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Question Paper Code : R 80739

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2025.

Fifth/Sixth/Seventh/Eighth Semester

Electronics and Communication Engineering

CEC 369 — IOT PROCESSORS

(Common to : Electronics and Telecommunication Engineering)

(Regulations 2021)

Time: Three hours

Maximum : 100 marks

Answer ALL questions.

PART A—(10 × 2 = 20 marks)

1. State the use of link register in ARM processor.
2. Compare the operation modes of Cortex-M3 processor.
3. What is meant by tail-chaining?
4. What is the function of systick timer?
5. What is meant by vector table relocation?
6. List the key features of a multiprocessor configuration?
7. What is meant by cross compiler?
8. State the difference between simulator and emulator.
9. What is meant by cycle time in chip design? How does it influence system performance?
10. State any two trade-offs between area and power in processor design for SoC.

PART B — (5 × 13 = 65 marks)

the ARM architecture and explain the instruction set architecture. Highlight the need for Thumb and Thumb-2 instruction sets with a suitable example.

Or

Draw a neat block diagram, explain the Cortex-M3 bus interfaces including I-Code, D-Code, System Bus, PPB and DAP. Explain the Cortex-M3 vector table and reset sequence.

State the exception and interrupt architecture of the Cortex-M3 with a neat diagram. With suitable timing diagrams, explain the interrupt exception processing flow.

Or

Explain the role and functioning of the Nested Vectored Interrupt Controller (NVIC) in Cortex-M3. Compare the SVC and PendSV exceptions with respect to priority, usage and execution.

Explain the role of CMSIS in C-based programming and the use of assembly code. Describe the steps to configure the Memory Protection Unit (MPU) registers and explain how the MPU is used in embedded applications.

Or

Explain the exception-driven programming model with a suitable example. Describe the steps to configure the power management module role in low-power operation of Cortex-M3/M4 systems.

Explain the role of ADC, Comparator and General-Purpose Timer peripherals in STM32L15xxx microcontroller. Explain their role in low-power embedded applications.

Or

Explain in detail about In-Circuit Emulator (ICE) and Logic Analyzer. Highlight their advantages in real-time debugging.

Explain the overall architecture of a System-on-Chip. Discuss the major components of an SoC, namely processors, memories and interconnects, and explain how they interact to achieve system-level functionality. State with a suitable block diagram.

Or

Explain memory organization and addressing schemes used in System-on-Chip design. Discuss different system-level interconnection techniques used in SoCs and analyze their impact on performance, reliability and power consumption.

PART C — (1 × 15 = 15 marks)

16. (a) (i) Write an ARM assembly program to add two 32-bit numbers stored in registers R0 and R1 and store the result in R2. Store the result in a memory location. (7)

(ii) Write an Embedded C program to transmit the string "Programming with ARM Cortex" to a PC by configuring the USART2 registers using the polling method. (8)

Or

(b) (i) Write an ARM assembly program to perform division where R1 contains the dividend and R2 contains the divisor. Store the quotient in R3 and the remainder in R5. (7)

(ii) Write an Embedded C program to turn ON the Green LED (PB6) and Blue LED (PB7) on the STM32L-Discovery board by configuring the GPIO registers. (8)