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(An Autonomous Institute Affiliated to AKTU, Lucknow) M.Tech. SEM: II - THEORY EXAMINATION (2021 - 2022) Subject: Real Time Operating System SECTION A 15 The are reserved for events such as unrecoverable memory errors. (a) non maskable interrupts (b) blocked interrupts (c) maskable interrupts (d) none of the mentioned Device drivers are implemented to interface _____. (a) character devices (b) block devices (c) network devices (d) all of the mentioned The embedded device contains an Embedded Operating System which can be one of:

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Roll. No:

Subject Code:- AMTVL0218

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

Time: 3 Hours

General Instructions:

1. The question paper comprises three sections, A, B, and C. You are expected to answer them as directed.

2. Section A - Question No- 1 is 1 marker & Question No- 2 carries 2 marks each.

3. Section B - Question No-3 is based on external choice carrying 4 marks each.

4. Section C - Questions No. 4-8 are within unit choice questions carrying 7 marks each.

5. No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.

1. Attempt all parts:-

1

1

1

(a) Real Time Operating System (RTOS)

(b) Customized General Purpose Operating System (GPOS)

- (c) both a and b
- (d) none of the Above

Max. Marks: 70

1

1

1

1	The maximum number of items a queue can hold is called its	1	
	(a) Space		
	(b) Length		
	(c) Both a and b		
	(d) None		
1-e.	RTX allow inter-task communication through	1	
	(a) Semaphores		
	(b) Mutexes		
	(c) Events		
	(d) All of above		
2. Attempt	t all parts:-		
2.a.	What is a long-term scheduler?	2	
2.b.	Define deadlock?	2	
2.c.	What are Data Type Modifiers?	2	
2.d.	What are Blocking Memory Functions?	2	
2.e.	Write the Mutex decleration.	2	
	SECTION B 20		
3. Answer any <u>five</u> of the following:-			
3	Classify the RTOS in detail.	4	
3	What is POSIX compatibility?	4	
3	What do you mean by Context save and context switching?	4	
3	Why the signals are different from all the other types of kernel objects?	4	
3.e.	Describe the various phases of Embedded development used in embedded system product development life cycle.	4	
3.f.	How to suspend the program based on scheduler?	4	
3.g.	Write a short note on Mailboxes & Signals.	4	
	SECTION C 35		
4. Answer any <u>one</u> of the following:-			
4-a.	Differentiate between Normal Linux kernal and Real time kernal on the basis of its scheduling policies.	7	

4-b. Describe the Architecture of Chibios-RT in detail.

5. Answer any one of the following:-

5-a.	Explain the architecture of device driver, with neat sketch and give the applications of device drivers.	7	
5-b.	Explain Semaphore obtain and release services.	7	
6. Answer any <u>one</u> of the following:-			
6-a.	Discuss Super-loop based approach. Write the 'C' program code for the super loop.	7	
6-b.	What is Integrated development environment (IDE)? Discuss in detail all important aspects.	7	
7. Answer any <u>one</u> of the following:-			
7-a.	Write a program to show use of counting semaphore to synchronize a task with an interrupt.	7	
	Also show the output produced when prgram is executed.		
7-b.	Write the pseudo code for non-interlocked one- way data communication, interlocked one-	7	
	way data communication and interlocked two way data communication.		
8. Answer any <u>one</u> of the following:-			
8	Describe the differences in Version 5 of CMSIS (Cortex Microcontroller Software Interface	7	
	Standard) compared to version1.3.		
8	Describe the configuration of a semaphore and use it to signal between two tasks.	7	