

KATHMANDU UNIVERSITY
End Semester Examination [C]
December, 2024

Marks Scored:

Level : B.E.

Course : COMP 306

Year : III

Semester : II

Exam Roll No. :

Time: 30 mins.

F. M. : 10

Registration No.:

Date : 11 DEC 2024

SECTION "A"

[20 Q. × 0.5 = 10 marks]

Choose and encircle in the most appropriate option from each set of choices

- Which of the following is NOT a characteristic of hard real-time systems?
 - Deterministic response time
 - High fault tolerance
 - Guaranteed task execution within deadlines
 - Best-effort scheduling
- Which of the following categories of embedded systems are primarily used in consumer electronics?
 - Standalone systems
 - Real-time systems
 - Mobile embedded systems
 - Networked embedded systems
- In embedded systems, the primary purpose of chip select is to:
 - Generate clock signals
 - Enable specific memory or I/O devices
 - Provide power to peripherals
 - Manage interrupts
- Which of the following interfacing methods is MOST effective for handling high-speed data transmission in embedded systems?
 - GPIO
 - I2C
 - UART
 - DMA
- Which type of sensor provides data in digital form directly without additional conversion?
 - Temperature sensor
 - Accelerometer
 - Digital light sensor
 - Pressure sensor
- Which layer in an embedded operating system primarily handles resource allocation for multiple tasks?
 - Hardware abstraction layer
 - Scheduler
 - Device driver layer
 - Communication software layer
- Which of the following is an advantage of using development tools like simulators in embedded systems?
 - Real-time debugging on physical hardware
 - Simplified hardware abstraction
 - Faster iteration of software changes
 - Reduced need for version control
- What is the primary advantage of Application-Specific Instruction Set Processors (ASIPs) over general-purpose processors?
 - Reduced hardware cost
 - High energy efficiency
 - Simplified instruction decoding
 - Universal software compatibility

9. Which design model focuses on sequential execution of control logic with state transitions?
a) FSM b) Dataflow model c) Black box model d) Pipeline model
10. Which addressing mode is MOST efficient for accessing peripheral registers in assembly programming?
a) Direct addressing b) Immediate addressing
c) Indexed addressing d) Indirect addressing
11. In VHDL, the "signal" construct is used primarily to:
a) Declare constants b) Implement flip-flops
c) Interconnect hardware components d) Generate clock pulses
12. Which development model is MOST suitable for embedded systems requiring incremental updates?
a) Waterfall model b) Agile model c) Spiral model d) V-model
13. Which of the following is a common cause of embedded system failures?
a) Insufficient stack memory b) Lack of real-time operating system
c) Over-specification of hardware d) Inadequate compiler optimizations
14. Which of the following is a key advantage of UART over SPI in embedded communication?
a) Faster data transfer rates b) multi-device support
c) Asynchronous communication d) Simpler error checking
15. What feature makes IEEE 802.11 particularly suitable for embedded wireless communication?
a) Low latency b) High bandwidth
c) Secure encryption protocols d) Energy-efficient design
16. Which scheduling algorithm is most appropriate for hard real-time systems?
a) Round-robin scheduling b) Priority scheduling
c) First-come, first-served d) Earliest deadline first
17. What is the primary function of a device driver in an embedded operating system?
a) Manage system power states b) Facilitate hardware-software communication
c) Allocate CPU time for processes d) Schedule interrupts efficiently
18. Which of the following trends in embedded systems aims to optimize power consumption in IoT devices?
a) Adaptive clock scaling b) Increased transistor density
c) Integration of ASIPs d) Hybrid real-time scheduling
19. What is the key advantage of assuming adequate hardware specifications during system representation?
a) Faster prototyping b) Simplified debugging
c) Reduced resource allocation errors d) Accurate simulation models
20. Which factor is MOST critical for ensuring the scalability of embedded systems in modern applications?
a) Hardware abstraction layers b) Modular software design
c) High-speed processors d) Fixed memory allocation