

## NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)
M.Tech.

SEM: II - THEORY EXAMINATION (2021-2022)
Subject: Real Time Operating System
Time: 3 Hours
Max. Marks: 70

## 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.

SECTION A

1. Attempt all parts:-

The $\qquad$ are reserved for events such as unrecoverable memory errors.
(a) non maskable interrupts
(b) blocked interrupts
(c) maskable interrupts
(d) none of the mentioned

1 Device drivers are implemented to interface $\qquad$ .
(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:
(a) Real Time Operating System (RTOS)
(b) Customized General Purpose Operating System (GPOS)
(c) both a and b
(d) none of the Above

The maximum number of items a queue can hold is called its $\qquad$ .
(a) Space
(b) Length
(c) Both a and b
(d) None

1-e. RTX allow inter-task communication through $\qquad$ .
(a) Semaphores
(b) Mutexes
(c) Events
(d) All of above
2. Attempt 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 five 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 4 development life cycle.
3.f. How to suspend the program based on scheduler? 4
3.g. Write a short note on Mailboxes \& Signals.

SECTION C
4. Answer any one of the following:-

4-a. Differentiate between Normal Linux kernal and Real time kernal on the basis of its scheduling policies.

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.
5-b. Explain Semaphore obtain and release services.
6. Answer any one of the following:-

6-a. Discuss Super-loop based approach. Write the 'C' program code for the super loop.
6-b. What is Integrated development environment (IDE)? Discuss in detail all important aspects.
7. Answer any one of the following:-

7-a. Write a program to show use of counting semaphore to synchronize a task with an interrupt.
Also show the output produced when prgram is executed.
7-b. Write the pseudo code for non-interlocked one- way data communication, interlocked one-
way data communication and interlocked two way data communication.
8. Answer any one of the following:-

8 Describe the differences in Version 5 of CMSIS (Cortex Microcontroller Software Interface
Standard) compared to version1.3.
Describe the configuration of a semaphore and use it to signal between two tasks.

