

(A constituent unit of MAHE, Manipal)

SEVENTH SEMESTER BTECH. (E & C) DEGREE END SEMESTER EXAMINATION JANUARY 2020

SUBJECT: ADVANCED EMBEDDED SYSTEM DESIGN (ECE - 4001)

TIME	3 HOURS	
	JIUUNJ	

MAX. MARKS: 50

- Instructions to candidatesAnswer ALL questions.
 - Missing data may be suitably assumed.
- 1A. Draw the typical ARM memory system. Explain the control logic with the diagram, which can access RAM and ROM, as well as to read/ write a byte, half word and word.
- 1B.Define the following signal in AMBA bus:i) BPROT[1:0]ii) BWAITiii) AREQxiv) BSIZE [1:0]v) PENABLEvi) HLOCKvii) HSPLIT [15:0]
- 1C. What are the theoretical advances in the development of operating systems? Explain any three in brief.

(4+3+3)

- 2A. Write an RTX code for LPC2148, having two tasks by setting an event for each tasks. Display the message for each task as "Task X created", where X= 1,2 respectively. The first Task continuously repeat 30ms after the second Task completes and the second Task must repeat 20ms after first Task completes.
- 2B. Draw the process state diagram with two suspended states and explain the significance of each with respect to its transition from other states.
- 2C. Give reasons for process suspension and explain.

(4+3+3)

- 3A. Write a sample code for running two tasks in a Round robin fashion.
- 3B. Discuss the various process interaction types. Give the potential control problems in each type.

```
3C. Void Task1 (void)
{
.
VCountErrors(9);
.
}
Void Task2 (void)
{
.
VCountErrors(11);
```

```
}
Static int cErrors;
void vCountErrors ( int cNewErrors)
{
cErrors += cNewErrors;
}
```

What is a reentrant function? Assuming initial value is 7 in the function code given above, what is the value of cErrors, if Task 2 interrupt the task1 before the result is stored? How to avoid the shared data problem? The various method used explain.

(4+3+3)

- 4A. Consider a classroom is shared by two teachers. Write a RTX code for LPC 2148 using MUTEX for sharing the classroom and display message 'TEACHER1', 'TEACHER 2' for the teacher who occupies the room at a given instant of time.
- 4B. Write the correct solution for Mutual exclusion by Dekker's Algorithm and explain.
- 4C What is deadlock? Briefly explain the conditions for deadlock.

(4+3+3)

- 5A. Assuming an ADC will read the value of voltage and current of an electronic circuit, write the RTX code for LPC2148 to send and receive these data using Mail box.
- 5B. What is boundary scan architecture? Explain in brief ARM debug architecture using boundary scan chain.
- 5C. With the diagram, explain the general model of access control in data protection of computer system/network.

(4+3+3)