Printed Page:- Subject Code:- ACSIOT0501

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NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech.

SEM: V - THEORY EXAMINATION (2022 - 2023)

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. Numbers of address lines needed for 1Gb Main memory. (CO1) 1

(a) 30

(b) 20

(c) 32

(d) 24

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

(a) minimal

(b) maximum

(c) Zero

(d) dependent on the scheduling

1-c. The ARM Cortex M0+ can be used in_____. (CO2) 1

(a) Desktop Computers

(b) Embedded Devices

(c) Both

(d) None of above

1-d. What is C in CISC? (CO2) 1

(a) Complex

(b) Complete

(c) Common

(d) Comparative

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

```
MOV r0,#0x22
MOV r1,#0x33
EOR r3,r0,r1, lsl #01
```

(a) 0x88

(b) 0x44

(c) 0x66

(d) 0x55

1-f. 16 bit-Analog to Digital Convertor(ADC) of FRDM-KL25z with Analog reference voltage of 5-Volt will have voltage sensitivity of _____.(CO3) 1

(a) 76.3 Micro-Volt

(b) 76.3 Milli-Volt

(c) 0.3125 volt

(d) 3.2 Volt

1-g. Select the platform which used in 32-bit ARM Cortex-M microcontrollers? (CO4) 1

(a) Kbed

(b) Sbed

(c) Mbed

(d) Zbed

1-h. Name the organisation who designed FRDM-KL25Z? (CO4) 1

(a) ScaleFree

(b) Scale

(c) Freescale

(d) No Scale

1-i. What will happen when a ARM processor use pipeline? (CO5) 1

(a) Throughput increase and latency increase

(b) Throughput decrease and latency increase

(c) Throughput increase and latency decrease

(d) Throughput decrease and latency decrease

1-j. Identify I2C signal from below (CO5) 1

(a) RX

(b) SDA

(c) TX

(d) MISO

2. Attempt all parts:-

2.a. Write any two Benefits of Embedded Computer Systems. (CO1) 2

2.b. Name Sub-protocols of AMBA. (CO2) 2

2.c. If "001100111101" is digital input in 12-bit DAC than what will be its analog voltage value? Consider 5-volt Analog reference voltage. (CO3) 2

2.d. List out major sections of FRDM-KL25Z. (CO4) 2

2.e. Distinguish half and full duplex. (CO5) 2

SECTION B 30

3. Answer any five of the following:-

3-a. Explain types of Embedded systems. (CO1) 6

3-b. What do you mean by a real-time system? (CO1) 6

3-c. Explain Steps of Program-Generation Flow. (CO2) 6

3-d. Explain process of Pipeline in ARM processor. (CO2) 6

3.e. Write an ALP program for addition of five numbers located at memory stated from 0x1000. (CO3) 6

3.f. Introduce KL-25Z. (CO4) 6

3.g. Explain process of Serial communication using UART protocol. (CO5) 6

SECTION C 50

4. Answer any one of the following:-

4-a. What is RISC processor architecture? how it is different from CISC microprocessor? (CO1) 10

4-b. Write short notes on: (CO1) 10

i) RTOS

ii) Mobile OS.

5. Answer any one of the following:-

5-a.	write sort notes on:- (CO2) i) Compiler ii) Linker iii) Locator	10
5-b.	Write specification of ARM Cortex-M0. (CO2)	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.	Explain need of CMSIS and its modules with specifications. (CO3)	10

7. Answer any one of the following:-

7-a.	Explain all GPIO Registers used in FRDM-KL25Z. (CO4)	10
7-b.	Write features of TPM in FRDM-KL25Z. (CO4)	10

8. Answer any one of the following:-

8-a.	write short notes on:- (CO5) i) SPI Protocol ii) I2C Protocol	10
8-b.	Design Smart street lighting system for smart cities using ARM. (CO5)	10