Ref. No.: Ex/ET/PE/B/T/424/J/2024(S)

B.E. (Electronics and Telecommunication Engg.) Supplementary Exam., 2024
(Final Year, 2nd Semester Supplementary Examination, 2024)

Introduction to ARM7TDMI Architecture

(Elective Paper #2)

Time: Three Hours Full Marks: 100

Answer ALL the Questions

(All Parts of the same question must be answered at one place only)

Module I (CO1)

1. (a) List and explain the important physical features that have driven the ARM Processor design.
   (b) Draw and explain the functional units of ARM core. (10 X 2 Marks)

Module II (CO2)

2. (a) (i) PRE r0 = 0x00000000 r1 = 0x00000077
   RSB r0, r1, #0
   POST (r0) = ? What is the use of this instruction?

   (ii) PRE r0 = 0x00000000, r1 = 0x02020608, r2 = 0x10305070
   ORR r0, r1, r2
   POST (r0) = ?

   (b) Find the result of the following instructions; What is the result of the final operation with respect to the initial / original value?
   (i) ADD R1, R2, R2, LSL#3
   (ii) SUB R0, R0, R0, LSL #2
   (iii) MULEQ R4, R3, R5
   (iv) MULSEQ R3, R2, R1 (5X2 + 10)

Module III (CO3)

3. (a) Prove that Thumb Instruction Set has higher Code Density than ARM Instruction Set with suitable Assembly Language Programs.
   (b) List the Summary of Thumb Register usage.
   (c) (i) How Thumb deviates from ARM style with respect to Barrel shift operations?
   (ii) PRE r2 = 0x00000002, r4 = 0x00000001
   LSL r2, r4
   POST (r2) = ? (10+5+(2+3))

Module IV (CO4)

4. (a) (i) How did the ARM as a Processor is different from ARM as a Microcontroller? (ii) List the different functional blocks in the LPC 214x SoC family.
(b) (i) Name the standard defined by ARM for on-chip buses in its SoC designs. (ii) Draw the internal bus structure of this Standard for the SoC design, and explain in brief. [(3+7)+(3+7)]

Module V (CO5)

5. (a) List the applications that can be used for GPIO Pins. How many registers are available for Programming the GPIO Pins, and explain the same.
(b) List the steps involved in the LPC214x Timer Operation. (10+10)

CO1: Illustrate the architecture of the ARM7TDMI Processor (K2, A1)
CO2: Understand the Instruction set of ARM Processor and write Assembly Language Program (ALP) (K2, K3, A2)
CO3: Compare and Analyze the advantages of ARM Thumb Instruction Set (K4, A2)
CO4: Describe the ARM Processor as a Microcontroller Unit with appropriate On chip Peripherals (K2, K4, A1)
CO5: Understand and write the Peripheral programming in C language(K2, A3)