Printed Page:-04 **Subject Code:- ACSIOT0501**

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech

SEM: V - THEORY EXAMINATION (2023 - 2024)

Subject: Arm Architecture for IoT

Time: 3 Hours **Max. Marks: 100**

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 20

1. Attempt all parts:-

1-a. For real time operating systems, interrupt latency should be _____ .(CO1) 1

(a) minimal
(b) maximum
(c) Zero
(d) dependent on the scheduling

1-b. Identify acronym of CLI? (CO1) 1

(a) Common Line interface
(b) Cascade Lane Integrator
(c) Command Line Interface
(d) Command Line Interrupt

1-e. Register is used for which purpose. (CO3) 1

(a) Temporary Store
(b) Addition
(c) Subtraction
(d) All of above

1-c. The Size of Normal Mode data in ARM M Series processor is_____. (CO2) 1

(a) 32 Bits
(b) 16 Bits
(c) 8 Bits

(d) 1 Bits

1-f. What will be the value in r3 after the program below? (CO3) 1

```
MOV r0,#0x22
MOV r1,#0x33
ADD r3,r0,r1
```

(a) 0x88
(b) 0x77
(c) 0x66
(d) 0x55

1-d. ARM C++ libraries are based on _____. (CO2) 1

(a) LCVM libc++ project
(b) LLVM libc++ project
(c) LCVB libc++ project
(d) LCVMD libc++ project

1-g. Identify ISFR register size in ARM cortex M0+ has (CO4) 1

(a) 4 bytes
(b) 3 bytes
(c) 2 bytes
(d) 1 byte

1-h. Number of Universal Asynchronized Receiver Transmitter(UART) available on on NXP FRDM-KL25z. (CO4) 1

(a) 2
(b) 3
(c) 4
(d) 1

1-i. A SPI has ____ number of slave components? (CO5) 1

(a) 1
(b) 2
(c) Multiple
(d) No Slave

1-j. What is the Speed of I2C in Standard Mode? (CO5) 1

(a) 400 Kbps
(b) 100 Kbps
(c) 3.4 Mbps
(d) 5 Mbps

2. Attempt all parts:-

2.a. Write name of any four Desktop OS. (CO1) 2

2.b. What is program image? (CO2) 2

2.c.	Write a Assembly Language program for divide any number by 4 using shifting. Take any two numbers in R0 and R1 and Store the Answer in R2. (CO3)	2
2.d.	What is the use of PORT Register? (CO4)	2
2.e.	Discuss Field Trials in Application development process. (CO5)	2

SECTION-B 30

3. Answer any five of the following:-

3-a.	What is Concurrency? Elaborate with example. (CO1)	6
3-b.	Differentiate Medium scale and sophisticated scale embedded systems. (CO1)	6
3-c.	Explain process of pipeline in ARM family processors. (CO2)	6
3-d.	Write about ARM processor registers in detail. (CO2)	6
3.e.	Write and compile code of Proximity (PIR) Sensor interfacing and for target board KL25Z. Use mbed library. PIR sensor connected on Port-B pin 3 and LED is connected on PTB4. (CO3)	6
3.f.	Summarize Timer modules in FRDM-KL25Z. (CO4)	6
3.g.	Differentiate UART protocol with SPI protocol. (CO5)	6

SECTION-C 50

4. Answer any one of the following:-

4-a.	Why we use an operating system? Can we design Embedded systems without OS? Justify your answer with appropriate Example. (CO1)	10
4-b.	Explain ARM Cortex-M Series architectures. (CO1)	10

5. Answer any one of the following:-

5-a.	Differentiate ARM processor modes. Also draw Programmers Models of ARM.(CO2)	10
5-b.	Write short notes on (CO2) i) ARM Nomenclature ii) ARM7-Pipeline	10

6. Answer any one of the following:-

6-a.	Write Embedded C Code using Mbed in ARM Cortex-M, Perform following:- (CO3) i) LED1 will blink every second ii) LED3 will toggle after 2.5 seconds iii) LED2 can be toggled through BUTTON1	10
6-b.	Write Sort notes on:- (CO3) i) Keil MDK-Software Packs ii) Keil MDK Tools	10

7. Answer any one of the following:-

7-a.	Explain all GPIO connectors of FRDM-KL25Z. (CO4)	10
7-b.	Explain PWM in TPM, also write PWM applications. (CO4)	10

8. Answer any one of the following:-

8-a.	Draw and Explain UART transmitter block diagram for Handling asynchronous Communication in KL-25z (CO5)	10
8-b.	Write features of MMA8451 used in KL-25z board. (CO5)	10