

BALLARI INSTITUTE OF TECHNOLOGY & MANAGEMENT

(Autonomous Institute under Visvesvaraya Technological University, Belagavi)

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Course Code

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Fifth Semester B.E. Degree Examinations, April/May 2024

MICROCONTROLLER AND EMBEDDED SYSTEMS

Duration: 3 hrs

Max. Marks: 100

Note: 1. Answer any FIVE full questions choosing ONE full Question from each Module.
2. Missing data, if any, may be suitably assumed

<u>Q. No</u>	<u>Question</u>	<u>Marks</u>	<u>(RBTL:CO:PO)</u>
<u>Module-1</u>			
1. a.	Define microcontroller? Explain 8051 microcontroller with neat block diagram.	08	(2:1:1.3.1)
b.	Differentiate between microcontroller and microprocessor.	05	(2:1:1.3.1)
c.	Explain the memory organization of 8051 microcontroller.	07	(2:1:1.3.1)
(OR)			
2. a.	Explain PSW register in details with examples for each flag	06	(2:1:1.3.1)
b.	Explain the functions of following pins of 8051. (i) ALE (ii) PSEN (iii) EA (iv) RST (v) INT0 (vi) RxD	06	(2:1:1.3.1)
c.	Differentiate between : (i) RISC and CISC (ii) Von Neumann and Harvard Architecture.	08	(2:1:1.3.1)
<u>Module-2</u>			
3. a.	What are Addressing modes? Explain different addressing modes of 8051.	08	(2:2:1.3.1)
b.	Explain the following instructions. (i) MOVX @DPTR,A (ii) SWAP A (iii) RLC A (iv) DAA (v) MOVC A,@A+DPTR (vi) DIV AB	06	(2:2:2.1.2)
c.	Explain data transfer instruction of 8051 microcontroller in detail with example.	06	(2:2:2.1.2)
(OR)			
4. a.	Write an assembly program to move a 10 block of data from internal memory location 40 h to external memory location 8000 h.	08	(2:2:2.1.2)
b.	State the type of addressing modes of the following instructions (i) SUBHB A,30h (ii) CJNE A,#29,AGAIN (iii) INC @R0 (iv) XCD A, R0 (v) MOV 20h,30h (vi) MOVC A, @A+PC	06	(2:2:2.1.2)
c.	Explain arithmetic instruction of 8051 microcontroller in detail with example.	06	(2:2:2.1.2)
<u>Module-3</u>			
5. a.	Explain important design rules of RISC design philosophy.	08	(2:3:1.3.1)
b.	Explain AMBA Bus protocol.	07	(2:3:1.3.1)
c.	Explain Registers of ARM cortex M3 in detail	05	(2:3:1.3.1)

(OR)**Note: (RBTL - Revised Bloom's Taxonomy Level: CO - Course Outcome: PI- Performance Indicator)**

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| 6. | a. | Explain the architecture of ARM cortex M3 in detail. | 07 | (2:3:1.3.1) |
| | b. | With a neat diagram explain the CPSR in detail. | 07 | (2:3:1.3.1) |
| | c. | Explain with a neat diagram the different software component of embedded systems. | 06 | (2:3:1.3.1) |

Module-4

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| 7. | a. | Explain arithmetic instruction of ARM Cortex M3 with example. | 10 | (2:4:1.3.1) |
| | b. | Explain shift instruction of ARM Cortex M3 with example. | 10 | (2:4:2.1.2) |

(OR)

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| 8. | a. | Explain logical instruction of ARM Cortex M3 with example. | 10 | (2:4:2.1.2) |
| | b. | Explain flow control instruction of ARM Cortex M3 with example. | 10 | (2:4:2.1.2) |

Module-5

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| 9. | a. | Explain the elements of embedded system with neat diagram. | 10 | (2:5:1.3.1) |
| | b. | Explain the following communication interfaces:
(i) I2C (ii) Bluetooth | 10 | (2:5:1.3.1) |

(OR)

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| 10 | a. | Explain sensors, actuators and opto-couplers. | 09 | (2:5:1.3.1) |
| | b. | Define embedded system. Explain the purpose of embedded system with an example for each. | 06 | (2:5:1.3.1) |
| | c. | What are the major application area of embedded system? Explain with examples. | 05 | (2:5:1.3.1) |

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