



**Fourth Semester B.E./B.Tech. Degree Examination, June/July 2024**

**Microcontrollers**

Max. Marks: 100

Time: 3 hrs.

*Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.  
2. M : Marks , L: Bloom's level , C: Course outcomes.*

Module - 1			M	L	C
Q.1	a.	Explain the architecture of an arm embedded device with a neat diagram.	10	L2	CO1
	b.	How are monitor and control internal operations performed in ARM core? Explain in brief.	10	L2	CO1
<b>OR</b>					
Q.2	a.	Explain memory management in ARM core. Compare cache and tightly coupled memory.	10	L2	CO1
	b.	Explain mechanism applied by ARM core to handle exception, interrupts using different vector table.	10	L2	CO1
<b>Module - 2</b>					
Q.3	a.	Examine data processing instructions requirement in the manipulation of data register? Explain in brief data processing instructions.	10	L2	CO2
	b.	Explain with examples the following 32-bit instruction of ARM processor i) CMN ii) MLA iii) MRS iv) BIC v) LDR.	10	L2	CO2
<b>OR</b>					
Q.4	a.	Explain the following with example: i) Stock operation ii) Swap instructions.	10	L2	CO2
	b.	Explain Branch instructions in ARM with suitable example. Demonstrate Branch instruction usage flow of execution with an example program.	10	L2	CO2
<b>Module - 3</b>					
Q.5	a.	How registers are allocated to optimize the program? Develop an assembly level program to find the sum of first to integer numbers.	10	L2	CO3
	b.	How compiler handles a "for loop" with variable number of iterations N and loop controlling with an example.	10	L2	CO3
<b>OR</b>					
Q.6	a.	Explain the following terms with an appropriate example: i) Pointer Aliasing ii) Portability issues.	10	L2	CO3
	b.	How function calling is efficiently used by ARM through APCS with an example program.	10	L2	CO3
<b>Module - 4</b>					
Q.7	a.	Explain ARM processors exception and modes with a neat diagram.	10	L2	CO4
	b.	Explain exception priorities and link register offset.	10	L2	CO4
<b>OR</b>					
Q.8	a.	List ARM firmware suite features. Explain firmware execution flow and Red Hat Boot.	10	L2	CO4
	b.	Explain IRQ and Fir exception, also to enable and disable IRQ and FIQ interrupts.	10	L2	CO4
<b>Module - 5</b>					
Q.9	a.	Explain basic architecture of cache memory.	10	L2	CO5
	b.	Explain process involved in main memory mapping to a cache memory.	10	L2	CO5
<b>OR</b>					
Q.10	a.	Explain with diagram set associative cache. How are efficiency is measured?	10	L2	CO5
	b.	Briefly explain cache line replacement policies with an example.	10	L2	CO5

\*\*\*\*\*

**CMRIT LIBRARY**  
BANGALORE - 560 037