumulator

Question 31: START
Which of the following instructions is used to perform a logical NOT operation on a register value in assembly language? (CO2)
Question 31: END

Option_a: NOT
Option_b: XOR
Option_c: AND
Option_d: OR
correct_option: NOT

Question 32: START
Which of the following addressing modes involves using a register and a memory address as the operand? (CO4)
Question 32: END

Option_a: Register Addressing
Option_b: Immediate Addressing
Option_c: Indexed Addressing
Option_d: Indirect Addressing
correct_option: Indexed Addressing

Question 33: START
Which of the following tools helps to identify errors in assembly code during program

execution? (CO5)
Question 33: END

Option_a: Simulator
Option_b: Debugger
Option_c: Compiler
Option_d: IDE
correct_option: Debugger

Question 34: START
Which of the following instructions is used to perform an arithmetic shift left in assembly language? (CO2)
Question 34: END

Option_a: ASL
Option_b: LSR
Option_c: LSL
Option_d: ROR
correct_option: LSL

Question 35: START
Which of the following is true about the Stack Pointer register in assembly? (CO3)
Question 35: END

Option_a: It points to the next instruction to be executed
Option_b: It points to the last value pushed onto the stack
Option_c: It holds the result of arithmetic operations
Option_d: It stores the return address for subroutines
correct_option: It points to the last value pushed onto the stack

Question 36: START
What is the purpose of the 'RET' instruction in assembly? (CO1)
Question 36: END

Option_a: Return from a subroutine
Option_b: Perform an addition operation
Option_c: Save the return address to the stack
Option_d: Compare two values
correct_option: Return from a subroutine

Question 37: START
Which of the following instructions is used to perform an exclusive OR operation in assembly language? (CO2)
Question 37: END

Option_a: XOR
Option_b: AND

Option_c: OR
Option_d: NOT
correct_option: XOR

Question 38: START
Which of the following is an example of a non-conditional branch instruction? (CO2)
Question 38: END

Option_a: JMP
Option_b: JE
Option_c: JNE
Option_d: JZ
correct_option: JMP

Question 39: START
What is the function of the 'MOV' instruction in assembly language? (CO2)
Question 39: END

Option_a: It moves data between registers
Option_b: It adds two values
Option_c: It performs logical operations
Option_d: It jumps to a new address
correct_option: It moves data between registers

Question 40: START
Which of the following is used to implement a shift operation in assembly language? (CO2)
Question 40: END

Option_a: ROR
Option_b: ROL
Option_c: LSR
Option_d: ASR
correct_option: ASR

Question 41: START
Which of the following instructions is used to increment the value of a register by 1? (CO2)
Question 41: END

Option_a: INC
Option_b: DEC
Option_c: ADD
Option_d: SUB
correct_option: INC

Question 42: START
Which of the following is used to perform a division operation in assembly language? (CO2)
Question 42: END

Option_a: DIV
Option_b: MOD
Option_c: MUL
Option_d: CMP
correct_option: DIV

Question 43: START
What is the function of the 'CALL' instruction in assembly language? (CO1)
Question 43: END

Option_a: Calls a subroutine
Option_b: Performs an arithmetic operation
Option_c: Compares two values
Option_d: Pushes data to the stack
correct_option: Calls a subroutine

Question 44: START
Which of the following is a feature of an Integrated Development Environment (IDE) in embedded systems? (CO5)
Question 44: END

Option_a: It only compiles the code
Option_b: It helps in writing and debugging code
Option_c: It runs the program on hardware
Option_d: It converts assembly code to high-level code
correct_option: It helps in writing and debugging code

Question 45: START
Which of the following is used to test whether two values are equal in assembly language? (CO2)
Question 45: END

Option_a: CMP
Option_b: MOV
Option_c: ADD
Option_d: SUB
correct_option: CMP

Question 46: START
Which of the following instructions is used to jump to a specified address in assembly language? (CO2)
Question 46: END

Option_a: JMP
Option_b: CALL
Option_c: RET

Option_d: JE
correct_option: JMP

Question 47: START
Which of the following is used to clear a register in assembly language? (CO2)
Question 47: END

Option_a: CLR
Option_b: MOV
Option_c: INC
Option_d: SUB
correct_option: CLR

Question 48: START
Which of the following describes the function of a debugger in embedded systems? (CO5)
Question 48: END

Option_a: It converts assembly language to machine code
Option_b: It simulates the execution of code
Option_c: It helps in identifying and fixing errors in the code
Option_d: It generates assembly language code
correct_option: It helps in identifying and fixing errors in the code

Question 49: START
Which of the following instructions is used to perform a logical AND operation between two registers in assembly? (CO2)
Question 49: END

Option_a: AND
Option_b: OR
Option_c: XOR
Option_d: NOT
correct_option: AND

Question 50: START
Which of the following is the correct syntax for an instruction in assembly language? (CO1)
Question 50: END

Option_a: INSTRUCTION OPERAND
Option_b: INSTRUCTION; OPERAND
Option_c: INSTRUCTION: OPERAND
Option_d: INSTRUCTION -> OPERAND
correct_option: INSTRUCTION OPERAND

UNIT -3 SAM[LE QUESTIONS

Question **1:** START

Which of the following is a key characteristic of embedded systems? **CO1**
Question **1:** END
Option_a: High power consumption
Option_b: General-purpose computing
Option_c: Real-time operation
Option_d: Requires an external monitor
correct_option: Real-time operation

Question **2:** START
What is the primary function of an embedded system? **CO1**
Question **2:** END
Option_a: Run multiple applications like a personal computer
Option_b: Perform a dedicated function efficiently
Option_c: Provide multitasking for multiple users
Option_d: Execute complex graphical processing
correct_option: Perform a dedicated function efficiently

Question **3:** START
Which of the following is NOT a component of a microprocessor? **CO1**
Question **3:** END
Option_a: ALU (Arithmetic Logic Unit)
Option_b: Control Unit
Option_c: RAM
Option_d: Registers
correct_option: RAM

Question **4:** START
A **complex system** in embedded design refers to: **CO1**
Question **4:** END
Option_a: A system with a single microcontroller
Option_b: A system with simple control logic
Option_c: A system with multiple interconnected components
Option_d: A system with no hardware components
correct_option: A system with multiple interconnected components

Question **5:** START
What is the first step in the embedded system design process? **CO1**
Question **5:** END
Option_a: Hardware selection
Option_b: Software coding
Option_c: Requirement analysis
Option_d: System testing
correct_option: Requirement analysis

Question **6:** START
Which of the following is NOT a part of the embedded system design process? **CO1**
Question **6:** END
Option_a: Defining system specifications
Option_b: Selecting hardware and software components
Option_c: Using a general-purpose OS like Windows
Option_d: Testing and validation
correct_option: Using a general-purpose OS like Windows

Question **7:** START
Which of the following formal methods is commonly used for embedded system modeling?
a) UML (Unified Modeling Language) **CO1**
Question **7:** END
Option_a: UML (Unified Modeling Language)
Option_b: HTML
Option_c: CSS
Option_d: SQL
correct_option: UML (Unified Modeling Language)

Question **8:** START
What is the purpose of finite state machines (FSM) in embedded systems? **CO1**
Question **8:** END
Option_a: To store large amounts of data
Option_b: To describe the system's behavior in different states
Option_c: To execute parallel processing tasks
Option_d: To design graphical user interfaces
correct_option: To describe the system's behavior in different states

Answer: b) To describe the system's behavior in different states
Question **9:** START
Which of the following is an example of an embedded system? **CO1**
Question **9:** END
Option_a: Desktop Computer
Option_b: Microwave Oven
Option_c: Mainframe Computer
Option_d: Supercomputer
correct_option: Microwave Oven

Question **10:** START
In a **real-time embedded system**, which factor is the most critical? **CO1**
Question **10:** END
Option_a: Speed of execution
Option_b: User interface
Option_c: Power consumption

Option_d: Response time
correct_option: Response time

Question **11:** START
Which of the following is the first step in writing an assembly language program? **CO2**
Question **11:** END
Option_a: Debugging the program
Option_b: Writing the source code
Option_c: Converting code to machine language
Option_d: Executing the program
correct_option: Writing the source code

Question **12:** START
In assembly language programming, which tool is used to convert assembly code into machine code? **CO2**
Question **12:** END
Option_a: Assembler
Option_b: Compiler
Option_c: Linker
Option_d: Debugger
correct_option: Assembler

Question **13:** START
Which of the following is NOT a typical assembly language programming tool? **CO2**
Question **13:** END
Option_a: Editor
Option_b: Assembler
Option_c: Debugger
Option_d: Web browser
correct_option: Web browser
Answer: d) Web browser

Question **14:** START
What is the purpose of a linker in assembly programming? **CO2**
Question **14:** END
Option_a: To debug the program
Option_b: To convert high-level code to assembly
Option_c: To combine multiple object files into an executable
Option_d: To edit source code
correct_option: To combine multiple object files into an executable

Question **15:** START
In keyboard interfacing, which technique is commonly used to detect keypresses? **CO2**
Question **15:** END
Option_a: Polling
Option_b: Multiplexing

Option_c: Segmentation
Option_d: Segmentation
correct_option: Polling

Question **16:** START
In a 7-segment display, which type of interfacing is used for better efficiency? **CO2**
Question **16:** END
Option_a: Parallel communication
Option_b: Serial communication
Option_c: Multiplexed display
Option_d: Interrupt-driven display
correct_option: Multiplexed display

Question **17:** START
What is the primary function of an **A/D (Analog to Digital) converter**? **CO2**
Question **17:** END
Option_a: Convert digital signals to analog signals
Option_b: Convert analog signals to digital signals
Option_c: Store digital data
Option_d: Amplify analog signals
correct_option: Convert analog signals to digital signals

Question **18:** START
Which technique is commonly used in **D/A conversion**? **CO2**
Question **18:** END
Option_a: R-2R Ladder Network
Option_b: Flip-flop circuits
Option_c: Ring counter
Option_d: Schmitt trigger
correct_option: R-2R Ladder Network

Question **19:** START
What is the main advantage of using **multiple interrupts** in microprocessor systems? **CO2**
Question **19:** END
Option_a: Reduces system power consumption
Option_b: Allows the processor to handle multiple tasks efficiently
Option_c: Eliminates the need for timers
Option_d: Increases the clock speed
correct_option: Allows the processor to handle multiple tasks efficiently

Question **20:** START
In **interrupt handling**, what is the purpose of an Interrupt Service Routine (ISR)?**CO2**
Question **20:** END
Option_a: To define the response to an interrupt request
Option_b: To execute the main program
Option_c: To clear the microprocessor registers

Option_d: To reset the CPU
correct_option: To define the response to an interrupt request

Question **21:** START
In **serial communication**, data is transmitted: **CO2**
Question **21:** END
Option_a: One bit at a time
Option_b: Eight bits at a time
Option_c: In parallel format
Option_d: Randomly
correct_option: One bit at a time

Question **22:** START
Which protocol is commonly used for serial communication in microcontrollers? **CO2**
Question **22:** END
Option_a: I2C
Option_b: USB
Option_c: HDMI
Option_d: PCI
correct_option: I2C

Question **23:** START
In an RTOS, which of the following is **not** a valid task state? **CO3**
Question **23:** END
Option_a: Running
Option_b: Waiting
Option_c: Terminated
Option_d: Swapped
correct_option: Swapped

Question **24:** START
A task in the **waiting state** is waiting for: **CO3**
Question **24:** END
Option_a: CPU time
Option_b: An event or resource
Option_c: Completion of another task
Option_d: System shutdown
correct_option: An event or resource

Question **25:** START
What is the main challenge in sharing data between tasks in an RTOS? **CO3**
Question **25:** END
Option_a: Code complexity
Option_b: Data corruption due to race conditions
Option_c: Slow execution speed
Option_d: High power consumption
correct_option: Data corruption due to race conditions

Question **26:** START
What is the best way to ensure **safe data sharing** between tasks in an RTOS? **CO3**
Question **26:** END
Option_a: Using global variables
Option_b: Implementing semaphores or mutexes
Option_c: Disabling all interrupts
Option_d: Running tasks sequentially
correct_option: Implementing semaphores or mutexes

Question **27:** START
What is the purpose of a **semaphore** in an RTOS? **CO3**
Question **27:** END
Option_a: To store messages
Option_b: To control access to shared resources
Option_c: To manage memory allocation
Option_d: To increase CPU speed
correct_option: To control access to shared resources

Question **28:** START
A **binary semaphore** can have how many possible states? **CO3**
Question **28:** END
Option_a: One
Option_b: Two
Option_c: Three
Option_d: Unlimited
correct_option: Two

Question **29:** START
In an RTOS, a **message queue** is used for: **CO3**
Question **29:** END
Option_a: Storing large amounts of data
Option_b: Synchronizing tasks using interrupts
Option_c: Communication between tasks through structured messages
Option_d: Increasing processor speed
correct_option: Communication between tasks through structured messages

Question **30:** START
What is the key difference between **mailboxes and message queues** in RTOS? **CO3**
Question **30:** END
Option_a: Mailboxes store only one message at a time
Option_b: Mailboxes can store multiple messages
Option_c: Message queues do not require synchronization
Option_d: Mailboxes do not support priority-based retrieval
correct_option: Mailboxes store only one message at a time

Question **31:** START

What is the primary use of **timers** in an RTOS? **CO3**
Question **31:** END
Option_a: Controlling task execution time
Option_b: Increasing the CPU frequency
Option_c: Reducing memory usage
Option_d: Enhancing multitasking performance
correct_option: Controlling task execution time

Question **32:** START
Which type of **timer** is commonly used in RTOS environments? **CO3**
Question **32:** END
Option_a: Watchdog timer
Option_b: Delay timer
Option_c: Real-time clock timer
Option_d: All of the above
correct_option: All of the above

Question **33:** START
What is the purpose of an **event flag** in RTOS? **CO3**
Question **33:** END
Option_a: To control memory allocation
Option_b: To trigger task execution when a specific condition is met
Option_c: To increase CPU clock speed
Option_d: To store large amounts of data
correct_option: To trigger task execution when a specific condition is met

Question **34:** START
In an RTOS, multiple tasks can **wait for the same event**. This mechanism is called: **CO3**
Question **34:** END
Option_a: Message passing
Option_b: Event grouping
Option_c: Task scheduling
Option_d: Multithreading
correct_option: Event grouping

Question **35:** START
In an RTOS, **dynamic memory allocation** can lead to: **CO3**
Question **35:** END
Option_a: Faster execution
Option_b: Memory fragmentation
Option_c: Reduced task switching
Option_d: Improved CPU performance
correct_option: Memory fragmentation

Question **36:** START
Which of the following is used for **efficient memory management** in RTOS? **CO3**
Question **36:** END

Option_a: Paging
Option_b: Memory pools
Option_c: Virtual memory
Option_d: Cache memory
correct_option: Memory pools

Question **37:** START
What happens when an interrupt occurs in an RTOS? **CO3**
Question **37:** END
Option_a: The running task continues execution
Option_b: The CPU immediately executes the Interrupt Service Routine (ISR)
Option_c: The CPU shuts down
Option_d: The task with the highest priority is executed
correct_option: The CPU immediately executes the Interrupt Service Routine (ISR)

Question **38:** START
What is the best way to handle **interrupts in an RTOS**? **CO4**
Question **38:** END
Option_a: Keep ISRs short and minimal
Option_b: Disable all interrupts permanently
Option_c: Use ISRs for complex computations
Option_d: Run all tasks inside the ISR
correct_option: Keep ISRs short and minimal

Question **39:** START
Which of the following is a key principle of an RTOS? **CO4**
Question **39:** END
Option_a: Task execution is unpredictable
Option_b: Tasks must meet strict timing constraints
Option_c: Tasks run only when the user requests
Option_d: RTOS does not support multitasking
correct_option: Tasks must meet strict timing constraints

Question **40:** START
What is the main difference between a **hard real-time system** and a **soft real-time system**? **CO4**
Question **40:** END
Option_a: Hard real-time systems allow delays, while soft real-time systems do not
Option_b: Hard real-time systems have strict deadlines, while soft real-time systems allow some deadline misses
Option_c: Hard real-time systems use general-purpose OS, while soft real-time systems use RTOS
Option_d: Soft real-time systems are always faster than hard real-time systems
correct_option: Hard real-time systems have strict deadlines, while soft real-time systems allow some deadline misses
-time systems have strict deadlines, while soft real-time systems allow some deadline misses

Question **41:** START
What is the primary function of a **semaphore** in an RTOS? **CO4**
Question **41:** END
Option_a: To store messages
Option_b: To control access to shared resources
Option_c: To allocate CPU time
Option_d: To increase system speed
correct_option: To control access to shared resources

Question **42:** START
In an RTOS, **message queues** are used for: **CO4**
Question **42:** END
Option_a: Storing system logs
Option_b: Inter-task communication
Option_c: Increasing CPU clock speed
Option_d: Reducing memory usage
correct_option: Inter-task communication

Question **43:** START
Which scheduling algorithm is commonly used in **hard real-time systems**? **CO4**
Question **43:** END
Option_a: Round Robin Scheduling
Option_b: Rate-Monotonic Scheduling (RMS)
Option_c: First Come First Serve (FCFS)
Option_d: Shortest Job First (SJF)
correct_option: Rate-Monotonic Scheduling (RMS)

Question **44:** START
In a **hard real-time system**, missing a deadline results in: **CO4**
Question **44:** END
Option_a: A minor performance loss
Option_b: System failure or critical errors
Option_c: Task rescheduling
Option_d: An increase in CPU usage
correct_option: System failure or critical errors

Question **45:** START
Which technique helps in **reducing memory usage** in an embedded system? **CO4**
Question **45:** END
Option_a: Using virtual memory
Option_b: Using dynamic memory allocation
Option_c: Using memory pools
Option_d: Running multiple instances of tasks
correct_option: Using memory pools

Question **46:** START

Which of the following is an effective way to **reduce power consumption** in an embedded system? **CO4**
Question **46:** END
Option_a: Increasing CPU clock speed
Option_b: Disabling unused peripherals
Option_c: Running multiple processes
Option_d: Using high-power components
correct_option: Disabling unused peripherals

Question **47:** START
µC-OS is an example of: **CO4**
Question **47:** START
Option_a: A general-purpose operating system
Option_b: A real-time operating system (RTOS)
Option_c: A device driver
Option_d: A hardware debugging tool
correct_option: A real-time operating system (RTOS)

Question **48:** START
Which language is µC-OS primarily written in? **CO4**
Question **48:** START
Option_a: Python
Option_b: Assembly
Option_c: C
Option_d: Java
correct_option: C

Question **49:** START
What is the role of a **host machine** in embedded system development? **CO4**
Question **49:** END
Option_a: It is the final system where the software runs
Option_b: It is used for developing, compiling, and debugging embedded software
Option_c: It only stores the embedded software
Option_d: It acts as a backup for real-time data
correct_option: It is used for developing, compiling, and debugging embedded software

Question **50:** START
A **linker/locator** is used for: **CO4**
Question **50:** END
Option_a: Debugging embedded software
Option_b: Placing code and data in specific memory locations
Option_c: Running tests on a host machine
Option_d: Managing power consumption
correct_option: Placing code and data in specific memory locations

Question **51:** START
Which of the following methods is commonly used to load embedded software onto a **target system**? **CO4**
Question **51:** END
Option_a: Cloud synchronization
Option_b: Flash programming
Option_c: Spreadsheet processing
Option_d: Text file transfer
correct_option: Flash programming

Question **52:** START
What is the purpose of a **bootloader** in an embedded system? **CO4**
Question **52:** END
Option_a: To manage real-time scheduling
Option_b: To load the operating system and firmware into memory
Option_c: To increase execution speed
Option_d: To compile source code
correct_option: To load the operating system and firmware into memory

Question **53:** START
In **embedded system debugging**, testing on a **host machine** is done to: **CO4**
Question **53:** END
Option_a: Evaluate the final hardware performance
Option_b: Simulate and test the software before deploying it to the target system
Option_c: Increase power efficiency
Option_d: Reduce the clock speed
correct_option: Simulate and test the software before deploying it to the target system

Question **54:** START
Which of the following laboratory tools is **commonly used** for debugging embedded systems? **CO4**
Question **54:** END
Option_a: Microscope
Option_b: Digital oscilloscope
Option_c: Inkjet printer
Option_d: 3D scanner
correct_option: Digital oscilloscope

Question **55:** START
ARM processors are based on which type of architecture? **CO5**
Question **55:** END
Option_a: CISC
Option_b: RISC
Option_c: VLIW
Option_d: DSP
correct_option: RISC

Question **56:** START
SHARC processors are primarily designed for: **CO5**
Question **56:** END
Option_a: General-purpose computing
Option_b: Digital signal processing (DSP) applications
Option_c: Mobile phone applications
Option_d: Web development
correct_option: Digital signal processing (DSP) applications

Question **57:** START
In **Harvard architecture**, which of the following is true? **CO5**
Question **57:** END
Option_a: Data and instructions share the same memory
Option_b: Data and instructions have separate memory
Option_c: Instructions are stored in registers
Option_d: Only RAM is used for program storage
correct_option: Data and instructions have separate memory

Question **58:** START
Which memory type is **non-volatile** and used to store firmware in embedded systems? **CO5**
Question **58:** END
Option_a: SRAM
Option_b: DRAM
Option_c: Flash memory
Option_d: Cache memory
correct_option: Flash memory

