

ĐỀ THI KẾT THÚC HỌC PHẦN

Môn học: **Hệ thống nhúng thời gian thực (ELT3071)**

Thời gian: 60 phút

Đề thi số: 1

Họ và tên:

Mã SV:

I. Câu hỏi trắc nghiệm (3 điểm)

Hãy chọn một đáp án đúng nhất cho mỗi câu hỏi sau bằng cách ghi đáp án đó vào giấy thi:

Câu 1:

What are the main functions of a Real-Time Operating System (RTOS)?

T1. Managing and allocating hardware resources of the system to processes.

T2. Managing processes.

T3. Scheduling multiple processes for concurrent execution.

T4. Managing the file system.

T5. All of the above.

Câu 2:

Is the statement "*The Round-Robin scheduling algorithm ensures that all tasks have an opportunity to execute on the processor but does not guarantee that they meet real-time requirements*" true or false?

T1. True

T2. False

Câu 3:

What is the concept of real-time embedded systems?

T1. They are systems in which the overall correctness of the system depends on both functional correctness and timing correctness.

T2. They are systems in which timing correctness is more important than functional correctness.

T3. They are embedded computer systems capable of generating responses to external events within a predetermined deadline.

T4. Both T1 and T2.

T5. All of T1, T2, and T3.

Câu 4:

What are the roles of scheduling algorithms in real-time embedded operating systems (RTOS)?

T1. Determine when a task is executed in the system and ensure tasks are completed before a specified deadline.

- T2. Determine the execution time of a task.
- T3. Determine the execution period of a task.
- T4. Determine the deadline for task completion.
- T5. All of the above.

Câu 5:

How is the interrupt mechanism implemented in the communication between a processor and peripheral devices?

- T1. The software program running on the processor continuously reads the status register of the peripheral to see if the device needs service or not.
- T2. The hardware logic circuit on the processor continuously monitors the interrupt request line from the peripheral to see if the device needs service or not.
- T3. The device continuously checks whether the processor is available to serve it or not.
- T4. If there is an interrupt request from the peripheral device, the processor pauses the current program and switches to executing a predefined code segment.
- T5. Both T2 and T4.

II. Câu hỏi tự luận

Câu 6 (4 điểm).

The following systems contains independent and preemptable periodic tasks and is scheduled by the cyclic scheduling algorithm. Calculate its hyperperiod, analyze and choose an appropriate frame size, and construct the schedule of the first hyperperiod.

$$T1 = (3, 1), T2 = (6, 1), T3 = (9, 2).$$

Câu 7

(3 điểm).

Consider the following systems of independent and preemptable periodic tasks that are scheduled by the RM algorithm. Test the schedulability of the system using the TDA (Time Demand Analysis). Construct the schedule in the segment of (0, 15) for the system.

$$T1 = (5, 1), T2 = (8, 2), T3 = (10, 2), T4 = (15, 2).$$