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

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

M.Tech

SEM: II - THEORY EXAMINATION (2022-2023 .)

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. Messages sent by a process have _____. (CO1) 1

(a) fixed size

(b) variable size

(c) fixed or variable sized

(d) none of the mentioned

1-b. Where are the device drivers located in RTOS with a microkernel. (CO2) 1

(a) In the kernel space

(b) In the user space

(c) In separately allocated space which is neither kernel space nor user space.

(d) None

1-c. _____ is the process of writing processor specific machine code in mnemonic form, converting the mnemonics into actual processor instructions. (CO3) 1

(a) Assembly language

(b) Machine language

(c) Opcode

(d) operand

1-d. The beginning and end of message queues are called the _____ & _____. (CO4) 1

(a) tail and start

(b) tail and head

(c) head and tail

(d) Head and stop

1-e. If jobs have unpredictable release times a task is termed _____.(CO5) 1

(a) aperiodic

(b) sporadic

(c) periodic.

(d) None of these

2. Attempt all parts:-

2.a. Difference between Hard and Soft Real time system. (CO1) 2

2.b. Why signal is called as asynchronous event. (CO2) 2

2.c. Write the meaning of '.src' file.(CO3) 2

2.d. What is the difference between queue and semaphore? (CO4) 2

2.e. What is the endianness? (CO5) 2

SECTION B **20**

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

3-a. What is an embedded system? Give at least two examples of embedded systems. (CO1) 4

3-b. Define Advantage and disadvantage of RTOS. (CO1) 4

3-c. Define intertask communication and its types. (CO2) 4

3-d. Explain message passing technique for inter process communication in detail. (CO2) 4

3.e. Describe Embedded Firmware Design Approach. (CO3) 4

3.f. Describe implementation of mutual exclusion using a mutex with help of diagram. (CO4) 4

3.g. Describe a priority inversion and priority elevation in RTX. (CO5) 4

SECTION C **35**

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

4-a. Difference between General Purpose OS & RTOS. Describe basic architecture of 7

an RTOS. (CO1)

4-b. State the main difference between logical and physical address space with an example. (CO1) 7

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

5-a. Write a short note on Real time scheduling and Task Creation. (CO2) 7

5-b. Define Semaphores and Sockets. (CO2) 7

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

6-a. Write a program in C for LCD test program using an Emulator. (CO3) 7

6-b. Describe in detail Integrated development environment (IDE). (CO3) 7

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

7-a. What are the different types of scheduling queues? What is critical section in process synchronization?(CO4) 7

7-b. Write a short note on: (CO4) 7
i)Interrupt Management,
ii) Queues within an Interrupt Service Routine

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

8-a. Briefly describe the features of the Cortex M3 based microcontrollers memory organization. (CO5) 7

8-b. Describe the Architecture of of CMSIS-RTOS. (CO5) 7