Question **59:** START
What is the main goal of **instruction-level parallelism (ILP)**? **CO5**
Question **59:** END
Option_a: Reducing power consumption
Option_b: Executing multiple instructions simultaneously
Option_c: Reducing memory usage
Option_d: Increasing the number of registers
correct_option: Executing multiple instructions simultaneously

Question **60:** START
Pipelining in processors helps in: **CO5**
Question **60:** END
Option_a: Increasing instruction execution speed
Option_b: Reducing the number of registers
Option_c: Slowing down program execution
Option_d: Using a single memory for code and data
correct_option: Increasing instruction execution speed

Question **61:** START

Which of the following is a serial communication protocol used in embedded systems? CO5
Question **61:** END
Option_a: PCI
Option_b: I2C
Option_c: DDR
Option_d: USB 3.0
correct_option: I2C

Question **62:** START
The **main advantage of a CAN bus** in embedded systems is: **CO5**
Question **62:** END
Option_a: High-speed parallel communication
Option_b: Error detection and arbitration
Option_c: Supports only point-to-point communication
Option_d: Uses a single master node
correct_option: Error detection and arbitration

Question **63:** START
The I2C protocol supports communication between: **CO5**
Question **63:** END
Option_a: Only two devices
Option_b: Multiple master and slave devices
Option_c: Only one master and one slave
Option_d: Only analog devices
correct_option: Multiple master and slave devices

Question **64:** START
The **maximum standard bit rate of the CAN bus** is: **CO5**
Question **64:** END
Option_a: 10 Kbps
Option_b: 100 Kbps
Option_c: 1 Mbps
Option_d: 10 Mbps
correct_option: 1 Mbps

Question **65:** START
Which communication protocol is commonly used for **Internet-enabled embedded systems**? **CO5**
Question **65:** END
Option_a: HTTP
Option_b: PCIe
Option_c: SPI
Option_d: SATA
correct_option: HTTP

Question **66:** START

What is the main advantage of **IoT-enabled embedded systems**? **CO5**
Question **66:** END
Option_a: Reduced power consumption
Option_b: Remote monitoring and control
Option_c: Works only on wired connections
Option_d: Requires no internet connection
correct_option: Remote monitoring and control

Question **67:** START
What is the primary function of an **elevator controller** in an embedded system? **CO5**
Question **67:** START
Option_a: Displaying advertisements
Option_b: Controlling motor movement and door operations
Option_c: Enhancing signal strength
Option_d: Processing internet traffic
correct_option: Controlling motor movement and door operations

Question **68:** START
Which type of **sensor** is commonly used in an elevator system for detecting floor positions? **CO5**
Question **68:** END
Option_a: Temperature sensor
Option_b: Proximity sensor
Option_c: Pressure sensor
Option_d: Humidity sensor
correct_option: Proximity sensor

Question 69. START
Which is the component of the processor **CO1**
Question 69. END
Option_a: Arithmetic Logic Unit
Option_b: Set of the Register
Option_c: Control Unit
Option_d: All of the above mentioned options
correct_option: All of the above mentioned options

Question 70:START
Which one is not the control signal **CO1**
Question 70: END
Option_a: Read
Option_b: Write
Option_c: Reset
Option_d: None of the above mentioned options
correct_option: Reset

Question 71: START

Which is used the stack in processor **CO1**

Question 71: END

Option_a: FIFO
Option_b: LIFO
Option_c: LILO
Option_d: FILO
correct_option: LIFO

Question 72: START

What is the order of the processor to execute the instruction? **CO1**

Question 72: END

Option_a: Decode,Fetch,Execute
Option_b: Fetch,Decode,Execute
Option_c: Execute,Decode, Fetch
Option_d: Decode,Execute,Fetch
correct_option: Fetch,Decode,Execute

Question 73: START

EEPROM stands for **CO1**

Question 73: END

Option_a: Erasable Edit Programmable Read Only memory
Option_b: Erasable Edge Programmable Read Only memory
Option_c: Electrically Erasable Programmable Read Only memory
Option_d: Electrically Edit Programmable Read Only memory
correct_option: Electrically Erasable Programmable Read Only memory

Question 74: START

Which is the component of the Embedded processor **CO1**

Question 74: END

Option_a: Arithmetic Logic Unit
Option_b: Set of the Register
Option_c: Control Unit
Option_d: All of the above mentioned options
correct_option: All of the above mentioned options

Question **75:** START

Which one is not the control signal **CO1**

Question **75:** END

Option_a: Read
Option_b: Write
Option_c: Reset
Option_d: None of the above mentioned options
correct_option: Reset

Question 76: START

Which signal is sampled at regular intervals for the purpose of ADC? **CO2**

Question 76: END

Option_a: analog signal
Option_b: digital signal
Option_c: quantised signal
Option_d: sampled signal
correct_option: analog signal

Question 77: START

Which factor depends on the quantisation error? **CO2**

Question 77: END

Option_a: number of error
Option_b: number of bits
Option_c: size of error
Option_d: conversion process
correct_option: number of bits

Question 78: START

Which theorem describes the sampling rate with the frequency of the analogue signal? **CO3**

Question 78: END

Option_a: Nyquist theorem
Option_b: Bayes theorem
Option_c: Sampling theorem
Option_d: Parseval's theorem
correct_option: Nyquist theorem

Question 79: START

The time taken to respond to an interrupt is known as **CO3**

Question 79: END

Option_a: interrupt delay
Option_b: interrupt time
Option_c: interrupt latency
Option_d: interrupt function
correct_option: interrupt latency

Question 80.: START

Into how many parts does the interrupt can split the software? **CO3**

Question 80.: END

Option_a: 2
Option_b: 3
Option_c: 4
Option_d: 5
correct_option: 2

Question 81: START

Which of the following allows the splitting of the software? **CO3**

Question 81: END

Option_a: wait statement
Option_b: ready
Option_c: interrupt
Option_d: acknowledgement
correct_option: interrupt

Question 82: START

Which part of the software is transparent to the interrupt mechanism? **CO3**

Question 82: END

Option_a: background
Option_b: foreground
Option_c: both background and foreground
Option_d: lateral ground
correct_option: background

Question 83: START

Which part of the software performs tasks in response to the interrupts? **CO3**

Question 83: END

Option_a: background
Option_b: foreground
Option_c: lateral ground
Option_d: both foreground and background
correct_option: foreground

Question 84: START

Which factor depends on the number of times of polling the port while executing the task? **CO3**

Question 84: END

Option_a: data
Option_b: data transfer rate
Option_c: data size
Option_d: number of bits
correct_option: data transfer rate

Question 8: START

. Which of the following can improve the quality and the structure of a code? **CO3**

Question 8: END

Option_a: polling
Option_b: subroutine
Option_c: sequential code

Option_d: concurrent code
correct_option: subroutine

Question 86: START
Which of the following are asynchronous to the operation? **CO3**
Question 86: END
Option_a: interrupts
Option_b: software
Option_c: DMA
Option_d: memory
correct_option: interrupts

Question 87: START
What does ISR stand for? **CO3**
Question 87: END
Option_a: interrupt standard routine
Option_b: interrupt service routine
Option_c: interrupt software routine
Option_d: interrupt synchronous routine
correct_option: interrupt service routine

Question 88: START
Which of the following provides a buffer between the user and the low-level interfaces to the hardware? **CO4**
Question 88: END
Option_a: operating system
Option_b: kernel
Option_c: software
Option_d: hardware
correct_option: operating system

Question 89: START
Which of the following enables the user to utilise the system efficiently? **CO4**
Question 89: END
Option_a: kernel
Option_b: operating system
Option_c: software
Option_d: hardware
correct_option: operating system

Question 90: START
Which of the following can make the application program hardware independent? **CO4**
Question 90: END

Option_a: software
Option_b: application manager
Option_c: operating system
Option_d: kernel
correct_option: operating system

Question 91: START
Which of the following speed up the testing process? **CO4**
Question 91: END
Option_a: kernel
Option_b: software
Option_c: application manager
Option_d: program debugging tools
correct_option: program debugging tools

Question 92: START
Which of the following includes its own I/O routine? **CO4**
Question 92: END
Option_a: hardware
Option_b: kernel
Option_c: operating system
Option_d: application manager
correct_option: operating system

Question 93: START
Which forms the heart of the operating system? **CO4**
Question 93: END
Option_a: kernel
Option_b: applications
Option_c: hardware
Option_d: operating system
correct_option: kernel

Question 94: START
Which of the following locates a parameter block by using an address pointer? **CO4**
Question 94: END
Option_a: OS
Option_b: kernel
Option_c: system
Option_d: memory
correct_option: kernel

Question 95: START

Which of the following are not dependent on the actual hardware performing the physical task? **CO4**

Question 95: END

Option_a: applications
Option_b: hardware
Option_c: registers
Option_d: parameter block
correct_option: parameter block

Question 96: START

Which of the following bus can easily upgrade the system hardware? **CO4**

Question 96: END

Option_a: control bus
Option_b: data bus
Option_c: VMEbus
Option_d: bus interface unit
correct_option: VMEbus

Question 97: START

Which of the following is the first widely used operating system? **CO4**

Question 97: END

Option_a: MS-DOS
Option_b: windows XP
Option_c: android
Option_d: CP/M
correct_option: CP/M

Question 98: START

How an embedded system communicate with the outside world? **CO5**

Question 98: END

Option_a: Memory
Option_b: Output
Option_c: Peripherals
Option_d: Input
correct_option: Peripherals

Question 99: START

Which of the following helps in reducing the energy consumption of the embedded system? **CO5**

Question 99: END

Option_a: emulator
Option_b: debugger
Option_c: simulator

Option_d: compilers
correct_option: compilers

Question 100: START
Which of the following is the pin efficient method of communicating between other devices?
CO5
Question 100: END
Option_a: memory port
Option_b: peripheral port
Option_c: parallel port
Option_d: serial port
correct_option: serial port

2-MARKS SAMPLE QUESTIONS

1. Which is the component of the processor **CO1**

A . Arithmetic Logic Unit

B. Set of the Register

C. Control Unit

D. All of the above mentioned options **(ANSWER)**

2.Which one is not the control signal **CO1**

A.Read

B.Write

C.Reset **(ANSWER)**

D. None of the above mentioned options

3.Which is used the stack in processor **CO1**

A.FIFO

B.LIFO **(ANSWER)**

C.LILO

D.FILO

4. What is the order of the processor to execute the instruction? **CO1**

A.Decode,Fetch,Execute

B.Fetch,Decode,Execute **(ANSWER)**

C.Execute,Decode, Fetch

D.Decode,Execute,Fetch

5. EEPROM stands for **CO1**

A. Erasable Edit Programmable Read Only memory

B. Erasable Edge Programmable Read Only memory

C. Electrically Erasable Programmable Read Only memory **(ANSWER)**

D. Electrically Edit Programmable Read Only memory

6. The ARM core uses ____ Architecture. **CO5**

a) RISC **(ANSWER)**

b) CISC

c) Both

D) none

7. ARM Processor specifically designed for to reduce ___ **CO5**

a) Size

b) Power Consumption

C) both **(ANSWER)**

d) none.

8. ARM Processor core is a key component of ___ bit embedded system. **CO5**

a)8

b) 16

c)32 **(ANSWER)**

d)64

9. .ARM means ___ **CO5**

a) Advance Risc Machine **(ANSWER)**

b) Advance Review machine

c) Advance Risc mechanism

d) All

10. .RISC means ____ **CO5**

a)Reduced Instruction set computer **(ANSWER)**

b) Reduced Instruct set computer

C) both

d) None

11. Which is the component of the Embedded processor **CO1**

A . Arithmetic Logic Unit

B. Set of the Register

C. Control Unit

D. All of the above mentioned options **(ANSWER)**

12. Which one is not the control signal **CO1**

A.Read

B.Write

C.Reset **(ANSWER)**

D. None of the above mentioned options

13. Which is used the stack in processor **CO1**

A.FIFO

B.LIFO **(ANSWER)**

C.LILO

D.FI LO

14. What is the order of the processor to execute the instruction **CO1**

A.Decode,Fetch,Execute

B.Fetch,Decode,Execute **(ANSWER)**

C.Execute,Decode, Fetch

D.Decode,Execute,Fetch

15. EEPROM stands for **CO1**

A. Erasable Edit Programmable Read Only memory

B. Erasable Edge Programmable Read Only memory

C. Electrically Erasable Programmable Read Only memory **(ANSWER)**

D. Electrically Edit Programmable Read Only memory

16. .LPC 2148 microcontroller is based on ----------architecture **CO5**

A. ARM5

B. ARM7 **(ANSWER)**

C. ARM 9

D. ARM11

17. LPC 2148 microcontroller operated voltage is ---------V **CO5**

A. 5

B. 5.5

C. 3.3 **(ANSWER)**

D. 3

18. LPC2148 has **CO5**

A. 32kB on chip RAM and 128kB FLASH memory

B. 1MB RAM and 512kB on chip FLASH memory

C. 64kB RAM and 512kB on chip FLASH memory

D. 32kB RAM and 512kB on chip FLASH memory **(ANSWER)**

19. ADC in LPC 2148 microcontroller is ---------- successive approximation register type **CO5**

A. 16 bit

B. 12 bit

C. 10 bit **(ANSWER)**

D. 32 bit

20. ADC in LPC 2148 microcontroller is ---------- type **CO5**

A. 10 bit successive approximation register **(ANSWER)**

B. 10 bit Dual slope

C. 10 bit parallel

D. None of the mentioned above options

21. The ---------- block is to configure the Pins to the desired functions **CO5**

A. Pinstatus

B. pinselect

C. pincontrol **(ANSWER)**

D. None of the above mentioned options

22. Which type of communication can be transfer the signal in only one bit at a time **CO5**

A .Serial Communication **(ANSWER)**

B. Parallel Communication

C. Both serial and parallel communications

D. None of the above mentioned options

22. In communication protocol, number of bits transferred per second is known as ---------- ---------- A. Transmission rate **CO5**

B. Reception rate

C. Baud rate **(ANSWER)**

D. Bit rate

23. Which of the mode is used to transmit and receive data simultaneously? **CO5**

A.Simplex

B.Half Duplex

C.Full Duplex **(ANSWER)**

D.None of the mentioned other options

24. What is the advantages of Loop in c programingorder of the processor to execute the instruction? A.Reuseablity the same code **CO5**

B. we do not need to write the code and code again

C.we can transverse the elements from the array to linked list and viceversa

D.All of the mentioned above options **(ANSWER)**

25. In C Programming, what is the meaning of symbol << **CO5**

A. Left shift operator **(ANSWER)**

B. Right shift operator

C. Bit wise OR operator

D. one's complement operator

26. LPC 2148 Microcontroller has ---------- ALU **CO5**

A. 8-bit **(ANSWER)**

B. 16-bit

C. 32-bit

D.64-bit

27. Which of the following have an asynchronous data transmission? **CO5**

a) SPI

b)UART **(ANSWER)**

c) Parallel port

d) I2C

28. .Which are the two lines used in the I2C? **CO5**

a) SDA and SPDR

b) SPDR and SCL

c) SDA and SCL **(ANSWER)**

d) SCL and status line

29. SSP means that--------- **CO5**

a)Serial select port

b)Synchronous serial port **(ANSWER)**

c)Synchronous select port

d)Serial slave port

30. Which one of the following serial communication interface support for arbitration and synchronization logic **CO3**

a) USB

b) UART

c) I2C **(ANSWER)**

d) SSP

31. Universal Serial Bus (USB) in LPC 2148 operated at ---------- MHZ **CO3**

a)12

b) 36

c) 48 **(ANSWER)**

d) 64

32. Which one of the following is a real time operating system? **CO3**

a) RTLinux

b) VxWorks

c) Windows CE

d) All of the mentioned **(ANSWER)**

33. ----------kernel is not modular, fault-tolerant, configurable,modifiable **CO3**

a)Micro

b)Monolithic **(ANSWER)**

c)Macro

d) of the mentioned options

34. Kernel is used to performs---------- **CO3**

a)Task scheduling **(ANSWER)**

b)Install the drivers

c)Install the application programs

d)All of the mentioned options

35. Message Pipes is used for ---------- **CO3**

a)Task scheduling

b)Context switching

c)Inter task communication **(ANSWER)**

d)All of the mentioned options

36. What is Scheduling? **CO3**

a) allowing a job to use the processor **(ANSWER)**

b) making proper use of processor

c) all of the mentioned

d) none of the mentioned

37. .Which of the following decides which task can have the next time slot?

a) single task operating system **CO3**

b) applications

c) kernel **(ANSWER)**

d) software

38. Operating system is a …. **CO3**

a) System software **(ANSWER)**

b) Application software

c) Presentation software

d) Database software

39. The OS used to operate the mobile phone is a **CO3**

a) Smart card OS

b) Embedded OS **(ANSWER)**

c) Multiuser OS

d) None of above

40. _____ is when multiple jobs are executed by the CPU simultaneously by switching between them. **CO5**

a) Multiprogramming

b) Multitasking **(ANSWER)**

c) Distributed Environment

d) Spooling

41. Which of the following is an example of a real time operating system? **CO5**

a) Linux

b) MS DOS

c) Windows XP

d) Vxworks **(ANSWER)**

42. µC/OS-II RTOS is ---------- **CO5**

a)Pre-emptive based Multitasking Real time Kernel **(ANSWER)**

b)Non pre-emptive based Multitasking Real time Kernel

c)Round robin based Multitasking Real time Kernel

d)All of the mentioned options

43. µC/OS-II RTOS written in ---------- language **CO5**

a)Java

b)C++

c)ANSI C **(ANSWER)**

d)None of the mentioned other options

44. In µC/OS-II RTOS ----------number of task can be handle **CO5**

a) 32

b) 16

c) 64 **(ANSWER)**

d) 56

45. .Which one the following is the not the advantages of the µC/OS-II RTOS **CO5**

a) Heavy weight **(ANSWER)**

b) Simplicity

c) Modular in nature

d) None of the mentioned options

46. In µC/OS-II RTOS, while the task create function which one of following parameter to be passed **CO5**

a) Task pointer

b) Task identifier

c) Taskstack pointer

d) All of the mentioned options **(ANSWER)**

47. Which are the processors based on RISC? **CO5**

a) SPARC **(ANSWER)**

b) 80386

c) MC68030

d) MC68020

48. What is 80/20 rule? **CO5**
a) 80% instruction is generated and 20% instruction is executed **(ANSWER)**
b) 80% instruction is executed and 20% instruction is generated
c) 80%instruction is executed and 20% instruction is not executed
d) 80% instruction is generated and 20% instructions are not generated

49. Which of the architecture is more complex? **CO5**
a) SPARC **(ANSWER)**
b) MC68030
c) MC68030
d) 8086

50. Which is the first company who defined RISC architecture? **CO5**
a) Intel
b) IBM **(ANSWER)**
c) Motorola
d) MIPS

51. Which of the following processors execute its instruction in a single cycle? **CO5**
a) 8086
b) 8088
c) 8087
d) MIPS R2000 **(ANSWER)**

52. How is memory accessed in RISC architecture? **CO5**
a) load and store instruction **(ANSWER)**
b) opcode instruction
c) memory instruction
d) bus instruction

53. Which of the following has a Harvard architecture? **CO5**
a) EDSAC
b) SSEM
c) PIC **(ANSWER)**
d) CSIRAC

54. Which of the following statements are true for von Neumann architecture? **CO5**
a) shared bus between the program memory and data memory **(ANSWER)**
b) separate bus between the program memory and data memory
c) external bus for program memory and data memory
d) external bus for data memory only

55. What is CAM stands for? **CO5**
a) content-addressable memory **(ANSWER)**

b) complex addressable memory
c) computing addressable memory
d) concurrently addressable memory

56. Which of the following processors uses Harvard architecture? **CO5**
a) TEXAS TMS320 **(ANSWER)**
b) 80386
c) 80286
d) 8086

57. Which company further developed the study of RISC architecture? **CO5**
a) Intel
b) Motorola
c) university of Berkeley **(ANSWER)**
d) MIPS

58. Which signal is sampled at regular intervals for the purpose of ADC? **CO2**
a) analog signal **(ANSWER)**
b) digital signal
c) quantised signal
d) sampled signal

59. Which factor depends on the quantisation error? **CO2**
a) number of error
b) number of bits **(ANSWER)**
c) size of error
d) conversion process

60. Which theorem describes the sampling rate with the frequency of the analogue signal? **CO3**
a) Nyquist theorem **(ANSWER)**
b) Bayes theorem
c) Sampling theorem
d) Parseval's theorem

61. The time taken to respond to an interrupt is known as **CO3**
a) interrupt delay
b) interrupt time
c) interrupt latency **(ANSWER)**
d) interrupt function

62. Into how many parts does the interrupt can split the software? **CO3**
a) 2 **(ANSWER)**
b) 3

c) 4
d) 5

63. Which of the following allows the splitting of the software? **CO3**
a) wait statement
b) ready
c) interrupt **(ANSWER)**
d) acknowledgement

64. Which part of the software is transparent to the interrupt mechanism? **CO3**
a) background **(ANSWER)**
b) foreground
c) both background and foreground
d) lateral ground

65. Which part of the software performs tasks in response to the interrupts? **CO3**
a) background
b) foreground **(ANSWER)**
c) lateral ground
d) both foreground and background

66. Which factor depends on the number of times of polling the port while executing the task? **CO3**
a) data
b) data transfer rate **(ANSWER)**
c) data size
d) number of bits

67. Which of the following can improve the quality and the structure of a code? **CO3**
a) polling
b) subroutine **(ANSWER)**
c) sequential code
d) concurrent code

