Printed Page:- 03 **Subject Code:- AMTVL0218**

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NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

M.Tech

SEM: II - THEORY EXAMINATION (2023 - 2024)

Subject: Real Time Operating System

Time: 3 Hours **Max. Marks: 70**

General Instructions:

IMP: *Verify that you have received the question paper with the correct course, code, branch etc.*

1. *This Question paper comprises of* **three Sections -A, B, & C.** *It consists of Multiple Choice Questions (MCQ's) & Subjective type questions.*

2. *Maximum marks for each question are indicated on right -hand side of each question.*

3. *Illustrate your answers with neat sketches wherever necessary.*

4. *Assume suitable data if necessary.*

5. *Preferably, write the answers in sequential order.*

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

SECTION A **15**

1. Attempt all parts:-

1-a. Preemptive, priority based scheduling guarantees _____(CO1) 1

(a) hard real time functionality

(b) soft real time functionality

(c) protection of memory

(d) none of the mentioned

1-b. What will happen if a non-recursive mutex is locked more than once?(CO2) 1

(a) Starvation

(b) Deadlock

(c) Aging

(d) Signaling

1-c. GPOS stand for_____.(CO3) 1

(a) a) Customized General Purpose Operating System

(b) b) Computing General Purpose Operating System

(c) c) Customized General processor Operating System

(d) d) none of the above

1-d. A _____Semaphore can be used to unblock a task each time a particular interrupt occurs.(CO4) 1

(a) Binary

(b) counting

(c) mutex

(d) None

1-e. Each mailbox usually has _____ message pointer only, which can point to message.(CO5) 1

(a) One

(b) Two

(c) Three

(d) Four

2. Attempt all parts:-

2.a. Define Event latency. (CO1) 2

2.b. What are the two kinds of semaphores?(CO2) 2

2.c. Give the limitations of the high level language based development.(CO3) 2

2.d. Define deadlock.(CO4) 2

2.e. Define context switch time.(CO5) 2

SECTION B **20**

3. Answer any <u>five</u> of the following:-

3-a. Draw the structure of Micro kernel and explain in brief.(CO1) 4

3-b. Describe the six common types of services offered by RTOS .(CO1) 4

3-c. What is inter task communication? Describe the different methods of inter task communication.(CO2) 4

3-d. Explain interrupts and its types.(CO2) 4

3.e. Give some differences between compiler v/s cross compiler.(CO3) 4

3.f. What is interrupt nesting? What are the constants that control interrupt nesting? (CO4) 4

3.g. What are the various kinds of problems presents during peripheral programing in ARM Cortex-core controller?(CO5) 4

SECTION C **35**

4. Answer any <u>one</u> of the following:-

4-a.	Define an Operating system? Specify the comparisons between General and Real time.(CO1)	7
4-b.	What is a pre-emptive scheduler? Explain the model for critical section service by a pre-emptive scheduler.(CO1)	7

5. Answer any <u>one</u> of the following:-

5-a.	Explain the architecture of device driver, with neat sketch and give the applications of device drivers. (CO2)	7
5-b.	Write a program for implementation of semaphore reset.(CO2)	7

6. Answer any <u>one</u> of the following:-

6-a.	Describe Emulators and logic analyzer in detail. (CO3)	7
6-b.	Explain C Macros in detail with example.(CO3)	7

7. Answer any <u>one</u> of the following:-

7-a.	Explain Fixed-Size Memory Management in Embedded Systems.(CO4)	7
7-b.	Explain blocking vs non-blocking memory functions.(CO4)	7

8. Answer any <u>one</u> of the following:-

8-a.	Explain how to use semaphores through CMSIS-RTOS based on FreeRTO APIs.(CO5)	7
8-b.	Explain the scheduling options in RTX.(CO5)	7