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Brainware University
398, Ramkrishnapur Road, Barasat
Kolkata, West Bengal-700125

BRAINWARE UNIVERSITY

Term End Examination 2024-2025

Programme – M.Tech.(RA)-2024

Course Name – RTOS Programming

Course Code - MEC10103

(Semester I)

Full Marks : 60

Time : 2:30 Hours

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A

(Multiple Choice Type Question)

1 x 15=15

1. Choose the correct alternative from the following :

- (i) A microcontroller at-least should consist of:
 - a) RAM, ROM, I/O devices, serial and parallel ports and timers
 - b) CPU, RAM, I/O devices, serial and parallel ports and timers
 - c) CPU, RAM, ROM, I/O devices, serial and parallel ports and timers
 - d) CPU, ROM, I/O devices and timers
- (ii) Write, What is the order decided by a processor or the CPU of a controller to execute an instruction?
 - a) adecode,fetch,execute
 - b) execute,fetch,decode
 - c) fetch,execute,decode
 - d) fetch,decode,execute
- (iii) Choose RISC & CISC meaning.....
 - a) a. Complete Instruction Set Computer, Reduced Instruction Set Computer
 - b) b. Complex Instruction Set Computer, Reduced Instruction Set Computer
 - c) c. Complex Instruction Set Computer, Reliable Instruction Set Computer
 - d) d. Complete Instruction Set Computer, Reliable Instruction Set Computer
- (iv) Select CISC is
 - a) Computing instruction set complex
 - b) Complex instruction set computing
 - c) Complimentary instruction set computing
 - d) Complex instruction set complementary
- (v) Choose what does DMA stand for
 - a) direct memory access
 - b) direct main access
 - c) data main access
 - d) data memory address
- (vi) Identify the role of a DMA buffer in data transfer from the following?
 - a) It stores CPU instructions during DMA operations.
 - b) It temporarily holds data before it's transferred to memory.
 - c) It manages CPU cache.
 - d) It handles CPU interrupts.
- (vii) Select from the following characteristics: is it applicable for a microcomputer but not necessarily a microprocessor?

- a) High clock speed
c) Dedicated graphics processing
- b) Integrated memory
d) Arithmetic logic unit (ALU)
- (viii) Define an embedded microcontroller core.
- a) Tiny microcontrollers with minimal features.
c) A microprocessor with on-chip memory, I/O peripherals and a timer.
- b) A microcontroller unit that is integrated into a larger system.
d) A microcontroller with enhanced security features.
- (ix) Complete the sentence: Embedded memories are important in embedded systems because they store critical information required for system operation ...
- a) ...store the system's software code.
c) ...allow the system to store and retrieve data quickly.
- b) ...store the system's configuration data.
d) ...increase the system's power consumption.
- (x) Apply the advantages of using an analog-to-digital converter (ADC) in an embedded system.
- a) Increased processing speed
c) Enhanced accuracy
- b) Improved power efficiency
d) Reduced system complexity
- (xi) Identify the interrupt in the context of computer systems?
- a) A program that runs concurrently with the main program.
c) A hardware component that stores data temporarily.
- b) A request for the CPU's attention to handle an event or condition.
d) A communication protocol between devices.
- (xii) Identify the type of interrupt that has the highest priority and cannot be disabled?
- a) Hardware interrupt
c) Non-maskable interrupt
- b) Software interrupt
d) Maskable interrupt
- (xiii) Write the component in a computer system which is responsible for controlling DMA operations?
- a) Input/Output devices
c) Memory unit
- b) DMA controller
d) Central Processing Unit (CPU)
- (xiv) Select the role of a DMA buffer in data transfer from the following?
- a) It stores CPU instructions during DMA operations.
c) It manages CPU cache.
- b) It temporarily holds data before it's transferred to memory.
d) It handles CPU interrupts.
- (xv) Choose which is the thermal management in embedded systems.
- a) Cooling the system
c) Ensuring the system works at a specific temperature
- b) No option is correct
d) Preventing heat dissipation

Group-B
(Short Answer Type Questions)

3 x 5=15

2. Define embedded system. (3)
3. Enumerate the advantages of using embedded systems. (3)
4. Explain analog interfacing in embedded systems. (3)
5. Discover the role of a scheduler in a real-time operating system. (3)
6. Analyze inter-task communication in a real-time operating system and its impact on system performance. (3)

OR

- Judge the significance of tasks in a real-time operating system and explain their purpose. (3)

Group-C

(Long Answer Type Questions)

5 x 6=30

7. Express the salient feature of JTAG. (5)
8. Evaluate the system on chip (SOC) with an example. (5)
9. Categorize hardware-software co-design with a suitable block diagram. (5)
10. Examine Serial and parallel data Communication interfacing. (5)
11. Analyze embedded computing platforms. (5)
12. Analyze LCD Controller. (5)

OR

Connect Real-time systems and Real-time Scheduling.

(5)

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