68. Which of the following are asynchronous to the operation? **CO3**
a) interrupts **(ANSWER)**
b) software
c) DMA
d) memory

69. What does ISR stand for? **CO3**
a) interrupt standard routine
b) interrupt service routine **(ANSWER)**

c) interrupt software routine
d) interrupt synchronous routine

70. Which code is written as part of the ISR? **CO5**
a) data receive code
b) sequential code
c) data transfer code **(ANSWER)**
d) concurrent code

71. How is the protection and security for an embedded system made? **CO5**
a) Security chips
b) Memory disk security
c) IPR **(ANSWER)**
d) OTP

72. Which of the following task swapping method is a better choice in the embedded systems design? **CO5**
a) time slice
b) RMS
c) cooperative multitasking
d) pre-emptive **(ANSWER)**

73. Which type of memory is suitable for low volume production of embedded systems? **CO5**
a) Non-volatile **(ANSWER)**
b) RAM
c) Volatile
d) ROM

74. Which activity is concerned with identifying the task at the final embedded systems? **CO5**
a) scheduling
b) task-level concurrency management **(ANSWER)**
c) high-level transformation
d) compilation

75. Which level simulates the algorithms that are used within the embedded systems? **CO5**
a) algorithmic level **(ANSWER)**
b) switch level
c) gate level
d) circuit level

76. How an embedded system communicate with the outside world? **CO5**
a) Memory

b) Output
c) Peripherals **(ANSWER)**
d) Input

80. Which of the following helps in reducing the energy consumption of the embedded system? **CO5**
a) emulator
b) debugger
c) simulator
d) compilers **(ANSWER)**

81. Which of the following is the pin efficient method of communicating between other devices? **CO5**
a) memory port
b) peripheral port
c) parallel port
d) serial port **(ANSWER)**

82. Which of the following is a traditional method for emulating the processor? **CO5**
a) CPU simulator
b) SDS
c) ICE **(ANSWER)**
d) Low-level language simulator

83. Which of the following offers external chips for memory and peripheral interface circuits? **CO5**
a) Embedded system
b) Peripheral system
c) Microcontroller
d) Microprocessor **(ANSWER)**

84. Which of the following is a part of RTOS kernel? **CO5**
a) register
b) ISR **(ANSWER)**
c) memory
d) input

85. What does I2C stand for? **CO5**
a) inter-IC **(ANSWER)**
b) intra-IC
c) individual integrated chip
d) intel IC

86. Which are the two lines used in the I2C? **CO5**
a) SDA and SPDR
b) SPDR and SCL
c) SDA and SCL **(ANSWER)**
d) SCL and status line

87. Which of the following can be used for long distance communication? **CO5**
a) I2C
b) Parallel port
c) SPI
d) RS232 **(ANSWER)**

88. Which are the serial ports of the IBM PC? **CO1**
a) COM1
b) COM4 and COM1
c) COM1 and COM2 **(ANSWER)**
d) COM3

89. Which one of the following is the successor of 8086 and 8088 processor? **CO1**
a) 80286 **(ANSWER)**
b) 80387
c) 8051
d) 8087

90. Which are the 4 general purposes 16 bit register in Intel 80286? **CO1**
a) CS,DS,SS,ES
b) AX,BX,CX,DX **(ANSWER)**
c) IP,FL,DI,SI
d) DI,SI,BP,SP

91. Which of the following provides a buffer between the user and the low-level interfaces to the hardware? **CO4**
a) operating system **(ANSWER)**
b) kernel
c) software
d) hardware

92. Which of the following enables the user to utilise the system efficiently?
a) kernel **CO4**
b) operating system **(ANSWER)**
c) software
d) hardware

93. Which of the following can make the application program hardware independent? **CO4**
a) software
b) application manager
c) operating system **(ANSWER)**
d) kernel

94. Which of the following speed up the testing process? **CO4**
a) kernel
b) software
c) application manager
d) program debugging tools **(ANSWER)**

95. Which of the following includes its own I/O routine? **CO4**
a) hardware
b) kernel
c) operating system **(ANSWER)**
d) application manager

96. Which forms the heart of the operating system? **CO4**
a) kernel **(ANSWER)**
b) applications
c) hardware
d) operating system

97. Which of the following locates a parameter block by using an address pointer? **CO4**
a) OS
b) kernel **(ANSWER)**
c) system
d) memory

98. Which of the following are not dependent on the actual hardware performing the physical task? **CO4**

a) applications
b) hardware
c) registers
d) parameter block **(ANSWER)**

99. Which of the following bus can easily upgrade the system hardware? **CO4**
a) control bus
b) data bus
c) VMEbus **(ANSWER)**
d) bus interface unit

100. Which of the following is the first widely used operating system? **CO4**
a) MS-DOS
b) windows XP
c) android
d) CP/M **(ANSWER**

Question 1: START
In hard real-time systems, missing a deadline (CO3)
Question 1: END

Option_a: Reduces system performance
Option_b: Has no impact on system execution
Option_c: Leads to system failure
Option_d: Causes only minor delays
Correct_option: Leads to system failure

Question 2: START
Which of the following is commonly used for hard real-time task scheduling? (CO3)
Question 2: END

Option_a: Round Robin
Option_b: First-Come-First-Serve (FCFS)
Option_c: Rate Monotonic Scheduling (RMS)
Option_d: Multilevel Queue
Correct_option: Rate Monotonic Scheduling (RMS)

Question 3: START
The primary goal of hard real-time scheduling is to (CO3)
Question 3: END

Option_a: Maximize CPU utilization
Option_b: Minimize turnaround time
Option_c: Guarantee task deadlines
Option_d: Improve response time
Correct_option: Guarantee task deadlines

Question 4: START
Which of the following statements is true for Rate Monotonic Scheduling (RMS)? (CO3)
Question 4: END

Option_a: Longer period tasks have higher priority
Option_b: Shorter period tasks have higher priority
Option_c: It is a non-pre-emptive scheduling algorithm
Option_d: It allows tasks to miss deadlines
Correct_option: Shorter period tasks have higher priority

Question 5: START
Which scheduling algorithm is optimal for periodic hard real-time tasks? (CO3)
Question 5: END

Option_a: Earliest Deadline First (EDF)
Option_b: Round Robin
Option_c: Multilevel Queue
Option_d: Shortest Job Next (SJN)
Correct_option: Earliest Deadline First (EDF)

Question 6: START
In Deadline Monotonic Scheduling (DMS), priority is assigned based on (CO3)
Question 6: END

Option_a: Task period
Option_b: Task deadline
Option_c: Task execution time
Option_d: CPU utilization
Correct_option: Task deadline

Question 7: START
Which real-time scheduling approach ensures the highest priority for the task with the earliest deadline? (CO3)
Question 7: END

Option_a: Round Robin
Option_b: First-Come-First-Serve
Option_c: Earliest Deadline First (EDF)
Option_d: Least Slack Time First
Correct_option: Earliest Deadline First (EDF)

Question 8: START
Hard real-time systems are commonly used in (CO3)
Question 8: END

Option_a: Video streaming
Option_b: Industrial automation
Option_c: Gaming applications
Option_d: Web browsing
Correct_option: Industrial automation

Question 9: START
In Rate Monotonic Scheduling (RMS), what is the maximum CPU utilization for n tasks? (CO3)
Question 9: END

Option_a: n(2^(1/n) - 1)
Option_b: (n+1)/2
Option_c: (n-1)/n
Option_d: 1/n
Correct_option: n(2^(1/n) - 1)

Question 10: START
Which of the following is not a hard real-time system? (CO3)
Question 10: END

Option_a: Pacemaker
Option_b: Aircraft control system
Option_c: Banking transaction system
Option_d: Nuclear reactor control system
Correct_option: Banking transaction system

Question 11: START
Which of the following algorithms is not used in real-time scheduling? (CO3)
Question 11: END

Option_a: EDF
Option_b: RMS
Option_c: Shortest Job First (SJF)
Option_d: DMS
Correct_option: Shortest Job First (SJF)

Question 12: START
A hard real-time task must (CO3)
Question 12: END

Option_a: Execute as soon as possible
Option_b: Meet its deadline under all conditions
Option_c: Run only at high priority
Option_d: Always run before soft real-time tasks
Correct_option: Meet its deadline under all conditions

Question 13: START
In hard real-time systems, missing a deadline (CO3)
Question 13: END

Option_a: Reduces system performance
Option_b: Has no impact on system execution
Option_c: Leads to system failure
Option_d: Causes only minor delays
Correct_option: Leads to system failure

Question 14: START
What is the main disadvantage of using Flash memory in embedded systems?(CO3)
Question 14: END

Option_a: High power consumption
Option_b: Slow write cycles
Option_c: High cost
Option_d: Limited storage
correct_option: Slow write cycles

Question 15: START
The primary goal of hard real-time scheduling is to (CO3)
Question 15: END

Option_a: Maximize CPU utilization
Option_b: Minimize turnaround time
Option_c: Guarantee task deadlines
Option_d: Improve response time
Correct_option: Guarantee task deadlines

Question 16: START
Which power-saving technique is most effective for battery-powered embedded devices? (CO3)
Question 16: END
Option_a: Dynamic voltage and frequency scaling (DVFS)
Option_b: Increasing CPU clock speed
Option_c: Adding more cores
Option_d: Using high-power circuits
correct_option: Dynamic voltage and frequency scaling (DVFS)

Question 17: START
What is the primary purpose of a semaphore in an embedded system? (CO3)
Question 17: END

Option_a: Synchronization between tasks
Option_b: Increasing processing speed
Option_c: Power management
Option_d: Memory allocation
correct_option: Synchronization between tasks

Question 18: START
Which type of semaphore allows only one task to access a shared resource at a time? (CO3)
Question 18: END

Option_a: Binary semaphore
Option_b: Counting semaphore
Option_c: Mutex
Option_d: Recursive semaphore
correct_option: Binary semaphore

Question 19: START
What is the key difference between a mutex and a binary semaphore? (CO3)
Question 19: END

Option_a: A mutex can only be released by the task that acquired it
Option_b: A binary semaphore is slower than a mutex
Option_c: A mutex does not provide task synchronization
Option_d: A binary semaphore has priority inheritance
correct_option: A mutex can only be released by the task that acquired it

Question 20 START
Hard real-time systems are commonly used in (CO3)
Question 20: END

Option_a: Video streaming
Option_b: Industrial automation
Option_c: Gaming applications
Option_d: Web browsing
Correct_option: Industrial automation

Question 21: START
In Rate Monotonic Scheduling (RMS), what is the maximum CPU utilization for n tasks? (CO3)
Question 21: END

Option_a: n(2^(1/n) - 1)
Option_b: (n+1)/2
Option_c: (n-1)/n
Option_d: 1/n
Correct_option: n(2^(1/n) - 1)

Question 22: START
Which of the following is not a hard real-time system? (CO3)
Question 22: END

Option_a: Pacemaker
Option_b: Aircraft control system
Option_c: Banking transaction system
Option_d: Nuclear reactor control system
Correct_option: Banking transaction system

Question 23: START
A real-time system is considered schedulable if (CO3)
Question 23: END

Option_a: All tasks meet their deadlines
Option_b: CPU utilization is below 50%
Option_c: At least one task meets its deadline
Option_d: It follows FIFO scheduling
Correct_option: All tasks meet their deadlines

Question 24: START
Which problem can occur if a semaphore is not handled properly in an embedded system? (CO3)
Question 24: END

Option_a: Deadlock
Option_b: Increased power consumption
Option_c: Memory leak
Option_d: High CPU temperature
correct_option: Deadlock

Question 25: START
A counting semaphore with an initial value of 3 allows how many tasks to access a resource simultaneously? (CO3)
Question 5: END

Option_a: 1
Option_b: 2
Option_c: 3
Option_d: Unlimited
correct_option: 3

Question 26: START
Which of the following tools is primarily used for writing embedded software? (CO3)
Question 26: END

Option_a: Compiler
Option_b: Debugger
Option_c: Emulator
Option_d: Logic Analyzer
correct_option: Compiler

Question 27: START
Which software tool is responsible for converting high-level code into machine code? (CO3)
Question 27: END

Option_a: Assembler
Option_b: Compiler
Option_c: Debugger
Option_d: Simulator
correct_option: Compiler

Question 28: START
Which tool helps in detecting and fixing errors in embedded code? (CO3)
Question 28: END

Option_a: Emulator
Option_b: Debugger
Option_c: Compiler
Option_d: Assembler
correct_option: Debugger

Question 29: START
What is the main purpose of a cross-compiler in embedded systems? (CO3)
Question 29: END

Option_a: To compile code for a different architecture
Option_b: To debug software
Option_c: To generate assembly code
Option_d: To optimize program execution
correct_option: To compile code for a different architecture

Question 30: START
Which tool is used to analyze the execution of real-time embedded software? (CO3)
Question 30: END

Option_a: Simulator
Option_b: Debugger
Option_c: Profiler
Option_d: Editor
correct_option: Profiler

Question 31: START
Which of the following is an example of an integrated development environment (IDE) used for embedded systems? (CO3)
Question 31: END

Option_a: Keil uVision
Option_b: Adobe Photoshop
Option_c: Microsoft Excel
Option_d: Cisco Packet Tracer
correct_option: Keil uVision

Question 32: START
Which software tool converts assembly language code into machine code? (CO3)
Question 32: END

Option_a: Compiler
Option_b: Assembler
Option_c: Debugger
Option_d: Profiler
correct_option: Assembler

Question 33: START
What is the primary role of a linker in embedded software development? (CO3)
Question 33: END

Option_a: Convert source code to assembly code
Option_b: Resolve function and variable references
Option_c: Execute the embedded program
Option_d: Optimize runtime performance
correct_option: Resolve function and variable references

Question 34: START
Which tool provides real-time debugging capabilities? (CO3)
Question 34: END

Option_a: Compiler
Option_b: Debugger
Option_c: Logic Analyzer
Option_d: Emulator
correct_option: Emulator

Question 35: START
What does JTAG stand for in embedded system development? (CO3)
Question 35: END

Option_a: Joint Test Access Group
Option_b: Java Technical Access Gateway
Option_c: Jump Table Access Gateway
Option_d: Joint Task Allocation Group
correct_option: Joint Test Access Group

Question 36: START
Which software tool is used for real-time code execution analysis? (CO3)
Question 36: END

Option_a: Debugger
Option_b: Simulator
Option_c: Logic Analyzer
Option_d: Profiler
correct_option: Profiler

Question 37: START
Which embedded software development tool is essential for on-chip debugging? (CO3)
Question 37: END

Option_a: JTAG
Option_b: Compiler
Option_c: Assembler
Option_d: Disassembler
correct_option: JTAG

Question 38: START
Which of the following tools helps in simulating embedded software behaviour without actual hardware? (CO3)
Question 38: END

Option_a: Emulator
Option_b: Simulator
Option_c: Compiler
Option_d: Debugger
correct_option: Simulator

Question 39: START
What is the primary role of a host machine in embedded system development? (CO3)
Question 39: END

Option_a: Runs the embedded application
Option_b: Develops and compiles the embedded software
Option_c: Directly interfaces with sensors
Option_d: Controls real-time hardware
correct_option: Develops and compiles the embedded software

Question 40: START
Which of the following is an example of a target machine in an embedded system? (CO3)
Question 40: END

Option_a: Desktop Computer
Option_b: Microcontroller
Option_c: Cloud Server
Option_d: Database Server
correct_option: Microcontroller

Question 41: START
Which of the following statements is true about host and target machines? (CO3)
Question 41: END

Option_a: Host and target machines always use the same processor architecture
Option_b: The host machine is typically used for development, while the target runs the final code
Option_c: A target machine is always more powerful than a host machine
Option_d: Host and target machines do not interact in embedded systems
correct_option: The host machine is typically used for development, while the target runs the final code

Question 42: START
What is the primary communication method between a host and a target machine in embedded development? (CO3)
Question 42: END

Option_a: Serial communication (UART, USB, JTAG)
Option_b: Ethernet only
Option_c: Wi-Fi only
Option_d: Optical fiber
correct_option: Serial communication (UART, USB, JTAG)

Question 43: START
Which of the following tools is used to transfer compiled code from the host to the target machine? (CO3)
Question 43: END

Option_a: Compiler
Option_b: Debugger
Option_c: Flash Programmer
Option_d: Logic Analyzer
correct_option: Flash Programmer

Question 44: START
What is the role of a cross-compiler in embedded system development? (CO3)
Question 44: END

Option_a: Compiles code on the target machine
Option_b: Converts high-level code into machine code for a different architecture
Option_c: Debugs software on the host machine
Option_d: Monitors power consumption
correct_option: Converts high-level code into machine code for a different architecture

Question 45: START
Which of the following is an example of a commonly used cross-compiler in embedded systems? (CO3)
Question 45: END

Option_a: GCC (GNU Compiler Collection)
Option_b: Adobe Compiler
Option_c: Windows Debugger
Option_d: Microsoft Excel
correct_option: GCC (GNU Compiler Collection)

Question 46: START
Which tool is primarily used for debugging software running on a target machine? (CO3)
Question 46: END

Option_a: Logic Analyzer
Option_b: GDB (GNU Debugger)
Option_c: Photoshop
Option_d: Text Editor
correct_option: GDB (GNU Debugger)

Question 47: START
Which interface is commonly used for low-level debugging between a host and a target machine? (CO3)
Question 47: END

Option_a: JTAG
Option_b: HDMI
Option_c: VGA
Option_d: Bluetooth
correct_option: JTAG

Question 48: START
Which of the following is not a common type of target machine in embedded systems? (CO3)
Question 48: END

Option_a: Microcontroller
Option_b: FPGA
Option_c: Cloud Server
Option_d: DSP (Digital Signal Processor)
correct_option: Cloud Server

Question 49: START
Which interface allows a host machine to send debugging commands to a target machine? (CO3)
Question 49: END

Option_a: SSH
Option_b: GDB Remote Protocol
Option_c: HDMI
Option_d: HTTP
correct_option: GDB Remote Protocol

Question 50: START
Which of the following correctly describes the difference between host and target machines? (CO3)
Question 50: END

Option_a: The host develops and compiles the code, while the target executes it
Option_b: The target compiles code, and the host executes it
Option_c: Host and target machines have the same software stack
Option_d: Host and target machines must use the same operating system
correct_option: The host develops and compiles the code, while the target executes it

Question 51: START
What is the primary function of a linker in embedded system development? (CO3)
Question 51: END

Option_a: Converts high-level code to assembly code
Option_b: Combines object files into an executable
Option_c: Executes the program on the target machine
Option_d: Optimizes power consumption
correct_option: Combines object files into an executable

Question 52: START
Which of the following is not a type of linker used in embedded systems? (CO3)
Question 52: END

Option_a: Static Linker
Option_b: Dynamic Linker
Option_c: Loader Linker
Option_d: Power Linker
correct_option: Power Linker

Question 53: START
What is the role of a loader in relation to a linker? (CO3)
Question 53: END

Option_a: Loads the linked executable into memory
Option_b: Combines object files into a single executable
Option_c: Converts C code to assembly
Option_d: Removes errors from source code
correct_option: Loads the linked executable into memory

Question 54: START
Which type of linker is commonly used in embedded systems? (CO3)
Question 54: END

Option_a: Static Linker
Option_b: Dynamic Linker
Option_c: Cloud Linker
Option_d: Script Linker
correct_option: Static Linker

Question 55: START
What does a linker script do in embedded system development? (CO3)
Question 55: END

Option_a: Specifies memory layout and sections for linking
Option_b: Converts machine code into object code
Option_c: Executes the compiled program
Option_d: Generates user interface designs
correct_option: Specifies memory layout and sections for linking

Question 56: START
Which of the following is not a standard linker output file format? (CO3)
Question 56: END

Option_a: ELF
Option_b: HEX
Option_c: OBJ
Option_d: DOCX
correct_option: DOCX

Question 57: START
What is relocation in the context of a linker? (CO3)
Question 7: END

Option_a: Assigning absolute addresses to symbols
Option_b: Optimizing power consumption
Option_c: Executing code on a microcontroller
Option_d: Removing syntax errors
correct_option: Assigning absolute addresses to symbols

Question 58: START
Which of the following tools performs linking in embedded system development? (CO3)
Question 58: END

Option_a: GNU LD
Option_b: MATLAB
Option_c: Excel
Option_d: Photoshop
correct_option: GNU LD

Question 59: START
What is the primary difference between static and dynamic linking? (CO3)
Question 59: END

Option_a: Static linking occurs at compile-time, dynamic linking occurs at runtime
Option_b: Static linking occurs at runtime, dynamic linking occurs at compile-time
Option_c: Static linking is used only for Linux, dynamic linking is for Windows
Option_d: Both perform identical functions
correct_option: Static linking occurs at compile-time, dynamic linking occurs at runtime

Question 60: START
Which section in an executable file contains initialized global and static variables? (CO3)
Question 60: END

Option_a: .bss
Option_b: .data
Option_c: .text
Option_d: .stack
correct_option: .data

Question 61: START
Which of the following is a limitation of static linking in embedded systems? (CO3)
Question 61: END

Option_a: Increases the size of the final executable
Option_b: Requires runtime support
Option_c: Introduces dependencies on shared libraries
Option_d: Reduces execution speed
correct_option: Increases the size of the final executable

Question 62: START
Which linker output format is commonly used for flashing firmware onto microcontrollers? (CO3)
Question 62: END

Option_a: HEX
Option_b: PDF
Option_c: MP3
Option_d: DOCX
correct_option: HEX

Question 63: START
What is the primary function of a locator in embedded system development? (CO3)
Question 63: END

Option_a: Assigns physical memory addresses to program sections
Option_b: Converts high-level code to assembly
Option_c: Debugs runtime errors
Option_d: Executes the embedded program
correct_option: Assigns physical memory addresses to program sections

Question 64: START
Which of the following is not a role of a locator? (CO3)
Question 64: END

Option_a: Mapping logical addresses to physical memory
Option_b: Allocating memory for program sections
Option_c: Optimizing power consumption
Option_d: Assigning variables to specific memory locations
correct_option: Optimizing power consumption

Question 65: START
Why is a locator needed in embedded system development? (CO3)
Question 65: END

Option_a: Embedded systems often use fixed memory locations
Option_b: It compiles the source code
Option_c: It controls external peripherals
Option_d: It provides an interface for debugging
correct_option: Embedded systems often use fixed memory locations

Question 66: START
Which of the following is not a common locator file format? (CO3)
Question 66: END

Option_a: ELF
Option_b: MAP
Option_c: DOCX
Option_d: HEX
correct_option: DOCX

Question 67: START
What type of memory layout does a locator define? (CO3)
Question 67: END

Option_a: Stack and heap allocation
Option_b: Instruction set encoding
Option_c: Clock speed and power consumption
Option_d: Compiler optimization techniques
correct_option: Stack and heap allocation

Question 68: START
Which tool is commonly used for memory location mapping in embedded systems? (CO3)
Question 68: END

Option_a: GNU LD
Option_b: Photoshop
Option_c: MS Word
Option_d: Excel
correct_option: GNU LD

Question 69: START
What does a memory map file generated by a locator contain? (CO3)
Question 69: END

Option_a: Memory address allocations for program sections
Option_b: Debugging logs of the execution
Option_c: Power consumption of the embedded system
Option_d: Source code errors
correct_option: Memory address allocations for program sections

Question 70 START
Which of the following is a key output of a locator? (CO3)
Question 70: END

Option_a: Linker script
Option_b: Memory map
Option_c: Assembly file
Option_d: Header file
correct_option: Memory map

Question 71: START
What happens if a locator does not correctly allocate memory? (CO3)
Question 71: END

Option_a: The program may crash or misbehave
Option_b: The compiler will automatically fix it
Option_c: The debugger will remove all errors
Option_d: The OS will dynamically adjust memory
correct_option: The program may crash or misbehave

Question 72: START
Which section in an embedded memory layout stores initialized global variables? (CO3)
Question 72: END

Option_a: .data
Option_b: .text
Option_c: .bss
Option_d: .stack
correct_option: .data

Question 73: START
Which component uses locator output to correctly load the program? (CO3)
Question 73: END

Option_a: Loader
Option_b: Compiler
Option_c: Debugger
Option_d: Linker
correct_option: Loader

Question 74: START
Which memory segment stores the stack in an embedded system? (CO3)
Question 74: END

Option_a: RAM
Option_b: ROM
Option_c: Flash
Option_d: Hard Disk
correct_option: RAM

Question 75: START
Which embedded tool uses locator output to burn software onto a microcontroller? (CO3)
Question 75: END

Option_a: Flash programmer
Option_b: Word processor
Option_c: Image editor
Option_d: Audio mixer
correct_option: Flash programmer

Question 76: START
What is µC-OS primarily designed for? (CO3)
Question 76: END

Option_a: General-purpose computing
Option_b: Real-time embedded systems
Option_c: Web development
Option_d: Data analytics
correct_option: Real-time embedded systems

Question 77: START
Which of the following is not a feature of µC-OS? (CO3)
Question 77: END

Option_a: Preemptive multitasking
Option_b: Deterministic behavior
Option_c: Dynamic memory allocation
Option_d: Priority-based scheduling
correct_option: Dynamic memory allocation

Question 78: START
What scheduling algorithm does µC-OS primarily use? (CO3)
Question 78: END

Option_a: Round Robin
Option_b: First-Come, First-Served
Option_c: Priority-based pre-emptive scheduling
Option_d: Shortest Job First
correct_option: Priority-based pre-emptive scheduling

Question 79: START
Which kernel type does µC-OS use? (CO3)
Question 79: END

Option_a: Microkernel
Option_b: Monolithic kernel
Option_c: Hybrid kernel
Option_d: Exokernel
correct_option: Microkernel

Question 80: START
How many task priorities are supported in µC-OS-II? (CO3)
Question 80: END

Option_a: 32
Option_b: 64
Option_c: 256
Option_d: 1024
correct_option: 64

Question 81: START
Which function in µC-OS is used to create a task? (CO3)
Question 81: END

Option_a: OSTaskCreate()
Option_b: OSCreate()
Option_c: TaskInit()
Option_d: CreateTask()
correct_option: OSTaskCreate()

Question 82: START
What is the purpose of the idle task in µC-OS? (CO3)
Question 82: END

Option_a: Executes when no other task is ready
Option_b: Handles system interrupts
Option_c: Allocates memory dynamically
Option_d: Monitors task scheduling
correct_option: Executes when no other task is ready

Question 83: START
Which memory model does µC-OS primarily use? (CO3)
Question 83: END

Option_a: Flat memory model
Option_b: Segmented memory model
Option_c: Virtual memory model
Option_d: Hybrid memory model
correct_option: Flat memory model

Question 84: START
What happens when a task in µC-OS blocks on a resource? (CO3)
Question 84: END

Option_a: The task is suspended
Option_b: The task keeps executing
Option_c: The task is deleted
Option_d: The system crashes
correct_option: The task is suspended

Question 85: START
Which function is used to start the µC-OS kernel? (CO3)
Question 85: END

Option_a: OSStart()
Option_b: KernelInit()
Option_c: RTOS_Run()
Option_d: StartOS()
correct_option: OSStart()

Question 86: START
Which hardware component is essential for µC-OS timing operations? (CO3)
Question 86: END

Option_a: System clock
Option_b: ROM
Option_c: Hard disk
Option_d: GPIO
correct_option: System clock

Question 87: START
What is the main purpose of OSMutexPend() in µC-OS? (CO3)
Question 87: END

Option_a: To acquire a mutex
Option_b: To delete a task
Option_c: To allocate dynamic memory
Option_d: To initialize the OS
correct_option: To acquire a mutex

Question 88: START
What is the maximum number of tasks supported in µC-OS-III? (CO3)
Question 88: END

Option_a: Unlimited
Option_b: 64
Option_c: 128
Option_d: 256
correct_option: Unlimited

Question 89: START
What type of multitasking does µC-OS support? (CO3)
Question 89: END

Option_a: Pre-emptive multitasking
Option_b: Cooperative multitasking
Option_c: Hybrid multitasking
Option_d: Single-task execution
correct_option: Pre-emptive multitasking

Question 90: START
Which component in µC-OS manages inter-task communication? (CO3)
Question 90: END

Option_a: Message queues and semaphores
Option_b: CPU scheduler
Option_c: Memory allocator
Option_d: Task monitor
correct_option: Message queues and semaphores

Question 91: START
Which of the following techniques is commonly used to reduce power consumption in embedded systems? (CO3)
Question 91: END

Option_a: Increasing clock frequency
Option_b: Using low-power modes
Option_c: Increasing voltage levels
Option_d: Using complex instruction sets
correct_option: Using low-power modes

Question 92: START
Which memory type consumes the least power? (CO3)
Question 92: END
Option_a: DRAM
Option_b: SRAM
Option_c: Flash memory
Option_d: Hard disk
correct_option: Flash memory

Question 93: START
What is the primary advantage of dynamic voltage scaling (DVS)? (CO3)
Question 93: END
Option_a: Increases processing speed
Option_b: Reduces power consumption
Option_c: Reduces cache size
Option_d: Increases memory fragmentation
correct_option: Reduces power consumption

Question 94: START
Which of the following is a software technique for saving memory? (CO3)
Question 94: END

Option_a: Increasing clock speed
Option_b: Using data compression
Option_c: Overclocking the CPU
Option_d: Increasing RAM size
correct_option: Using data compression

Question 95: START
Which hardware component directly affects power consumption in an embedded system? (CO3)
Question 95: END

Option_a: GPU
Option_b: Battery
Option_c: Power management unit
Option_d: External storage
correct_option: Power management unit

Question 96: START
What is clock gating used for? (CO3)
Question 6: END

Option_a: Reducing memory usage
Option_b: Reducing power consumption by disabling unused circuits
Option_c: Increasing CPU performance
Option_d: Reducing program execution time
correct_option: Reducing power consumption by disabling unused circuits

Question 97: START
Which low-power mode stops the processor but retains memory? (CO3)
Question 7: END

Option_a: Power-down mode
Option_b: Sleep mode
Option_c: Standby mode
Option_d: Reset mode
correct_option: Sleep mode

Question 98: START
Which memory type is non-volatile and commonly used in embedded systems? (CO3)
Question 98: END

Option_a: SRAM
Option_b: DRAM
Option_c: ROM
Option_d: Cache memory
correct_option: ROM

Question 99: START
What does DMA (Direct Memory Access) help reduce? (CO3)
Question 99: END

Option_a: CPU workload
Option_b: Power consumption
Option_c: Memory fragmentation
Option_d: Program execution time
correct_option: CPU workload

Question 100: START
Which power optimization technique involves reducing the number of active components in a system? (CO3)
Question 100: END

Option_a: Dynamic voltage scaling
Option_b: Clock gating
Option_c: Memory swapping
Option_d: Increasing clock frequency
correct_option: Clock gating

2-Mark Questions

Question 1: START
Which of the following conditions must be met for a task set to be schedulable under RMS? (CO3)
Question 1: END

Option_a: CPU utilization ≤ 69.3% for large n
Option_b: All tasks have the same execution time
Option_c: No task has a period less than 10 ms
Option_d: Tasks must be non-preemptive
Correct_option: CPU utilization ≤ 69.3% for large n

Question 2: START
What is the worst-case response time of a task in fixed-priority pre-emptive scheduling? (CO3)
Question 2: END

Option_a: Execution time + higher priority task interference
Option_b: Task period
Option_c: Task deadline
Option_d: Average execution time
Correct_option: Execution time + higher priority task interference

Question 3: START
In EDF scheduling, which task is executed first? (CO3)
Question 3: END

Option_a: Task with the highest priority
Option_b: Task with the shortest deadline
Option_c: Task with the shortest execution time
Option_d: Task with the longest period
Correct_option: Task with the shortest deadline

Question 4: START
What happens if the utilization bound is exceeded in Rate Monotonic Scheduling? (CO3)
Question 4: END

Option_a: Some tasks may miss their deadlines
Option_b: CPU utilization increases
Option_c: Tasks execute at the same priority
Option_d: System runs without any issue
Correct_option: Some tasks may miss their deadlines

Question 5: START
Which of the following is a limitation of Earliest Deadline First (EDF) scheduling? (CO3)
Question 5: END

Option_a: It is not optimal
Option_b: It does not guarantee deadlines
Option_c: It requires more runtime overhead

Option_d: It cannot handle periodic tasks
Correct_option: It requires more runtime overhead
Question 6: START
For a real-time system, the term jitter refers to (CO4)
Question 6: END

Option_a: Variation in task execution time
Option_b: Total system utilization
Option_c: The gap between two consecutive task executions
Option_d: The number of preemptions
Correct_option: Variation in task execution time

Question 7: START
Which condition is necessary for a hard real-time system to be schedulable under EDF? (CO3)
Question 7: END

Option_a: Total CPU utilization ≤ 100%
Option_b: Tasks have equal priority
Option_c: Execution time is always equal to deadline
Option_d: Periods are equal for all tasks
Correct_option: Total CPU utilization ≤ 100%

Question 8: START
A real-time system is considered schedulable if (CO4)
Question 8: END

Option_a: All tasks meet their deadlines
Option_b: CPU utilization is below 50%
Option_c: At least one task meets its deadline
Option_d: It follows FIFO scheduling
Correct_option: All tasks meet their deadlines

Question 9: START
Which of the following techniques reduces both memory usage and power consumption? (CO3)
Question 9: END

Option_a: Using multiple cores
Option_b: Using compressed data storage
Option_c: Increasing instruction set size
Option_d: Increasing cache size
correct_option: Using compressed data storage

Question 10: START
What is the role of power-aware scheduling in an embedded system? (CO3)
Question 10: END

Option_a: Improves memory allocation
Option_b: Reduces power by scheduling tasks efficiently
Option_c: Increases processor speed

Option_d: Reduces code execution time
correct_option: Reduces power by scheduling tasks efficiently

Question 11: START
Why is SRAM preferred over DRAM for low-power applications? (CO3)
Question 11: END

Option_a: SRAM consumes less power
Option_b: DRAM is faster
Option_c: SRAM is cheaper
Option_d: DRAM has a higher storage capacity
correct_option: SRAM consumes less power

Question 12: START
Which technique can help in reducing both memory access time and power consumption? (CO3)
Question 12: END

Option_a: Caching frequently accessed data
Option_b: Increasing RAM size
Option_c: Running the processor at full speed
Option_d: Using a slower clock frequency
correct_option: Caching frequently accessed data

Question 13: START
Which low-power mode completely turns off the CPU but retains essential system states? (CO3)
Question 13: END

Option_a: Sleep mode
Option_b: Deep sleep mode
Option_c: Standby mode
Option_d: Power-down mode
correct_option: Standby mode

Question 14: START
Which of the following is a power-efficient communication protocol in embedded systems? (CO3)
Question 14: END
Option_a: SPI
Option_b: I2C
Option_c: UART
Option_d: PCIe
correct_option: I2C

Question 15: START
How does dynamic frequency scaling (DFS) help in power saving? (CO3)
Question 15: END

Option_a: Reduces CPU voltage when workload is low
Option_b: Increases execution speed

Option_c: Reduces program memory size
Option_d: Improves data transfer rates
correct_option: Reduces CPU voltage when workload is low

Question 16: START
Which of the following tools is used for hardware debugging and boundary scan testing? (CO3)
Question 16: END

Option_a: JTAG
Option_b: Emulator
Option_c: Compiler
Option_d: Assembler
correct_option: JTAG

Question 17: START
What is the main function of a real-time operating system (RTOS) in embedded development? (CO3)
Question 17: END

Option_a: To enable real-time task scheduling
Option_b: To convert high-level code into assembly code
Option_c: To provide graphical user interface
Option_d: To design circuit diagrams
correct_option: To enable real-time task scheduling

Question 18: START
Which component of an embedded software development toolchain combines multiple object files into a single executable? (CO3)
Question 18: END

Option_a: Compiler
Option_b: Assembler
Option_c: Linker
Option_d: Debugger
correct_option: Linker

Question 19: START
Which debugging tool allows step-by-step execution of an embedded program? (CO7)
Question 19: END

Option_a: Compiler
Option_b: Emulator
Option_c: Logic Analyzer
Option_d: Disassembler
correct_option: Emulator

Question 20: START
What is the main function of a bootloader in an embedded system? (CO3)
Question 20: END

Option_a: Load the operating system into memory
Option_b: Debug embedded software
Option_c: Compile source code
Option_d: Perform real-time profiling
correct_option: Load the operating system into memory
Question 21: START
Which of the following tools helps analyze memory usage and detect memory leaks in embedded software? (CO3)
Question 21: END

Option_a: Linker
Option_b: Debugger
Option_c: Memory Profiler
Option_d: Compiler
correct_option: Memory Profiler

Question 22: START
Which of the following is an example of an open-source embedded development tool? (CO3)
Question 22: END

Option_a: Keil uVision
Option_b: MPLAB
Option_c: GCC (GNU Compiler Collection)
Option_d: IAR Embedded Workbench
correct_option: GCC (GNU Compiler Collection)

Question 23: START
Which debugging tool allows a host machine to step through target machine code in real time? (CO3)
Question 23: END

Option_a: Simulator
Option_b: Emulator
Option_c: Logic Analyzer
Option_d: Disassembler
correct_option: Emulator

Question 24: START
Which communication protocol is typically used for flashing firmware from host to target machines? (CO3)
Question 24: END

Option_a: I2C
Option_b: SPI
Option_c: UART
Option_d: HTTP
correct_option: UART

Question 25: START
What is the function of a bootloader in a target machine? (CO3)
Question 25: END

Option_a: Loads the embedded software into RAM
Option_b: Compiles the code on the target
Option_c: Optimizes the power consumption of the target machine
Option_d: Establishes a connection between host and target
correct_option: Loads the embedded software into RAM

Question 26: START
Which tool helps in simulating embedded software behaviour without actual target hardware? (CO3)
Question 26: END

Option_a: Debugger
Option_b: Simulator
Option_c: Compiler
Option_d: Flash Programmer
correct_option: Simulator

Question 27: START
What is the primary purpose of an embedded emulator in a host-target setup? (CO4)
Question 27: END

Option_a: Emulates hardware behaviour for software development
Option_b: Converts C code to machine code
Option_c: Acts as a secondary power source
Option_d: Runs a web server
correct_option: Emulates hardware behaviour for software development

Question 28: START
Which of the following is a real-world example of a target machine in an embedded system? (CO4)
Question 28: END

Option_a: Raspberry Pi running a control system
Option_b: Microsoft Windows desktop PC
Option_c: Google Chrome web browser
Option_d: Cloud-based AI model
correct_option: Raspberry Pi running a control system

Question 29: START
Which debugging technique allows real-time debugging of embedded applications on a target machine? (CO3)
Question 29: END

Option_a: Software Debugging
Option_b: Remote Debugging
Option_c: Power Debugging
Option_d: Machine Learning Debugging
correct_option: Remote Debugging

Question 30: START
Which of the following is a limitation of debugging on a target machine instead of a host machine? (CO3)
Question 30: END

Option_a: Limited resources (memory, processing power)
Option_b: Higher processing speed
Option_c: Easier debugging process
Option_d: More accurate profiling
correct_option: Limited resources (memory, processing power)

Question 31: START
What does a linker resolve when generating an executable? (CO3)
Question 31: END

Option_a: Undefined symbols and memory addresses
Option_b: Syntax errors
Option_c: Logical errors in code
Option_d: Power optimization issues
correct_option: Undefined symbols and memory addresses

Question 32: START
Which of the following best describes a memory map generated by a linker? (CO3)
Question 32: END

Option_a: A graphical representation of software logic
Option_b: A log of all executed instructions
Option_c: A report showing memory section allocations
Option_d: A tool for debugging syntax errors
correct_option: A report showing memory section allocations

Question 33: START
What is the role of the .bss section in an embedded system executable?(CO3)
Question 33: END

Option_a: Stores uninitialized global and static variables
Option_b: Contains executable code
Option_c: Stores function call stack
Option_d: Holds external library references
correct_option: Stores uninitialized global and static variables

Question 34: START
Which of the following errors can occur due to incorrect linker settings? (CO4)
Question 34: END

Option_a: Unresolved symbol error
Option_b: Syntax error
Option_c: Power failure
Option_d: Compiler warning
correct_option: Unresolved symbol error

Question 35: START
Which linker directive specifies memory allocation for different sections in embedded systems? (CO4)
Question 35: END

Option_a: SECTIONS
Option_b: VARIABLES
Option_c: LOOP
Option_d: INTERRUPT
correct_option: SECTIONS

Question 36: START
Why is static linking preferred over dynamic linking in embedded systems? (CO3)
Question 36: END

Option_a: Embedded systems do not always support dynamic linking
Option_b: Static linking requires less memory
Option_c: Static linking reduces execution speed
Option_d: Dynamic linking is better in all cases
correct_option: Embedded systems do not always support dynamic linking

Question 37: START
What is an overlay in a linker script used for? (CO3)
Question 37: END

Option_a: Managing functions that share the same memory space
Option_b: Encrypting the executable file
Option_c: Debugging the program
Option_d: Loading external libraries
correct_option: Managing functions that share the same memory space

Question 38: START
What happens if an entry point is not specified in the linker script? (CO3)
Question 38: END

Option_a: The program may not execute properly
Option_b: The compiler will generate an optimized entry point
Option_c: The debugger will correct the issue
Option_d: The OS will assign a random entry point
correct_option: The program may not execute properly

Question 39: START
What is the function of a locator script in embedded systems? (CO3)

Question 39: END

Option_a: Defines memory mapping and section placement
Option_b: Converts assembly to machine code
Option_c: Generates executable files
Option_d: Detects logical errors in C code
correct_option: Defines memory mapping and section placement

Question 40: START
Which of the following best describes a memory map in embedded software? (CO3)
Question 40: END

Option_a: A table showing memory section allocations
Option_b: A representation of software architecture
Option_c: A list of source code functions
Option_d: A debugging tool for syntax errors
correct_option: A table showing memory section allocations

Question 41: START
Which section in an executable file is used for uninitialized global variables? (CO3)
Question 41: END

Option_a: .bss
Option_b: .data
Option_c: .text
Option_d: .heap
correct_option: .bss

Question 42: START
What issue might occur if a locator assigns overlapping memory addresses? (CO3)
Question 42: END

Option_a: Program instability and crashes
Option_b: Increased power consumption
Option_c: Optimized execution speed
Option_d: Reduced debugging time
correct_option: Program instability and crashes

Question 43: START
Which file format is commonly used by a locator for memory allocation? (CO3)
Question 43: END
Option_a: MAP
Option_b: PNG
Option_c: DOCX
Option_d: ZIP
correct_option: MAP

Question 44: START
Why is ROM mapping important in embedded systems?(CO4)
Question 44: END

Option_a: Code is stored in ROM for execution
Option_b: ROM prevents the program from running
Option_c: ROM is only used for debugging
Option_d: ROM mapping is unnecessary
correct_option: Code is stored in ROM for execution

Question 45: START
What is the purpose of heap memory allocation in an embedded system? (CO4)
Question 45: END

Option_a: To store dynamically allocated variables
Option_b: To store global static variables
Option_c: To store function instructions
Option_d: To store interrupt vectors
correct_option: To store dynamically allocated variables

Question 46: START
What is the role of the scheduler in µC-OS? (CO3)
Question 46: END

Option_a: Determines which task runs next
Option_b: Allocates memory dynamically
Option_c: Handles hardware interrupts
Option_d: Manages input/output operations
correct_option: Determines which task runs next

Question 47: START
What is the significance of the tick interrupt in µC-OS? (CO3)
Question 47: END

Option_a: It drives the RTOS scheduler
Option_b: It provides debugging logs
Option_c: It loads the OS into memory
Option_d: It allocates CPU resources
correct_option: It drives the RTOS scheduler

Question 48: START
Which of the following best describes deterministic behaviour in µC-OS? (CO3)
Question 48: END

Option_a: Tasks execute in a predictable manner
Option_b: CPU cycles are shared randomly
Option_c: Memory usage is unpredictable
Option_d: The system adapts dynamically to load
correct_option: Tasks execute in a predictable manner

Question 49: START

How does µC-OS handle task synchronization? (CO3)
Question 49: END

Option_a: Using semaphores and message queues
Option_b: Using dynamic memory allocation
Option_c: Using a first-come, first-served queue
Option_d: Using a polling mechanism
correct_option: Using semaphores and message queues

Question 50: START
Which of the following is a disadvantage of µC-OS? (CO3)
Question 50: END

Option_a: Limited support for dynamic memory allocation
Option_b: Poor real-time performance
Option_c: High power consumption
Option_d: Unstable kernel execution
correct_option: Limited support for dynamic memory allocation

Question 1: START
A developer compiles their C program successfully, but when trying to execute it, they receive a "Segmentation Fault" error. What could be the most likely cause? (CO4)
Question 1: END

Option_a: A syntax error in the code
Option_b: The compiler did not generate an executable file
Option_c: Incorrect memory access (e.g., accessing NULL or out-of-bounds memory)
Option_d: The linker failed to link object files
correct_option: c) Incorrect memory access (e.g., accessing NULL or out-of-bounds memory)

Question 2: START
A software engineer is working on an embedded system and needs to compile the code on a Windows PC but run it on an ARM-based microcontroller. What type of compiler should they use? (CO4)
Question 2: END

Option_a: Native compiler
Option_b: Just-In-Time (JIT) compiler
Option_c: Cross-compiler
Option_d: Debugger
correct_option: c) Cross-compiler

Question 3: START
After compiling and linking a C++ project, the developer encounters an "undefined reference" error when calling a function from another file. What is the probable cause? (CO4)
Question 3: END

Option_a: The function was declared but not defined
Option_b: The syntax of the function is incorrect
Option_c: The compiler did not recognize the function name
Option_d: The program has a logical error
correct_option: a) The function was declared but not defined

Question 4: START
A software tester runs a program on a host machine and notices significantly faster execution compared to when it runs on the target embedded system. What could explain this difference? (CO4)
Question 4: END

Option_a: The compiler optimized the code differently
Option_b: The host machine has a more powerful processor
Option_c: The target system lacks debugging capabilities
Option_d: The host machine uses an older version of the program
correct_option: b) The host machine has a more powerful processor

Question 5: START
A developer runs their program on a test environment, and it executes without issues. However, on the target system, it crashes immediately. What is the most effective debugging approach in this case? (CO4)
Question 5: END

Option_a: Use a symbolic debugger (GDB, LLDB)
Option_b: Recompile the program with extra optimizations
Option_c: Restart the system and try again
Option_d: Ignore the issue since it works on the test machine
correct_option: a) Use a symbolic debugger (GDB, LLDB)

Question 6: START
An embedded system developer is testing a real-time application. The program behaves correctly on the host machine but exhibits unexpected delays on the target system. What could be the reason? (CO4)
Question 6: END

Option_a: The host machine does not have real-time constraints
Option_b: The target system is not correctly powered
Option_c: The compiler removed important sections of code
Option_d: The debugger is missing
correct_option: a) The host machine does not have real-time constraints

Question 7: START
A developer enables compiler optimizations (-O2 flag in GCC) and notices that some debugging breakpoints no longer work. What is the likely reason? (CO4)
Question 7: END

Option_a: The compiler removed or reordered some code
Option_b: The debugger is not installed
Option_c: The source code contains syntax errors
Option_d: The executable file is missing
correct_option: a) The compiler removed or reordered some code

Question 8: START
During software testing, a developer finds that the program behaves differently when compiled with different compilers (GCC vs. Clang). What is the most likely cause? (CO4)
Question 8: END

Option_a: The compilers have different optimization techniques
Option_b: The program has syntax errors
Option_c: The compilers do not support the same programming language
Option_d: The computer's hardware is faulty
correct_option: a) The compilers have different optimization techniques

Question 9: START

A software engineer is debugging a C program and finds that a variable is showing a garbage value even though it was declared but not explicitly initialized. What could be the reason? (CO4)
Question 9: END

Option_a: The compiler introduced an error
Option_b: The variable was allocated memory but not initialized
Option_c: The program logic is incorrect
Option_d: The linker failed to link the program correctly
correct_option: b) The variable was allocated memory but not initialized

Question 10: START
A real-time system developer notices that enabling debug logs causes the program to miss timing deadlines. What is the best course of action? (CO4)
Question 10: END

Option_a: Reduce the frequency of logging or use buffered logging
Option_b: Increase the processor clock speed
Option_c: Ignore timing constraints during debugging
Option_d: Use an older version of the program
correct_option: a) Reduce the frequency of logging or use buffered logging

Question 11: START
A real-time operating system (RTOS) is used in an automotive braking system. What is the main reason for choosing an RTOS? (CO5)
Question 11: END

Option_a: Cost-effectiveness
Option_b: User-friendly interface
Option_c: Predictable timing and scheduling
Option_d: High memory consumption
correct_option: c) Predictable timing and scheduling

Question 12: START
A firm real-time system can tolerate occasional missed deadlines. Which of the following is a good example of a firm real-time system? (CO5)
Question 12: END

Option_a: A stock trading application
Option_b: A pacemaker
Option_c: An aircraft control system
Option_d: A hard disk drive controller
correct_option: a) A stock trading application

Question 13: START
Which factor is most critical in designing a hard real-time system? (CO5)

Question 13: END

Option_a: Minimizing development costs
Option_b: Maximizing battery life
Option_c: Guaranteeing worst-case execution time (WCET)
Option_d: Ensuring a user-friendly interface
correct_option: c) Guaranteeing worst-case execution time (WCET)

Question 14: START
A real-time embedded system is experiencing latency issues due to excessive interrupt handling. What is the best approach to reduce this? (CO5)
Question 14: END

Option_a: Disable all interrupts
Option_b: Increase the processor speed
Option_c: Use interrupt priority levels and minimize ISR execution time
Option_d: Increase the number of interrupts
correct_option: c) Use interrupt priority levels and minimize ISR execution time

Question 15: START
Which of the following is a key difference between real-time systems and general-purpose systems? (CO5)
Question 15: END

Option_a: Real-time systems focus on user experience
Option_b: Real-time systems always have higher processing power
Option_c: Real-time systems guarantee response within a deadline
Option_d: General-purpose systems always use an RTOS
correct_option: c) Real-time systems guarantee response within a deadline

Question 16: START
In a real-time scheduling algorithm, what is the primary advantage of Rate Monotonic Scheduling (RMS)? (CO5)
Question 16: END

Option_a: It ensures 100% CPU utilization
Option_b: It is optimal for periodic tasks with fixed priorities
Option_c: It minimizes task execution time
Option_d: It works only for dynamic tasks
correct_option: b) It is optimal for periodic tasks with fixed priorities

Question 17: START
Which feature of real-time systems ensures that time-critical tasks are executed before non-critical tasks? (CO5)

Question 17: END

Option_a: Preemptive scheduling
Option_b: Background processing
Option_c: Virtual memory swapping
Option_d: FIFO execution
correct_option: a) Preemptive scheduling

Question 18: START
In real-time systems, priority inversion occurs when: (CO5)
Question 18: END

Option_a: A low-priority task prevents a high-priority task from executing
Option_b: A task runs faster than expected
Option_c: A system executes tasks in reverse order
Option_d: The CPU frequency suddenly drops
correct_option: a) A low-priority task prevents a high-priority task from executing

Question 19: START
A developer is testing a real-time control system in an industrial plant. The system must handle unexpected external events with minimal delay. Which type of scheduling is best? (CO5)
Question 19: END

Option_a: Static scheduling
Option_b: Non-preemptive scheduling
Option_c: Event-driven scheduling
Option_d: Batch scheduling
correct_option: c) Event-driven scheduling

Question 20: START
In a real-time system, what is the consequence of a missed hard deadline? (CO5)
Question 20: END

Option_a: Slightly reduced system efficiency
Option_b: Possible system failure or catastrophic consequences
Option_c: Minor performance degradation
Option_d: The system will automatically recover
correct_option: b) Possible system failure or catastrophic consequences

Question 21: START
What is a key advantage of the ARM architecture over traditional CISC architectures? (CO5)
Question 21: END

Option_a: Higher power consumption
Option_b: Complex instruction set
Option_c: Reduced instruction set leading to better performance and efficiency
Option_d: Higher number of transistors
correct_option: c) Reduced instruction set leading to better performance and efficiency

Question 22: START
Which of the following is a major feature of ARM Thumb instruction set? (CO5)
Question 22: END

Option_a: Uses 64-bit instructions
Option_b: Allows for higher code density and smaller binaries
Option_c: Increases instruction execution time
Option_d: Disables floating-point operations
correct_option: b) Allows for higher code density and smaller binaries

Question 23: START
Which ARM mode is used for handling exceptions and system-level operations? (CO5)
Question 23: END

Option_a: User mode
Option_b: System mode
Option_c: Thumb mode
Option_d: Application mode
correct_option: b) System mode

Question 24: START
In ARM processors, what does barrel shifter do? (CO5)
Question 24: END

Option_a: Increases instruction pipeline depth
Option_b: Allows efficient bit shifting and rotation within one instruction cycle
Option_c: Handles memory addressing
Option_d: Manages cache operations
correct_option: b) Allows efficient bit shifting and rotation within one instruction cycle

Question 25: START
Which ARM feature significantly reduces power consumption in mobile devices? (CO5)
Question 25: END

Option_a: Complex instruction set computing (CISC)
Option_b: Superscalar execution
Option_c: Reduced instruction set computing (RISC) and power-efficient design
Option_d: Fixed pipeline stages
correct_option: c) Reduced instruction set computing (RISC) and power-efficient design

Question 26: START
Which register in ARM architecture holds the program counter (PC)? (CO5)
Question 26: END

Option_a: R13

Option_b: R14
Option_c: R15
Option_d: R10
correct_option: c) R15

Question 27: START
What is the function of the Link Register (LR) in ARM? (CO5)
Question 27: END

Option_a: Holds the current instruction
Option_b: Stores return addresses during function calls
Option_c: Controls exception handling
Option_d: Manages stack memory
correct_option: b) Stores return addresses during function calls

Question 28: START
Which ARM processor feature allows switching between 32-bit and 16-bit instruction sets? (CO5)
Question 28: END

Option_a: ARM TrustZone
Option_b: Thumb mode
Option_c: VFP unit
Option_d: Cortex-M mode
correct_option: b) Thumb mode

Question 29: START
What is the purpose of the ARM NEON technology? (CO5)
Question 29: END

Option_a: Floating-point operations
Option_b: SIMD processing for multimedia applications
Option_c: Memory management
Option_d: Power efficiency
correct_option: b) SIMD processing for multimedia applications

Question 30: START
Which ARM instruction is used to perform an unconditional branch? (CO5)
Question 30: END

Option_a: ADD
Option_b: CMP
Option_c: B
Option_d: SUB
correct_option: c) B

Question 31: START
What is the key advantage of the SHARC (Super Harvard Architecture) DSP over traditional DSP architectures? (CO5)
Question 31: END

Option_a: Uses a Von Neumann architecture
Option_b: Supports SIMD (Single Instruction Multiple Data) processing
Option_c: Uses only integer processing
Option_d: Lacks on-chip memory
correct_option: b) Supports SIMD (Single Instruction Multiple Data) processing

Question 32: START
In SHARC processors, which feature allows efficient parallel processing? (CO5)
Question 32: END

Option_a: VLIW (Very Long Instruction Word)
Option_b: SIMD (Single Instruction Multiple Data)
Option_c: RISC pipeline
Option_d: Harvard architecture alone
correct_option: b) SIMD (Single Instruction Multiple Data)

Question 33: START
Which type of arithmetic operations does the SHARC processor primarily focus on? (CO5)

Question 33: END
Option_a: Integer arithmetic only
Option_b: Floating-point and fixed-point arithmetic
Option_c: Complex number calculations only
Option_d: Only logical operations
correct_option: b) Floating-point and fixed-point arithmetic

Question 34: START
How does the Harvard architecture benefit the SHARC processor? (CO5)
Question 34: END

Option_a: Improves data and instruction fetch efficiency
Option_b: Reduces power consumption
Option_c: Allows execution of multiple instruction sets
Option_d: Prevents parallelism
correct_option: a) Improves data and instruction fetch efficiency

Question 35: START
Which type of memory architecture is used in SHARC DSPs to enhance data access speed? (CO5)
Question 35: END

Option_a: Single-bus memory system
Option_b: Multi-banked memory system

Option_c: Serial access memory
Option_d: Only cache-based memory
correct_option: b) Multi-banked memory system

Question 36: START
What is the primary purpose of the DMA (Direct Memory Access) controller in SHARC DSPs? (CO5)
Question 36: END

Option_a: Reduce processor load for memory operations
Option_b: Execute complex arithmetic calculations
Option_c: Control power management
Option_d: Increase pipeline depth
correct_option: a) Reduce processor load for memory operations

Question 37: START
Which feature of SHARC enables zero-overhead looping for DSP applications? (CO5)
Question 37: END

Option_a: Loop unrolling
Option_b: Hardware loop buffer
Option_c: Cache optimization
Option_d: Dual-core processing
correct_option: b) Hardware loop buffer

Question 38: START
How does SIMD (Single Instruction Multiple Data) in SHARC benefit digital signal processing? (CO5)
Question 38: END

Option_a: Allows parallel execution of multiple data operations
Option_b: Reduces instruction count but slows execution
Option_c: Minimizes power usage at the cost of performance
Option_d: Ensures only integer calculations are performed
correct_option: a) Allows parallel execution of multiple data operations

Question 39: START
What is the main floating-point data format supported by SHARC DSPs? (CO5)
Question 39: END

Option_a: IEEE 754 single-precision
Option_b: Binary-coded decimal (BCD)
Option_c: Fixed-point 8-bit representation
Option_d: Custom DSP-specific format

correct_option: a) IEEE 754 single-precision

Question 40: START
Which communication protocol is commonly used with SHARC DSPs for high-speed data transfer? (CO5)
Question 40: END

Option_a: I2C
Option_b: SPI
Option_c: Link Port
Option_d: UART
correct_option: c) Link Port

Section 2: Processor & Memory Organization – Cache, Pipeline (Q41–Q50)
Question 41: START
What is the main purpose of cache memory in a processor? (CO5)
Question 41: END

Option_a: Reduce main memory access latency
Option_b: Store permanent data
Option_c: Execute all program instructions
Option_d: Increase power consumption
correct_option: a) Reduce main memory access latency

Question 42: START
Which cache mapping technique provides the best performance for accessing frequently used data? (CO5)
Question 42: END

Option_a: Direct-mapped cache
Option_b: Associative cache
Option_c: Set-associative cache
Option_d: Random cache placement
correct_option: c) Set-associative cache

Question 43: START
What is cache hit in memory organization? (CO5)
Question 43: END

Option_a: When the requested data is found in the cache
Option_b: When cache fails to locate data
Option_c: When the CPU slows down due to memory access
Option_d: When cache memory is completely full
correct_option: a) When the requested data is found in the cache

Question 44: START
Which pipeline hazard occurs due to data dependency between instructions? (CO5)
Question 44: END

Option_a: Structural hazard
Option_b: Data hazard
Option_c: Control hazard
Option_d: Resource conflict
correct_option: b) Data hazard

Question 45: START
What is the main advantage of instruction pipelining? (CO5)
Question 45: END

Option_a: Increases CPU clock speed
Option_b: Improves instruction throughput
Option_c: Reduces CPU heat generation
Option_d: Minimizes program size
correct_option: b) Improves instruction throughput

Question 46: START
Which pipeline stage is responsible for fetching instructions from memory? (CO5)
Question 46: END

Option_a: Decode stage
Option_b: Execution stage
Option_c: Fetch stage
Option_d: Write-back stage
correct_option: c) Fetch stage

Question 47: START
What is branch prediction in pipelining? (CO5)
Question 47: END

Option_a: A method to reduce instruction stalls in pipelines
Option_b: A technique to execute instructions randomly
Option_c: A way to delay CPU execution
Option_d: A process of discarding instructions
correct_option: a) A method to reduce instruction stalls in pipelines

Question 48: START
Which memory level is closest to the CPU? (CO5)
Question 48: END

Option_a: L1 cache
Option_b: L2 cache
Option_c: RAM
Option_d: Hard disk
correct_option: a) L1 cache

Question 49: START
Which technique is used to handle control hazards in pipelines? (CO5)
Question 49: END

Option_a: Pipeline flushing
Option_b: Instruction reordering
Option_c: Data prefetching
Option_d: Instruction skipping
correct_option: a) Pipeline flushing

Question 50: START
Which of the following reduces cache miss rate? (CO5)
Question 50: END

Option_a: Increasing cache size
Option_b: Reducing clock speed
Option_c: Using single-level cache
Option_d: Disabling pipeline
correct_option: a) Increasing cache size

Question 1: START
Which tool is used to convert source code into machine code? (CO4)
Question 1: END

Option_a: Compiler
Option_b: Linker
Option_c: Debugger
Option_d: Assembler
correct_option: a) Compiler

Question 2: START
What is the main purpose of a linker? (CO4)
Question 2: END

Option_a: To convert source code into assembly code
Option_b: To translate high-level code into machine code
Option_c: To combine object files into a single executable
Option_d: To load the program into memory
correct_option: c) To combine object files into a single executable

Question 3: START
Which phase of software execution is responsible for loading the program into memory? (CO4)
Question 3: END

Option_a: Compilation
Option_b: Linking
Option_c: Loading
Option_d: Execution
correct_option: c) Loading

Question 4: START
Which tool is used to identify and fix runtime errors in a program? (CO4)
Question 4: END

Option_a: Compiler
Option_b: Linker
Option_c: Debugger
Option_d: Assembler
correct_option: c) Debugger

Question 5: START
Which component of the operating system is responsible for executing the program after it has been loaded into memory? (CO4)
Question 5: END

Option_a: Scheduler
Option_b: Loader
Option_c: Debugger
Option_d: Linker
correct_option: a) Scheduler

Question 6: START
What is the role of an assembler in the compilation process? (CO4)
Question 6: END

Option_a: Converts assembly code into machine code
Option_b: Links multiple object files together
Option_c: Loads the executable into memory
Option_d: Executes the compiled program
correct_option: a) Converts assembly code into machine code

Question 7: START
Which of the following is an intermediate file generated during compilation? (CO4)
Question 7: END

Option_a: Source file
Option_b: Executable file
Option_c: Object file
Option_d: Script file
correct_option: c) Object file

Question 8: START
What is the primary function of a loader? (CO4)
Question 8: END

Option_a: Converts high-level language into machine code
Option_b: Combines multiple object files into one
Option_c: Loads the program into memory for execution
Option_d: Detects and fixes errors in a program
correct_option: c) Loads the program into memory for execution

Question 9: START
Which type of software converts source code into an executable in a single step? (CO4)
Question 9: END

Option_a: Interpreter
Option_b: Compiler
Option_c: Linker
Option_d: Loader
correct_option: b) Compiler

Question 10: START
Which of the following tools is NOT directly involved in the compilation process? (CO4)
Question 10: END

Option_a: Compiler
Option_b: Linker
Option_c: Debugger
Option_d: Assembler
correct_option: c) Debugger

Question 11: START
Which debugging technique involves analyzing the source code without executing it? (CO4)
Question 11: END

Option_a: Static analysis
Option_b: Dynamic analysis
Option_c: Black-box testing
Option_d: Breakpoint debugging
correct_option: a) Static analysis

Question 12: START
What is the purpose of dynamic analysis in debugging? (CO4)
Question 12: END

Option_a: To check code correctness without execution
Option_b: To analyze the program while it is running
Option_c: To optimize the source code
Option_d: To compile the program into machine code
correct_option: b) To analyze the program while it is running

Question 13: START
Which type of bug is difficult to reproduce and usually occurs due to timing issues? (CO4)
Question 13: END

Option_a: Syntax bug
Option_b: Logic bug
Option_c: Heisenbug
Option_d: Memory leak
correct_option: c) Heisenbug

Question 14: START
Which of the following debugging tools helps track memory leaks in a program? (CO4)
Question 14: END

Option_a: GDB
Option_b: Valgrind
Option_c: Compiler
Option_d: Linker
correct_option: b) Valgrind

Question 15: START
Which of the following is NOT a benefit of testing software on a host machine? (CO4)
Question 15: END

Option_a: Faster debugging and testing
Option_b: Identifying errors before deployment
Option_c: Reducing hardware dependency
Option_d: Ensuring hardware compatibility
correct_option: d) Ensuring hardware compatibility

Question 16: START
Which of the following is an advantage of automated testing on a host machine? (CO4)
Question 16: END

Option_a: Reduces human errors in testing
Option_b: Slows down the debugging process
Option_c: Increases manual intervention
Option_d: Replaces the need for a debugger
correct_option: a) Reduces human errors in testing

Question 17: START
Which type of testing ensures that recent code changes have not affected existing functionality? (CO4)
Question 17: END

Option_a: Unit testing
Option_b: Regression testing
Option_c: Load testing
Option_d: Stress testing
correct_option: b) Regression testing

Question 18: START
Which of the following best describes a core dump? (CO4)
Question 18: END

Option_a: A detailed error message
Option_b: A snapshot of program memory at the time of a crash
Option_c: A program optimization technique
Option_d: A method of code refactoring
correct_option: b) A snapshot of program memory at the time of a crash

Question 19: START
Which testing approach is performed without knowledge of the internal code structure? (CO4)
Question 19: END

Option_a: White-box testing
Option_b: Black-box testing
Option_c: Unit testing
Option_d: Memory debugging
correct_option: b) Black-box testing

Question 20: START
Which software testing technique focuses on testing individual components of a program? (CO4)
Question 20: END

Option_a: System testing
Option_b: Regression testing
Option_c: Unit testing
Option_d: Performance testing
correct_option: c) Unit testing

Question 21: START
Which of the following is a key characteristic of a real-time system? (CO4)
Question 21: END

Option_a: High execution speed
Option_b: Guaranteed response within a time constraint
Option_c: Unpredictable output
Option_d: Maximum resource utilization
correct_option: b) Guaranteed response within a time constraint

Question 22: START
Which type of real-time system must respond within strict time limits to avoid system failure? (CO4)
Question 22: END

Option_a: Soft real-time system
Option_b: Hard real-time system
Option_c: Embedded system
Option_d: Distributed system
correct_option: b) Hard real-time system

Question 23: START
What is the primary function of a real-time operating system (RTOS)? (CO4)
Question 23: END

Option_a: To execute tasks in any order
Option_b: To manage hardware resources efficiently
Option_c: To ensure timely task execution
Option_d: To optimize memory usage only
correct_option: c) To ensure timely task execution

Question 24: START
Which of the following is an example of a soft real-time system? (CO4)
Question 24: END

Option_a: Airbag deployment system
Option_b: Video streaming application
Option_c: Nuclear reactor control
Option_d: Spacecraft navigation system
correct_option: b) Video streaming application

Question 25: START
What is the main challenge in designing a real-time system? (CO4)
Question 25: END

Option_a: Ensuring correct functional output
Option_b: Maintaining low hardware cost
Option_c: Meeting strict timing constraints
Option_d: Reducing software size
correct_option: c) Meeting strict timing constraints

Question 26: START
Which scheduling algorithm is commonly used in real-time systems? (CO4)
Question 26: END

Option_a: Round-robin scheduling
Option_b: Shortest job next
Option_c: Earliest Deadline First (EDF)
Option_d: First Come First Serve (FCFS)
correct_option: c) Earliest Deadline First (EDF)

Question 27: START
Which component of a real-time system ensures that critical tasks get priority execution? (CO4)
Question 27: END

Option_a: Memory manager
Option_b: Real-time scheduler
Option_c: File system
Option_d: Power management unit
correct_option: b) Real-time scheduler

Question 28: START
Which of the following is NOT a feature of real-time operating systems (RTOS)? (CO4)
Question 28: END

Option_a: Preemptive multitasking
Option_b: Deterministic response time
Option_c: High-level application execution
Option_d: Real-time scheduling
correct_option: c) High-level application execution

Question 29: START
What is the main reason embedded systems often use real-time operating systems? (CO4)
Question 29: END

Option_a: To improve hardware speed
Option_b: To ensure predictable task execution
Option_c: To increase data storage
Option_d: To optimize graphical performance
correct_option: b) To ensure predictable task execution

Question 30: START
Which of the following best describes jitter in a real-time system? (CO4)
Question 30: END

Option_a: The total system response time
Option_b: The variation in task response times
Option_c: The CPU utilization rate
Option_d: The amount of memory allocated to tasks
correct_option: b) The variation in task response times

Question 31: START
What does ARM stand for in ARM architecture? (CO5)
Question 31: END

Option_a: Advanced RISC Machines
Option_b: Automated Resource Management
Option_c: Advanced Register Module
Option_d: Asynchronous RISC Microcontroller
correct_option: a) Advanced RISC Machines

Question 32: START
Which of the following best describes the ARM architecture? (CO5)
Question 32: END

Option_a: Complex Instruction Set Computing (CISC)
Option_b: Reduced Instruction Set Computing (RISC)
Option_c: Hybrid Instruction Set Computing (HISC)
Option_d: Virtual Instruction Set Computing (VISC)
correct_option: b) Reduced Instruction Set Computing (RISC)

Question 33: START
Which feature of ARM processors improves power efficiency? (CO5)
Question 33: END

Option_a: Pipelining
Option_b: High clock speed
Option_c: Reduced instruction set
Option_d: Out-of-order execution
correct_option: c) Reduced instruction set

Question 34: START
Which of the following is a characteristic feature of ARM processors? (CO5)
Question 34: END

Option_a: Large instruction set
Option_b: High power consumption
Option_c: Load/store architecture
Option_d: Complex addressing modes
correct_option: c) Load/store architecture

Question 35: START
What is the word size of most modern ARM processors? (CO5)
Question 35: END

Option_a: 8-bit
Option_b: 16-bit
Option_c: 32-bit
Option_d: 64-bit
correct_option: c) 32-bit

Question 36: START
Which ARM instruction is used to load a value from memory into a register? (CO5)
Question 36: END

Option_a: MOV
Option_b: LDR
Option_c: STR
Option_d: ADD
correct_option: b) LDR

Question 37: START
Which ARM instruction is used to store a register value into memory? (CO5)
Question 37: END

Option_a: STR
Option_b: LDR
Option_c: MOV
Option_d: SUB
correct_option: a) STR

Question 38: START
What is the purpose of the ARM Thumb instruction set? (CO5)
Question 38: END

Option_a: To improve floating-point performance
Option_b: To provide 16-bit compressed instructions for better code density
Option_c: To support only integer operations
Option_d: To enable out-of-order execution
correct_option: b) To provide 16-bit compressed instructions for better code density

Question 39: START
Which register in ARM holds the return address of a subroutine call? (CO5)
Question 39: END

Option_a: R0
Option_b: R13
Option_c: R14
Option_d: R15
correct_option: c) R14

Question 40: START
Which of the following best describes pipelining in ARM processors? (CO5)
Question 40: END

Option_a: Parallel execution of multiple instructions
Option_b: Execution of a single instruction at a time
Option_c: Reducing the number of registers
Option_d: Storing multiple instructions in memory
correct_option: a) Parallel execution of multiple instructions

Question 41: START
What does SHARC stand for in SHARC architecture? (CO5)
Question 41: END

Option_a: Super Harvard Architecture Computer
Option_b: Synchronous Hybrid Advanced RISC Computing
Option_c: Scalable High-Performance Analog RISC Core
Option_d: Signal Handling and Real-time Computing
correct_option: a) Super Harvard Architecture Computer

Question 42: START
Which company developed the SHARC processor series? (CO5)
Question 42: END

Option_a: Intel
Option_b: Texas Instruments
Option_c: Analog Devices
Option_d: ARM Holdings
correct_option: c) Analog Devices

Question 43: START
What type of processor is SHARC primarily designed for? (CO5)
Question 43: END

Option_a: General-purpose computing
Option_b: Digital signal processing (DSP)
Option_c: Graphics processing
Option_d: Data center applications
correct_option: b) Digital signal processing (DSP)

Question 44: START
Which architectural feature makes SHARC processors suitable for DSP applications? (CO5)
Question 44: END

Option_a: Complex instruction set
Option_b: Parallel execution of multiple instructions
Option_c: Single-cycle floating-point operations
Option_d: Large number of general-purpose registers
correct_option: c) Single-cycle floating-point operations

Question 45: START
Which memory architecture is used in SHARC processors? (CO5)
Question 45: END

Option_a: Von Neumann architecture
Option_b: Harvard architecture
Option_c: Modified Harvard architecture
Option_d: Pipeline-based architecture
correct_option: c) Modified Harvard architecture

Question 46: START
What is the primary advantage of the SHARC architecture over traditional DSP processors? (CO5)
Question 46: END

Option_a: Lower power consumption
Option_b: Higher performance with SIMD operations
Option_c: Reduced instruction set complexity
Option_d: General-purpose processing capability
correct_option: b) Higher performance with SIMD operations

Question 47: START
What does SIMD stand for in SHARC processors? (CO5)
Question 47: END

Option_a: Single Instruction Multiple Data
Option_b: Simple Instruction Multi Device
Option_c: Sequential Independent Memory Data
Option_d: Super Integrated Memory Device
correct_option: a) Single Instruction Multiple Data

Question 48: START
Which of the following applications is SHARC most suitable for? (CO5)
Question 48: END

Option_a: Web browsing
Option_b: Audio and speech processing
Option_c: Text processing
Option_d: Database management
correct_option: b) Audio and speech processing

Question 49: START
Which of the following best describes SHARC’s instruction set? (CO5)
Question 49: END

Option_a: CISC (Complex Instruction Set Computing)
Option_b: RISC (Reduced Instruction Set Computing)
Option_c: VLIW (Very Long Instruction Word)
Option_d: Hybrid CISC-RISC
correct_option: d) Hybrid CISC-RISC

Question 50: START
Which of the following is a feature of SHARC's I/O system? (CO5)
Question 50: END

Option_a: Parallel port communication only
Option_b: Dedicated DMA channels for fast data transfer
Option_c: No external memory interface
Option_d: Serial-only communication
correct_option: b) Dedicated DMA channels for fast data transfer

Question 51: START
Which floating-point format does SHARC support? (CO5)
Question 51: END

Option_a: 8-bit IEEE 754
Option_b: 16-bit IEEE 754
Option_c: 32-bit IEEE 754
Option_d: 64-bit IEEE 754
correct_option: c) 32-bit IEEE 754

Question 52: START
Which addressing mode is NOT supported in SHARC architecture? (CO5)
Question 52: END

Option_a: Immediate addressing
Option_b: Register direct addressing
Option_c: Memory indirect addressing
Option_d: Stack-based addressing
correct_option: d) Stack-based addressing

Question 53: START
What makes SHARC suitable for real-time signal processing? (CO5)
Question 53: END

Option_a: Low memory requirements
Option_b: High latency operations
Option_c: Deterministic instruction execution
Option_d: Variable clock speeds
correct_option: c) Deterministic instruction execution

Question 54: START
Which type of memory is used in SHARC for fast instruction execution? (CO5)
Question 54: END

Option_a: Flash memory
Option_b: SRAM
Option_c: DRAM
Option_d: ROM
correct_option: b) SRAM

Question 55: START
Which of the following is NOT a feature of SHARC processors? (CO5)
Question 55: END

Option_a: SIMD architecture
Option_b: VLIW instruction execution
Option_c: Floating-point arithmetic support
Option_d: Harvard memory architecture
correct_option: b) VLIW instruction execution

Question 56: START

Which instruction is used for multiplication in SHARC architecture? (CO5)
Question 56: END

Option_a: ADD
Option_b: SUB
Option_c: MPY
Option_d: DIV
correct_option: c) MPY

Question 57: START
How many floating-point registers does a typical SHARC processor have? (CO5)
Question 57: END

Option_a: 8
Option_b: 16
Option_c: 32
Option_d: 64
correct_option: c) 32

Question 58: START
What is the function of DMA (Direct Memory Access) in SHARC? (CO5)
Question 58: END

Option_a: Enhancing ALU performance
Option_b: Reducing CPU load during data transfer
Option_c: Increasing clock speed
Option_d: Converting analog signals to digital
correct_option: b) Reducing CPU load during data transfer

Question 59: START
Which bus architecture is commonly used in SHARC processors for high-speed data transfer? (CO5)
Question 59: END

Option_a: PCI
Option_b: VME
Option_c: Crossbar switch
Option_d: Super Harvard Bus Architecture
correct_option: d) Super Harvard Bus Architecture

Question 60: START
Which of the following applications does NOT typically use SHARC processors? (CO5)
Question 60: END

Option_a: Automotive radar systems
Option_b: High-speed networking
Option_c: Professional audio processing
Option_d: Industrial automation
correct_option: b) High-speed networking

Question 61: START
What is the primary function of a processor cache? (CO5)
Question 61: END

Option_a: To store frequently used data and instructions for quick access
Option_b: To permanently store all programs
Option_c: To act as a replacement for RAM
Option_d: To increase hard disk storage
correct_option: a) To store frequently used data and instructions for quick access

Question 62: START
Which of the following is NOT a common type of cache memory? (CO5)
Question 62: END

Option_a: L1 Cache
Option_b: L2 Cache
Option_c: L3 Cache
Option_d: Virtual Cache
correct_option: d) Virtual Cache

Question 63: START
Which cache level is the smallest but fastest? (CO5)
Question 63: END

Option_a: L1 Cache
Option_b: L2 Cache
Option_c: L3 Cache
Option_d: RAM
correct_option: a) L1 Cache

Question 64: START
What is the role of a write-back policy in cache memory? (CO5)
Question 64: END

Option_a: Data is written to both cache and main memory simultaneously
Option_b: Data is written to cache first and updated in main memory later
Option_c: Data is never written to the cache
Option_d: Cache is bypassed for writing operations
correct_option: b) Data is written to cache first and updated in main memory later

Question 65: START
What is the purpose of a cache replacement policy? (CO5)
Question 65: END

Option_a: To determine which data to remove when the cache is full
Option_b: To increase RAM size dynamically
Option_c: To permanently store data in cache
Option_d: To prevent cache misses completely
correct_option: a) To determine which data to remove when the cache is full

Question 66: START
Which cache mapping technique allows any block to be placed in any cache line? (CO5)
Question 66: END

Option_a: Direct mapping
Option_b: Associative mapping
Option_c: Set-associative mapping
Option_d: Hash mapping
correct_option: b) Associative mapping

Question 67: START
What is a cache hit? (CO5)
Question 67: END

Option_a: When requested data is found in cache memory
Option_b: When cache memory is full
Option_c: When data is fetched directly from RAM
Option_d: When data is lost due to cache overflow
correct_option: a) When requested data is found in cache memory

Question 68: START
What happens during a pipeline stall? (CO5)
Question 68: END

Option_a: Instructions are executed at a faster rate
Option_b: The pipeline stops until the issue is resolved
Option_c: The pipeline skips an instruction
Option_d: Cache memory is flushed
correct_option: b) The pipeline stops until the issue is resolved

Question 69: START
Which technique is used to reduce pipeline stalls? (CO5)
Question 69: END

Option_a: Increasing cache size
Option_b: Branch prediction
Option_c: Reducing clock speed
Option_d: Using single-cycle execution
correct_option: b) Branch prediction

Question 70: START
Which stage of a pipeline fetches the instruction from memory? (CO5)
Question 70: END

Option_a: Decode stage
Option_b: Execute stage
Option_c: Instruction Fetch (IF) stage
Option_d: Write-back stage
correct_option: c) Instruction Fetch (IF) stage

Question 71: START
What is instruction-level parallelism (ILP) in pipelining? (CO5)
Question 71: END

Option_a: Executing multiple instructions in parallel
Option_b: Storing instructions in cache
Option_c: Using multiple processors
Option_d: Executing instructions sequentially
correct_option: a) Executing multiple instructions in parallel

Question 72: START
Which of the following is a common hazard in pipeline execution? (CO5)
Question 72: END

Option_a: Power failure
Option_b: Instruction cache overflow
Option_c: Data dependency
Option_d: Memory corruption
correct_option: c) Data dependency

Question 73: START
What is the main advantage of pipelining in a processor? (CO5)
Question 73: END

Option_a: Increases instruction execution speed
Option_b: Reduces power consumption
Option_c: Improves RAM access time
Option_d: Eliminates all execution hazards
correct_option: a) Increases instruction execution speed

Question 74: START
Which type of pipeline hazard occurs when an instruction depends on the result of a previous instruction? (CO5)
Question 74: END

Option_a: Structural hazard
Option_b: Data hazard
Option_c: Control hazard
Option_d: Branch hazard
correct_option: b) Data hazard

Question 75: START
Which pipeline stage executes arithmetic and logic operations? (CO5)
Question 75: END

Option_a: Instruction Fetch (IF)
Option_b: Execute (EX)
Option_c: Decode (ID)
Option_d: Memory Access (MEM)
correct_option: b) Execute (EX)

Question 76: START
Which technique helps in resolving control hazards? (CO5)
Question 76: END

Option_a: Increasing RAM size
Option_b: Using branch prediction
Option_c: Using virtual memory
Option_d: Reducing cache memory
correct_option: b) Using branch prediction

Question 77: START
What is the role of the write-back (WB) stage in a pipeline? (CO5)
Question 77: END

Option_a: It executes the instruction
Option_b: It writes the result back to the register file
Option_c: It fetches the next instruction
Option_d: It decodes the instruction
correct_option: b) It writes the result back to the register file

Question 78: START
Which cache memory is closest to the processor? (CO5)
Question 78: END

Option_a: L1 Cache
Option_b: L2 Cache
Option_c: L3 Cache
Option_d: Virtual Cache
correct_option: a) L1 Cache

Question 79: START
Which technique allows multiple pipeline stages to execute at the same time? (CO5)
Question 79: END

Option_a: Sequential execution
Option_b: Pipelining
Option_c: Branch prediction
Option_d: Cache mapping
correct_option: b) Pipelining

Question 80: START
What is a pipeline flush? (CO5)
Question 80: END

Option_a: Clearing all instructions in the pipeline due to a misprediction or exception
Option_b: Removing old data from cache
Option_c: Increasing the number of pipeline stages
Option_d: Writing data back to RAM
correct_option: a) Clearing all instructions in the pipeline due to a misprediction or exception

Question 81: START
What is the primary function of a compiler? (CO4)
Question 81: END

Option_a: Execute the program directly
Option_b: Convert high-level code to machine code
Option_c: Debug the program
Option_d: Load the program into memory
correct_option: b) Convert high-level code to machine code

Question 82: START
Which of the following is an example of a compiled language? (CO4)
Question 82: END

Option_a: Python
Option_b: Java
Option_c: C++
Option_d: JavaScript
correct_option: c) C++

Question 83: START
What is the role of an assembler in compilation? (CO4)
Question 83: END

Option_a: Converts high-level code to assembly code
Option_b: Translates assembly code into machine code
Option_c: Links object files into an executable
Option_d: Optimizes source code
correct_option: b) Translates assembly code into machine code

Question 84: START
Which stage of compilation is responsible for optimizing code? (CO4)
Question 84: END

Option_a: Lexical analysis
Option_b: Syntax analysis
Option_c: Code generation
Option_d: Code optimization
correct_option: d) Code optimization

Question 85: START
Which of the following tools is used to execute a compiled program? (CO4)
Question 85: END

Option_a: Compiler
Option_b: Linker
Option_c: Loader
Option_d: Debugger
correct_option: c) Loader

Question 86: START
What is the output of the compilation process before linking? (CO4)
Question 86: END

Option_a: Source code
Option_b: Object file
Option_c: Executable file
Option_d: Machine code
correct_option: b) Object file

Question 87: START
Which type of error is detected during compilation? (CO4)
Question 87: END

Option_a: Runtime error
Option_b: Logical error
Option_c: Syntax error
Option_d: Memory leak
correct_option: c) Syntax error

Question 88: START
What is the purpose of a linker in compilation? (CO4)
Question 88: END

Option_a: Converts assembly code to machine code
Option_b: Combines object files into an executable
Option_c: Loads the program into memory
Option_d: Detects syntax errors
correct_option: b) Combines object files into an executable

Question 89: START
Which compilation model translates and executes code line by line? (CO4)
Question 89: END

Option_a: Just-In-Time (JIT) compilation
Option_b: Interpreter
Option_c: Ahead-Of-Time (AOT) compilation
Option_d: Preprocessor
correct_option: b) Interpreter

Question 90: START
What is the function of a preprocessor in compilation? (CO4)
Question 90: END

Option_a: Optimizes the machine code
Option_b: Handles macros and includes header files
Option_c: Executes the compiled program
Option_d: Translates assembly code to machine code
correct_option: b) Handles macros and includes header files

Question 91: START
Which stage of compilation involves checking the grammar of the source code? (CO4)
Question 91: END

Option_a: Lexical analysis
Option_b: Syntax analysis
Option_c: Code generation
Option_d: Optimization
correct_option: b) Syntax analysis

Question 92: START
What type of file does a C compiler generate before linking? (CO4)
Question 92: END

Option_a: .exe
Option_b: .c
Option_c: .o (or .obj)
Option_d: .asm
correct_option: c) .o (or .obj)

Question 93: START
Which of the following is an example of a dynamic linking method? (CO4)
Question 93: END

Option_a: Statically linking all libraries
Option_b: Using shared libraries (.dll or .so)
Option_c: Embedding libraries into the executable
Option_d: Hardcoding library paths
correct_option: b) Using shared libraries (.dll or .so)

Question 94: START
What does Just-In-Time (JIT) compilation do? (CO4)
Question 94: END

Option_a: Compiles the entire program before execution
Option_b: Interprets code without compiling
Option_c: Compiles code during runtime for faster execution
Option_d: Optimizes machine code at compile-time
correct_option: c) Compiles code during runtime for faster execution

Question 95: START
Which of the following is NOT a phase of compilation? (CO4)
Question 95: END

Option_a: Lexical analysis
Option_b: Syntax analysis
Option_c: Execution
Option_d: Code generation
correct_option: c) Execution

Question 96: START
What is a cross-compiler used for? (CO4)
Question 96: END

Option_a: Compiling code for the same system it runs on
Option_b: Converting code to an interpreted format
Option_c: Compiling code for a different target architecture
Option_d: Debugging compiled programs
correct_option: c) Compiling code for a different target architecture

Question 97: START
Which optimization technique reduces redundant calculations? (CO4)
Question 97: END

Option_a: Dead code elimination
Option_b: Constant folding
Option_c: Loop unrolling
Option_d: Register allocation
correct_option: b) Constant folding

Question 98: START
What is the primary disadvantage of static linking? (CO4)
Question 98: END

Option_a: Increases execution speed
Option_b: Reduces memory usage
Option_c: Increases executable file size
Option_d: Requires external libraries at runtime
correct_option: c) Increases executable file size

Question 99: START
What does an interpreter do differently from a compiler? (CO4)
Question 99: END

Option_a: Converts source code to machine code at once
Option_b: Executes code line by line without producing an executable
Option_c: Optimizes machine code before execution
Option_d: Eliminates the need for runtime environments
correct_option: b) Executes code line by line without producing an executable

Question 100: START
Which of the following languages typically uses JIT compilation? (CO4)
Question 100: END

Option_a: C
Option_b: Python
Option_c: Java
Option_d: Assembly
correct_option: c) Java

Question01: START
What is Instruction-Level Parallelism (ILP)? (CO3)
Question01: END

Option_a: Running multiple programs simultaneously
Option_b: Executing multiple instructions from a single program at the same time
Option_c: Executing one instruction at a time
Option_d: Running a program in parallel across multiple cores
Correct_option: Executing multiple instructions from a single program at the same time

Question02: START
Which of the following is a type of ILP? (CO3)
Question02: END

Option_a: Superscalar execution
Option_b: Pipelining
Option_c: Out-of-order execution
Option_d: All of the above
Correct_option: All of the above

Question03: START
What does superscalar architecture refer to? (CO3)
Question03: END

Option_a: A CPU that can execute only one instruction at a time
Option_b: A CPU that can execute multiple instructions simultaneously
Option_c: A CPU that can execute instructions in serial order
Option_d: A CPU with only one pipeline
Correct_option: A CPU that can execute multiple instructions simultaneously

Question04: START
Which of the following is a technique used to increase ILP? (CO3)
Question04: END

Option_a: Data forwarding
Option_b: Cache memory
Option_c: Branch prediction
Option_d: All of the above
Correct_option: All of the above

Question05: START
ILP improves the performance of which type of processor? (CO3)
Question05: END

Option_a: Single-core processors
Option_b: Multi-core processors
Option_c: SIMD processors
Option_d: RISC processors
Correct_option: RISC processors

Question06: START
What is the key challenge in exploiting ILP? (CO3)
Question06: END

Option_a: Memory latency
Option_b: Data hazards
Option_c: Clock speed
Option_d: Processor heat
Correct_option: Data hazards

Question07: START
Which of the following best defines a "data hazard"? (CO3)
Question07: END

Option_a: When two instructions depend on different resources
Option_b: When an instruction depends on data that has not yet been calculated
Option_c: When instructions are executed in parallel
Option_d: When an instruction does not execute due to resource contention
Correct_option: When an instruction depends on data that has not yet been calculated

Question08: START
What is the purpose of branch prediction in ILP? (CO3)
Question08: END

Option_a: To reduce the time spent on loading data from memory
Option_b: To guess the path of conditional branches to avoid pipeline stalls
Option_c: To execute instructions out of order
Option_d: To calculate data hazards
Correct_option: To guess the path of conditional branches to avoid pipeline stalls

Question09: START
Which of the following can reduce pipeline stalls? (CO3)
Question09: END

Option_a: Data forwarding
Option_b: Branch prediction
Option_c: Instruction reordering

Option_d: All of the above
Correct_option: All of the above

Question10: START
How does "out-of-order execution" enhance ILP? (CO3)
Question10: END
Option_a: It allows instructions to be executed in the order they appear in the code
Option_b: It executes instructions that are independent of others ahead of time
Option_c: It limits instruction reordering
Option_d: It only executes one instruction per clock cycle
Correct_option: It executes instructions that are independent of others ahead of time

Question11: START
A networked embedded system primarily relies on: (CO3)
Question11: END

Option_a: High-level programming languages
Option_b: Continuous interaction with network services
Option_c: Distributed processing
Option_d: All of the above
Correct_option: Continuous interaction with network services

Question12: START
Which of the following is commonly used for communication between embedded systems? (CO3)
Question12: END

Option_a: Bluetooth
Option_b: Wi-Fi
Option_c: Ethernet
Option_d: All of the above
Correct_option: All of the above

Question13: START
What is the main role of a gateway in a networked embedded system? (CO3)
Question13: END

Option_a: To process data from sensors
Option_b: To translate between different communication protocols
Option_c: To store data for offline processing
Option_d: To control access to the network
Correct_option: To translate between different communication protocols

Question14: START
In a networked embedded system, what does the term "edge computing" refer to? (CO3)
Question14: END

Option_a: Data processing done at a central server
Option_b: Data processing done closer to the data source
Option_c: Communication between multiple devices in the system
Option_d: Data storage on the cloud
Correct_option: Data processing done closer to the data source

Question15: START
Which protocol is most commonly used for small IoT devices to communicate over a network? (CO3)
Question15: END

Option_a: HTTP
Option_b: MQTT
Option_c: TCP
Option_d: FTP
Correct_option: MQTT

Question16: START
Which of the following is a key advantage of networked embedded systems? (CO3)
Question16: END

Option_a: Remote monitoring and control
Option_b: Reduced power consumption
Option_c: Simplified hardware design
Option_d: Limited connectivity
Correct_option: Remote monitoring and control

Question17: START
A sensor in a networked embedded system might communicate data to a cloud platform using: (CO3)
Question17: END

Option_a: Serial communication
Option_b: SPI
Option_c: HTTP
Option_d: None of the above
Correct_option: HTTP

Question18: START
The security of a networked embedded system is typically enhanced by: (CO3)
Question18: END

Option_a: Encrypting data in transit
Option_b: Disabling network communication
Option_c: Using a single device for all processing
Option_d: Avoiding wireless networks
Correct_option: Encrypting data in transit

Question19: START
Which of the following is a popular wireless communication technology for networked embedded systems? (CO3)
Question19: END
Option_a: Zigbee
Option_b: LoRa
Option_c: 5G
Option_d: All of the above
Correct_option: All of the above

Question20: START
In networked embedded systems, how is energy consumption typically managed? (CO3)
Question20: END

Option_a: By optimizing the software code
Option_b: Using low-power components
Option_c: By minimizing network communication
Option_d: All of the above
Correct_option: All of the above

Question21: START
What does the I2C bus stand for? (CO3)
Question21: END

Option_a: Inter-integrated Circuit
Option_b: Integrated Circuit Interchange
Option_c: Internal Circuit Interconnect
Option_d: Internet Communication Interconnect
Correct_option: Inter-integrated Circuit

Question22: START
The I2C bus typically supports how many devices on a single bus? (CO3)
Question22: END

Option_a: One device
Option_b: Two devices
Option_c: Up to 128 devices
Option_d: Up to 256 devices
Correct_option: Up to 128 devices

Question23: START
What are the two main lines used in the I2C protocol? (CO3)
Question23: END

Option_a: SCL and SDA
Option_b: TX and RX
Option_c: MOSI and MISO
Option_d: CLK and DATA
Correct_option: SCL and SDA

Question24: START
What is the role of the SDA line in I2C communication? (CO3)
Question24: END

Option_a: To provide clock pulses
Option_b: To transmit data
Option_c: To acknowledge data reception
Option_d: To reset the bus
Correct_option: To transmit data

Question25: START
The maximum speed of an I2C bus is typically: (CO3)
Question25: END

Option_a: 1 Mbps
Option_b: 100 Mbps
Option_c: 400 Kbps
Option_d: 10 Mbps
Correct_option: 400 Kbps

Question26: START
In I2C communication, which component generates the clock signal?
Question26: END

Option_a: Master device
Option_b: Slave device
Option_c: Both master and slave

Option_d: Bus manager
Correct_option: Master device

Question27: START
How many devices are required for I2C communication to work? (CO3)
Question27: END

Option_a: One device
Option_b: Two devices
Option_c: Three devices
Option_d: Four devices
Correct_option: Two devices

Question28: START
What is the primary advantage of the I2C protocol over SPI? (CO3)
Question28: END

Option_a: Faster data transfer rates
Option_b: Support for multiple masters
Option_c: Fewer pins needed for communication
Option_d: More devices can be connected to the bus
Correct_option: Fewer pins needed for communication

Question29: START
What is the maximum number of devices that can be connected on an I2C bus using 7-bit addressing? (CO3)
Question29: END

Option_a: 8
Option_b: 128
Option_c: 256
Option_d: 1024
Correct_option: 128

Question30: START
In I2C, how is data transferred between devices? (CO3)
Question30: END

Option_a: Bit by bit
Option_b: Byte by byte
Option_c: Packet by packet
Option_d: Frame by frame
Correct_option: Byte by byte

Question31: START
What does CAN stand for in CAN bus? (CO3)
Question31: END

Option_a: Controller Area Network
Option_b: Communication and Network
Option_c: Centralized Area Node
Option_d: Computerized Application Network
Correct_option: Controller Area Network

Question32: START
What is the main advantage of using the CAN bus in embedded systems? (CO3)
Question32: END

Option_a: High data transfer rates
Option_b: Reduced wiring complexity
Option_c: Limited device support
Option_d: Increased latency
Correct_option: Reduced wiring complexity

Question33: START
Which type of network topology does the CAN bus use? (CO3)
Question33: END

Option_a: Star
Option_b: Bus
Option_c: Ring
Option_d: Mesh
Correct_option: Bus

Question34: START
In CAN bus communication, what is the function of the arbitration process? (CO3)
Question34: END

Option_a: To prevent multiple nodes from transmitting at the same time
Option_b: To ensure data integrity
Option_c: To establish a communication link
Option_d: To increase data throughput
Correct_option: To prevent multiple nodes from transmitting at the same time

Question35: START
How many wires are typically used in a standard CAN bus setup? (CO3)
Question35: END

Option_a: One
Option_b: Two
Option_c: Three
Option_d: Four
Correct_option: Two

Question36: START
What is the maximum data rate supported by the CAN bus standard? (CO3)
Question36: END

Option_a: 500 Kbps
Option_b: 1 Mbps
Option_c: 10 Mbps
Option_d: 20 Mbps
Correct_option: 1 Mbps

Question37: START
In a CAN bus system, what is the primary function of the "message frame"? (CO3)
Question37: END

Option_a: To store data
Option_b: To carry communication between nodes
Option_c: To acknowledge transmission
Option_d: To establish network security
Correct_option: To carry communication between nodes

Question38: START
What does the term "bit stuffing" in CAN bus communication refer to? (CO3)
Question38: END

Option_a: Inserting extra data to fill the message
Option_b: Adding idle periods between frames
Option_c: Inserting a '0' bit after five consecutive '1' bits
Option_d: Encrypting data for security
Correct_option: Inserting a '0' bit after five consecutive '1' bits

Question39: START
Which of the following CAN bus versions supports high-speed data transmission up to 1 Mbps? (CO3)
Question39: END

Option_a: CAN 1.0
Option_b: CAN 2.0
Option_c: CAN FD
Option_d: CAN Lite
Correct_option: CAN 2.0

Question40: START
What is the role of the "acknowledgment" bit in CAN communication? (CO3)
Question40: END

Option_a: To verify message integrity
Option_b: To confirm the reception of the message
Option_c: To control the timing of the message
Option_d: To ensure message security
Correct_option: To confirm the reception of the message

Question41: START
Which of the following protocols is commonly used for internet communication in embedded systems? (CO3)
Question41: END

Option_a: HTTP
Option_b: MQTT
Option_c: CoAP
Option_d: All of the above
Correct_option: All of the above

Question42: START
What does IoT stand for in the context of embedded systems? (CO3)
Question42: END

Option_a: Internet of Things
Option_b: Integrated Online Technologies
Option_c: Intelligent Operating Transmission
Option_d: Internal Online Transceiver
Correct_option: Internet of Things

Question43: START
In internet-enabled embedded systems, which of the following is essential for establishing network connectivity? (CO3)
Question43: END

Option_a: A microcontroller

Option_b: A wireless communication module
Option_c: A storage device
Option_d: A display unit
Correct_option: A wireless communication module

Question44: START
Which technology is often used to make embedded systems communicate over long distances using minimal power? (CO3)
Question44: END

Option_a: Wi-Fi
Option_b: Zigbee
Option_c: LoRa
Option_d: Bluetooth
Correct_option: LoRa

Question45: START
In embedded systems, which component is responsible for providing internet connectivity? (CO3)
Question45: END

Option_a: Network interface controller
Option_b: Microcontroller
Option_c: Wireless network module
Option_d: Sensor module
Correct_option: Wireless network module

Question46: START
Which is a common use case for internet-enabled embedded systems? (CO3)
Question46: END
Option_a: Remote monitoring and control of devices
Option_b: Data storage in embedded devices
Option_c: Real-time video processing
Option_d: Low-power device management
Correct_option: : Remote monitoring and control of devices

Question47: START
Which of the following protocols is optimized for low-bandwidth communication in embedded systems? (CO3)
Question47: END

Option_a: HTTP
Option_b: FTP
Option_c: CoAP

Option_d: TCP
Correct_option: CoAP

Question48: START
In an internet-enabled embedded system, what is the role of a cloud platform? (CO3)
Question48: END

Option_a: To process data on the edge devices
Option_b: To store and analyze data from multiple devices
Option_c: To control the local embedded systems
Option_d: To handle only user interactions
Correct_option: To store and analyze data from multiple devices

Question49: START
Which of the following is a major concern when designing internet-enabled embedded systems? (CO3)
Question49: END

Option_a: Security
Option_b: Power consumption
Option_c: Network reliability
Option_d: All of the above
Correct_option: All of the above

Question50: START
Which of the following is an example of an internet-enabled embedded system? (CO3)
Question50: END

Option_a: Smart thermostat
Option_b: Digital camera
Option_c: Barcode scanner
Option_d: None of the above
Correct_option: Smart thermostat

Question51: START
What is the primary goal of an elevator control system? (CO3)
Question51: END

Option_a: To move the elevator at a constant speed
Option_b: To manage floor requests and control elevator movement efficiently
Option_c: To ensure passenger safety
Option_d: To display the floor numbers on the screen
Correct_option: To manage floor requests and control elevator movement efficiently

Question52: START
In an elevator control system, which of the following is used to detect the position of the elevator? (CO3)
Question52: END

Option_a: Floor sensors
Option_b: Proximity sensors
Option_c: Speed sensors
Option_d: Weight sensors
Correct_option: Floor sensors

Question53: START
What is the role of a microcontroller in an elevator control system? (CO3)
Question53: END

Option_a: To control the motor speed
Option_b: To manage floor requests and control the elevator's operation
Option_c: To monitor the passenger load
Option_d: To display the time of day
Correct_option: To manage floor requests and control the elevator's operation

Question54: START
Which of the following features is commonly included in modern elevator systems for safety? (CO3)
Question54: END

Option_a: Emergency stop button
Option_b: Automatic door closure
Option_c: Overload sensors
Option_d: All of the above
Correct_option: All of the above

Question55: START
In an elevator control system, what is the purpose of a "call button"? (CO3)
Question55: END

Option_a: To request the elevator to go to a specific floor
Option_b: To control the elevator motor
Option_c: To stop the elevator at a random floor
Option_d: To monitor the elevator's weight
Correct_option: To request the elevator to go to a specific floor

Question56: START
Which of the following components is used to open and close the elevator doors? (CO3)
Question56: END

Option_a: Motor controller
Option_b: Door operator
Option_c: Weight sensor
Option_d: Call button
Correct_option: Door Operator

Question57: START
What method is typically used to control the speed of an elevator? (CO3)
Question57: END

Option_a: Variable frequency drive (VFD)
Option_b: On/off switches
Option_c: Hydraulic pumps
Option_d: Proportional flow valves
Correct_option: Variable frequency drive (VFD)

Question58: START
Which of the following is used to prevent the elevator from overshooting a floor? (CO3)
Question58: END

Option_a: Speed sensors
Option_b: Limit switches
Option_c: Position encoders
Option_d: All of the above
Correct_option: All of the above

Question59: START
In an elevator control system, how are multiple requests handled efficiently? (CO3)
Question59: END

Option_a: Using a priority scheduling algorithm
Option_b: By following a pre-set fixed pattern
Option_c: Using a random allocation method
Option_d: Ignoring the second and subsequent requests
Correct_option: Using a priority scheduling algorithm

Question60: START
What is a key consideration when designing an elevator control system for a high-rise building? (CO3)
Question60: END

Option_a: Speed and efficiency of floor servicing
Option_b: Energy consumption
Option_c: Passenger safety and convenience
Option_d: All of the above
Correct_option: All of the above

Question61: START
Which of the following is true for superscalar processors? (CO3)
Question61: END

Option_a: They can execute multiple instructions per clock cycle
Option_b: They execute instructions one by one
Option_c: They do not use pipelining
Option_d: They can only execute integer instructions
Correct_option: They can execute multiple instructions per clock cycle

Question62: START
What does a "pipeline stall" refer to? (CO3)
Question62: END

Option_a: The time taken to execute a single instruction
Option_b: A delay in the pipeline due to data dependencies
Option_c: A process to fetch new instructions
Option_d: A method to speed up instruction execution
Correct_option: A delay in the pipeline due to data dependencies

Question63: START
Which of the following reduces pipeline stalls in ILP? (CO3)
Question63: END

Option_a: Out-of-order execution
Option_b: Fixed-length instruction encoding
Option_c: Single instruction execution
Option_d: None of the above
Correct_option: Out-of-order execution

Question64: START
What is the purpose of "register renaming" in ILP? (CO3)
Question64: END

Option_a: To improve the utilization of registers
Option_b: To remove unnecessary instructions
Option_c: To prevent instruction reordering

Option_d: To reduce instruction set complexity
Correct_option: To improve the utilization of registers

Question65: START
Which of the following is a characteristic of "dynamic scheduling" in ILP? (CO3)
Question65: END

Option_a: Instructions are executed in order, based on program flow
Option_b: Instructions are reordered at runtime based on availability of resources
Option_c: Instructions are executed at a fixed rate
Option_d: It only executes integer instructions
Correct_option: Instructions are reordered at runtime based on availability of resources

Question66: START
Which of the following is essential for the real-time performance of networked embedded systems? (CO3)
Question66: END

Option_a: High data throughput
Option_b: Low latency
Option_c: High power consumption
Option_d: Complex data processing
Correct_option: Low latency

Question67: START
Which of the following is commonly used for wireless communication in networked embedded systems? (CO3)
Question67: END

Option_a: Zigbee
Option_b: Bluetooth
Option_c: LoRa
Option_d: All of the above
Correct_option: All of the above

Question68: START
In a networked embedded system, which layer of the OSI model is responsible for routing and addressing? (CO3)
Question68: END
Option_a: Application layer
Option_b: Transport layer
Option_c: Network layer
Option_d: Data link layer
Correct_option: Network layer

Question69: START
What is a key factor in choosing a communication protocol for networked embedded

systems? (CO3)
Question69: END

Option_a: Bandwidth
Option_b: Power consumption
Option_c: Communication distance
Option_d: All of the above
Correct_option: All of the above

Question70: START
Which of the following best describes a "sensor node" in a networked embedded system? (CO3)
Question70: END

Option_a: A device that performs calculations
Option_b: A device that collects data from the environment and transmits it to a gateway
Option_c: A device that stores large amounts of data
Option_d: A device that processes data at the central server
Correct_option: A device that collects data from the environment and transmits it to a gateway

Question71: START
What is the maximum length of the I2C bus communication in a typical embedded system? (CO3)
Question71: END

Option_a: 1 meter
Option_b: 10 meters
Option_c: 100 meters
Option_d: 1000 meters
Correct_option: 1 meter

Question72: START
Which of the following is a key advantage of I2C over SPI? (CO3)
Question72: END

Option_a: Faster communication speed
Option_b: Simpler wiring with only two lines
Option_c: Ability to handle longer distances
Option_d: Higher data throughput
Correct_option: Simpler wiring with only two lines

Question73: START
What happens if there is a collision on the I2C bus? (CO3)
Question73: END

Option_a: The devices retry the communication automatically
Option_b: The bus stops working permanently
Option_c: Only the master device can continue communication
Option_d: Data is discarded without recovery
Correct_option: The devices retry the communication automatically

Question74: START
What is the primary role of the "acknowledgment" (ACK) bit in I2C communication? (CO3)
Question74: END

Option_a: To confirm successful reception of data
Option_b: To generate clock pulses
Option_c: To separate data bytes
Option_d: To terminate communication
Correct_option: To confirm successful reception of data

Question75: START
In I2C communication, how does the master device initiate communication? (CO3)
Question75: END

Option_a: By sending an address byte to the slave device
Option_b: By generating clock pulses
Option_c: By waiting for a slave device to respond
Option_d: By sending a stop condition
Correct_option: By sending an address byte to the slave device

Question76: START
In a CAN bus system, how is the priority of a message determined? (CO3)
Question76: END

Option_a: By the sender’s address
Option_b: By the message ID
Option_c: By the size of the message
Option_d: By the time of transmission
Correct_option: By the message ID

Question77: START
Which type of message is used for time-critical communication in CAN bus? (CO3)
Question77: END

Option_a: Data frame
Option_b: Remote frame
Option_c: Error frame
Option_d: Overload frame
Correct_option: Data frame

Question78: START
In a CAN bus system, what type of error frame is used for data corruption detection? (CO3)
Question78: END

Option_a: Active error frame
Option_b: Passive error frame
Option_c: Overload error frame
Option_d: Error delimiter frame
Correct_option: Active error frame

Question79: START
Which of the following is the main advantage of the CAN bus over traditional serial communication protocols? (CO3)
Question79: END

Option_a: Faster data transmission speed
Option_b: Lower error rates
Option_c: Increased reliability in noisy environments
Option_d: All of the above
Correct_option: d

Question80: START
How does a CAN bus handle message collisions? (CO3)
Question80: END

Option_a: It uses a token-passing protocol
Option_b: It uses the highest priority message to win arbitration
Option_c: It retries the transmission after a random delay
Option_d: It ignores lower-priority messages
Correct_option: It uses the highest priority message to win arbitration

Question81: START
Which of the following protocols is lightweight and ideal for IoT communication in internet-enabled embedded systems? (CO3)
Question81: END

Option_a: MQTT
Option_b: HTTP
Option_c: FTP
Option_d: Telnet
Correct_option: MQTT

Question82: START
What is the main challenge in internet-enabled embedded systems for long-term deployment? (CO3)
Question82: END

Option_a: Power consumption
Option_b: Data security
Option_c: Network congestion
Option_d: Both a and b
Correct_option: Both a and b

Question83: START
What is the typical role of an embedded web server in an IoT system? (CO3)
Question83: END

Option_a: To process data on the device
Option_b: To provide web-based access to the device for monitoring and control
Option_c: To handle large databases
Option_d: To communicate with external cloud services
Correct_option: To provide web-based access to the device for monitoring and control

Question84: START
Which of the following is a common method for ensuring secure communication in internet-enabled embedded systems? (CO3)
Question84: END

Option_a: Using strong encryption techniques
Option_b: Implementing authentication protocols
Option_c: Regular software updates
Option_d: All of the above
Correct_option: All of the above

Question85: START
What is a key benefit of using cloud computing with embedded IoT systems? (CO3)
Question85: END

Option_a: Increased data storage and analysis capabilities
Option_b: Reduced power consumption
Option_c: Local data processing
Option_d: Reduced network dependency
Correct_option: Increased data storage and analysis capabilities

Question86: START
What type of system is typically used to control the movement of an elevator in modern designs? (CO3)
Question86: END

Option_a: Hydraulic system
Option_b: Pneumatic system

Option_c: DC motor system
Option_d: Electric motor system
Correct_option: Electric motor system

Question87: START
Which of the following is NOT a feature typically included in an elevator controller design? (CO3)
Question87: END

Option_a: Floor selection
Option_b: Emergency stop functionality
Option_c: Automatic door operation
Option_d: Bluetooth connectivity
Correct_option: Bluetooth connectivity

Question88: START
What does the term "elevator zoning" refer to in a controller design? (CO3)
Question88: END

Option_a: Division of floors into groups to optimize elevator traffic
Option_b: Assigning zones of control to different elevator motors
Option_c: Zoning the control system for energy efficiency
Option_d: A method to reduce elevator maintenance costs
Correct_option: Division of floors into groups to optimize elevator traffic

Question89: START
In elevator systems, which of the following is crucial for handling emergency situations like a power failure? (CO3)
Question89: END

Option_a: Backup battery
Option_b: Emergency stop button
Option_c: Overload sensors
Option_d: A warning light
Correct_option: Backup battery

Question90: START
Which algorithm is commonly used in elevator controller design for optimizing the scheduling of floor requests? (CO3)
Question90: END

Option_a: First Come First Serve (FCFS)
Option_b: Shortest Job Next (SJN)
Option_c: Shortest Seek Time First (SSTF)

Option_d: Elevator scheduling algorithm
Correct_option: Elevator scheduling algorithm

Question91: START
What is the primary purpose of instruction-level parallelism in processors? (CO3)
Question91: END

Option_a: To execute multiple instructions in parallel
Option_b: To increase the number of instructions executed per clock cycle
Option_c: To reduce power consumption
Option_d: To optimize memory usage
Correct_option: To execute multiple instructions in parallel

Question92: START
Which of the following is a challenge of implementing instruction-level parallelism? (CO3)
Question92: END

Option_a: Data hazards
Option_b: Instruction cache misses
Option_c: Dependency between instructions
Option_d: All of the above
Correct_option: All of the above

Question93: START
Which type of dependency is resolved by "out-of-order execution" in ILP? (CO3)
Question93: END

Option_a: Control dependency
Option_b: Data dependency
Option_c: Structural dependency
Option_d: No dependency
Correct_option: Data dependency

Question94: START
Which of the following is a hardware technique used to increase instruction-level parallelism? (CO3)
Question94: END
Option_a: Branch prediction
Option_b: Memory interleaving
Option_c: Register renaming
Option_d: Both a and c
Correct_option: Both a and c

Question95: START
What is a key benefit of vector processors in relation to ILP? (CO3)
Question95: END

Option_a: They allow parallel execution of similar operations on multiple data elements
Option_b: They can execute a large number of instructions per cycle
Option_c: They improve memory access speeds
Option_d: They reduce power consumption
Correct_option: They allow parallel execution of similar operations on multiple data elements

Question96: START
Which of the following protocols is designed specifically for low-power, low-data-rate IoT networks? (CO3)
Question96: END

Option_a: Zigbee
Option_b: Wi-Fi
Option_c: LTE
Option_d: Ethernet
Correct_option: Zigbee

Question97: START
What is a common challenge when designing a networked embedded system for industrial applications? (CO3)
Question97: END

Option_a: Ensuring reliable communication in harsh environments
Option_b: High energy consumption
Option_c: Limited scalability
Option_d: Low communication speed
Correct_option: Ensuring reliable communication in harsh environments

Question98: START
In networked embedded systems, which of the following is typically used to reduce power consumption during data transmission? (CO3)
Question98: END

Option_a: Power-saving mode
Option_b: Data compression
Option_c: Adaptive data transmission rates

Option_d: Both b and c
Correct_option: Both b and c

Question99: START
Which of the following types of networks is commonly used in industrial networked embedded systems? (CO3)
Question99: END

Option_a: Industrial Ethernet
Option_b: LoRaWAN
Option_c: Modbus
Option_d: All of the above
Correct_option: All of the above

Question100: START
What is the primary role of an embedded gateway in a networked embedded system? (CO3)
Question100: END

Option_a: To interface with external networks and collect data from sensor nodes
Option_b: To handle data storage in the system
Option_c: To encrypt the data for security
Option_d: To provide a web interface for system control
Correct_option: To interface with external networks and collect data from sensor nodes

Question01: START
Which of the following techniques helps improve instruction-level parallelism (ILP) by enabling multiple instructions to execute in parallel across different execution units? (CO3)
Question01: END

Option_a: Data pipelining
Option_b: Superscalar architecture
Option_c: Memory interleaving
Option_d: Out-of-order execution
Correct_option: Superscalar architecture

Question02: START
Which of the following is a key disadvantage of instruction-level parallelism? (CO3)
Question02: END

Option_a: Increased power consumption
Option_b: Complexity in managing dependencies between instructions
Option_c: Reduction in processor clock speed
Option_d: Inability to use multiple cores
Correct_option: Complexity in managing dependencies between instructions

Question03: START
Which type of dependency must be resolved by compiler optimization techniques to fully leverage instruction-level parallelism? (CO3)
Question03: END

Option_a: Control dependency
Option_b: Structural dependency
Option_c: Data dependency
Option_d: All of the above
Correct_option: Data dependency

Question04: START
Which technique is used to allow instruction-level parallelism by executing instructions out of order to avoid pipeline stalls? (CO3)
Question04: END

Option_a: Branch prediction
Option_b: Register renaming
Option_c: Dynamic scheduling
Option_d: Instruction pipelining
Correct_option: Dynamic scheduling

Question05: START
What is the main purpose of an instruction pipeline in a processor? (CO3)
Question05: END
Option_a: To increase the clock frequency
Option_b: To allow multiple instructions to be processed simultaneously
Option_c: To reduce the size of the processor
Option_d: To store frequently used instructions
Correct_option: To allow multiple instructions to be processed simultaneously

Question06: START
Which of the following is the main concern in networked embedded systems for real-time applications? (CO3)
Question06: END

Option_a: High energy consumption
Option_b: Low data throughput
Option_c: High latency and jitter
Option_d: Large physical size
Correct_option: High latency and jitter

Question07: START
Which of the following technologies is commonly used in wireless sensor networks for long-range communication? (CO3)
Question07: END

Option_a: Bluetooth
Option_b: Zigbee
Option_c: LoRa
Option_d: NFC
Correct_option: LoRa

Question08: START
Which layer of the OSI model is primarily responsible for managing communication between networked embedded devices? (CO3)
Question08: END

Option_a: Data Link layer
Option_b: Network layer
Option_c: Transport layer
Option_d: Application layer
Correct_option: Network layer

Question09: START
What is one of the biggest challenges when integrating networked embedded systems with

the internet? (CO3)
Question09: END

Option_a: Interfacing with standard protocols
Option_b: Security and data encryption
Option_c: High data throughput
Option_d: Lack of support for low-power devices
Correct_option: Security and data encryption

Question10: START
Which of the following protocols is widely used for managing low-power communication in IoT-based networked embedded systems? (CO3)
Question10: END

Option_a: TCP/IP
Option_b: MQTT
Option_c: HTTP
Option_d: FTP
Correct_option: MQTT

Question11: START
In the I2C bus protocol, how many wires are typically used for communication? (CO3)
Question11: END

Option_a: One
Option_b: Two
Option_c: Three
Option_d: Four
Correct_option: Two

Question12: START
What does the "acknowledge" (ACK) signal in I2C communication signify? (CO3)
Question12: END

Option_a: The end of a communication cycle
Option_b: Acknowledgment that the data was successfully received
Option_c: The start of a new communication frame
Option_d: A notification of data collision
Correct_option: Acknowledgment that the data was successfully received

Question13: START
What happens when two devices on an I2C bus have the same address? (CO3)
Question13: END

Option_a: One device gets disconnected automatically
Option_b: Communication is not possible
Option_c: The bus controller generates an error
Option_d: The devices communicate on different frequencies
Correct_option: Communication is not possible

Question14: START
Which device type in I2C communication generates the clock signal? (CO3)
Question14: END

Option_a: Master device
Option_b: Slave device
Option_c: Data bus
Option_d: Controller
Correct_option: Master device

Question15: START
Which of the following is a limitation of the I2C bus protocol? (CO3)
Question15: END

Option_a: Limited to a single master device
Option_b: It has a slow communication speed compared to SPI
Option_c: It supports only two devices on the bus
Option_d: It uses a complex protocol for address management
Correct_option: It has a slow communication speed compared to SPI

Question16: START
What does CAN stand for in CAN bus communication? (CO3)
Question16: END

Option_a: Controller Area Network
Option_b: Communication Area Network
Option_c: Circuit Area Network
Option_d: Centralized Autonomous Network
Correct_option: Controller Area Network

Question17: START
Which of the following is a key feature of the CAN bus protocol? (CO3)
Question17: END

Option_a: Supports only half-duplex communication
Option_b: Uses a single master and multiple slaves
Option_c: Supports multi-master communication

Option_d: Limited to low-speed data rates
Correct_option: Supports multi-master communication

Question18: START
What is the main advantage of using CAN bus in automotive systems? (CO3)
Question18: END

Option_a: High data rate
Option_b: Robust error detection and correction
Option_c: Supports wireless communication
Option_d: Simplified wiring and reduced cost
Correct_option: Robust error detection and correction

Question19: START
In CAN bus, what is the function of the arbitration process? (CO3)
Question19: END

Option_a: It determines which node will transmit data first
Option_b: It checks if the data is corrupted
Option_c: It schedules nodes for periodic communication
Option_d: It filters out unwanted messages
Correct_option: It determines which node will transmit data first

Question20: START
Which message type in CAN bus is used to request data from another node? (CO3)
Question20: END

Option_a: Data frame
Option_b: Remote frame
Option_c: Error frame
Option_d: Overload frame
Correct_option: Remote frame

Question21: START
Which protocol is typically used for lightweight communication between IoT devices in an internet-enabled embedded system? (CO3)
Question21: END

Option_a: HTTP
Option_b: MQTT
Option_c: FTP
Option_d: POP3
Correct_option: MQTT

Question22: START
Which of the following is a key advantage of using an embedded web server in an IoT device? (CO3)
Question22: END

Option_a: Reduced communication bandwidth
Option_b: Simplified user interface for control and monitoring
Option_c: Increased security risks
Option_d: Faster data processing
Correct_option: Simplified user interface for control and monitoring

Question23: START
What is the purpose of using encryption in internet-enabled embedded systems? (CO3)
Question23: END

Option_a: To improve power efficiency
Option_b: To prevent unauthorized access to data
Option_c: To reduce the data packet size
Option_d: To enhance data throughput
Correct_option: To prevent unauthorized access to data

Question24: START
Which of the following protocols is used to enable secure communication over a network in IoT-based embedded systems? (CO3)
Question24: END

Option_a: HTTPS
Option_b: FTP
Option_c: HTTP
Option_d: SNMP
Correct_option: HTTPS

Question25: START
In an IoT system, which of the following is used for long-distance, low-power communication between devices? (CO3)
Question25: END

Option_a: Wi-Fi
Option_b: Zigbee
Option_c: LoRa
Option_d: Bluetooth
Correct_option: LoRa

Question26: START
What is the main purpose of an elevator controller in a building? (CO3)
Question26: END

Option_a: To handle the maintenance schedule of the elevator
Option_b: To regulate the movement and stopping of the elevator based on user input
Option_c: To perform routine security checks
Option_d: To display the status of the elevator in the building
Correct_option: To regulate the movement and stopping of the elevator based on user input

Question27: START
Which of the following components is typically used to manage the elevator's floor selection in an elevator control system? (CO3)
Question27: END
Option_a: A push-button matrix
Option_b: A microcontroller
Option_c: A servo motor
Option_d: An encoder
Correct_option: A microcontroller

Question28: START
Which algorithm is commonly used to optimize the elevator's scheduling of requests from multiple floors? (CO3)
Question28: END

Option_a: Shortest Seek Time First (SSTF)
Option_b: First Come First Serve (FCFS)
Option_c: Elevator scheduling algorithm
Option_d: Random priority algorithm
Correct_option: Elevator scheduling algorithm

Question29: START
What is a critical safety feature in modern elevator controller designs? (CO3)
Question29: END

Option_a: Overload sensors
Option_b: Voice commands
Option_c: Wireless network connectivity
Option_d: Audio-visual communication
Correct_option: Overload sensors

Question30: START
In the context of elevator systems, what does the "zoning" method refer to? (CO3)
Question30: END

Option_a: Dividing the building into sections to reduce wait time
Option_b: Dividing the elevator shaft into zones for faster access
Option_c: Assigning specific elevators to specific floors to reduce overcrowding
Option_d: A method of ensuring equal energy usage by elevators
Correct_option: Dividing the building into sections to reduce wait time

Question31: START
Which processor feature allows the simultaneous execution of multiple instructions in parallel on different execution units? (CO3)
Question31: END

Option_a: Simultaneous Multithreading
Option_b: Out-of-order execution
Option_c: Pipelining
Option_d: Superpipelining
Correct_option: Out-of-order execution

Question32: START
In ILP, which of the following optimizations is used to resolve dependencies between instructions? (CO3)
Question32: END

Option_a: Register renaming
Option_b: Compiler optimization
Option_c: Branch prediction
Option_d: Both a and b
Correct_option: Both a and b

Question33: START
Which of the following is a key challenge in instruction-level parallelism? (CO3)
Question33: END

Option_a: Maintaining the correct order of instruction execution
Option_b: Increasing clock speed
Option_c: Minimizing power consumption
Option_d: Handling multiple instruction streams
Correct_option: Maintaining the correct order of instruction execution

Question34: START
Which of the following helps overcome the issue of data hazards in ILP? (CO3)
Question34: END

Option_a: Branch prediction

Option_b: Data forwarding
Option_c: Data prefetching
Option_d: Register renaming
Correct_option: Data forwarding

Question35: START
Which factor is most critical in determining the performance improvement in instruction-level parallelism? (CO3)
Question35: END

Option_a: The number of execution units available
Option_b: The type of instructions executed
Option_c: The memory access time
Option_d: The program's instruction mix
Correct_option: The number of execution units available

Question36: START
Which communication protocol is commonly used for remote monitoring of embedded devices in IoT applications? (CO3)
Question36: END

Option_a: FTP
Option_b: HTTP
Option_c: MQTT
Option_d: SSH
Correct_option: MQTT

Question37: START
Which of the following protocols is suitable for high-speed communication in networked embedded systems with minimal latency? (CO3)
Question37: END

Option_a: Bluetooth
Option_b: Zigbee
Option_c: Wi-Fi
Option_d: LoRa
Correct_option: Wi-Fi

Question38: START
What is the primary challenge for wireless networked embedded systems in urban environments? (CO3)
Question38: END

Option_a: High interference and congestion

Option_b: Low data throughput
Option_c: Limited battery life
Option_d: Lack of signal range
Correct_option: High interference and congestion

Question39: START
Which of the following is an important consideration when designing power-efficient networked embedded systems? (CO3)
Question39: END

Option_a: Energy harvesting
Option_b: Using high-power processors
Option_c: High-frequency data transmission
Option_d: Using cloud-based computing
Correct_option: Energy harvesting

Question40: START
In an IoT-based networked embedded system, which of the following is commonly used to protect the data being transmitted over a network? (CO3)
Question40: END

Option_a: Data encryption
Option_b: Data compression
Option_c: Data packet filtering
Option_d: Data redundancy
Correct_option: Data encryption

Question41: START
Which of the following defines the maximum clock frequency typically used in I2C communication? (CO3)
Question41: END

Option_a: 400 kHz
Option_b: 1 MHz
Option_c: 10 MHz
Option_d: 100 kHz
Correct_option: 400 kHz

Question42: START
In I2C communication, what is the main role of the master device? (CO3)
Question42: END

Option_a: To manage the clock signal and initiate communication
Option_b: To send data only when requested by the slave
Option c: To store data from the slave
Option d: To process the data sent by the slave
Correct_option: To manage the clock signal and initiate communication

Question43: START
How does I2C handle addressing for multiple devices on the same bus? (CO3)
Question43: END

Option_a: Devices are assigned a unique 8-bit address
Option b: Devices are assigned a 16-bit address
Option c: Devices use a broadcast address
Option d: Devices are addressed using their physical location
Correct_option: Devices are assigned a unique 8-bit address

Question44: START
Which of the following is an advantage of I2C over other serial communication protocols like SPI? (CO3)
Question44: END

Option a: Higher data rates
Option b: Reduced pin count (only two wires)
Option c: Faster transmission speeds
Option d: More efficient error handling
Correct_option: Reduced pin count (only two wires)

Question45: START
What does the "bit rate" in a CAN bus system typically determine? (CO3)
Question45: END

Option a: The frequency at which messages are transmitted over the bus
Option b: The number of devices that can be connected
Option c: The amount of data each device can send per cycle
Option d: The voltage level used to transmit messages
Correct_option: The frequency at which messages are transmitted over the bus

Question46: START
Which of the following best describes the purpose of the CAN bus's "error detection" mechanism? (CO3)
Question46: END

Option a: To ensure messages are sent without collision

Option b: To prevent unauthorized access to data
Option c: To identify corrupted or invalid data during transmission
Option d: To manage the number of nodes on the network
Correct_option: To identify corrupted or invalid data during transmission

Question47: START
Which of the following is a type of CAN bus message frame used for error handling? (CO3)
Question47: END

Option a: Data frame
Option b: Remote frame
Option c: Error frame
Option d: Overload frame
Correct_option: Error frame

Question48: START
In an elevator control system, what is the role of an "overload sensor"? (CO3)
Question48: END

Option a: To detect when the elevator doors are open
Option b: To ensure the elevator moves smoothly without jerking
Option c: To detect when the weight limit of the elevator is exceeded
Option d: To check the system's power supply
Correct_option: To detect when the weight limit of the elevator is exceeded

Question49: START
Which of the following algorithms is most commonly used in elevator systems to minimize waiting time for passengers? (CO3)
Question49: END

Option a: Shortest Seek Time First (SSTF)
Option b: Round-robin scheduling
Option c: Elevator control algorithm
Option d: Priority scheduling
Correct_option: Elevator control algorithm

Question50: START
In an elevator controller system, which of the following signals is most important for controlling the doors' opening and closing? (CO3)
Question50: END

Option a: The door motor’s feedback signal
Option b: The floor selection input
Option c: The emergency stop button signal

Option d: The overload sensor output
Correct_option: Elevator control algorithm