

BALLARI INSTITUTE OF TECHNOLOGY & MANAGEMENT

(Autonomous Institute under Visvesvaraya Technological University, Belagavi)

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Course Code

22CA62

Sixth Semester B.E. Degree Examinations, May/June 2026

MICROCONTROLLER & EMBEDDED AI

(CSE- AI)

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: PI)</u>
<u>Module-1</u>			
1.	a. Summarize the working of ARM embedded system with its characteristics and components.	10	(2 :1: 1.3.1)
	b. Discuss the architecture, memory features, peripherals, and applications of LPC2148 microcontroller.	10	(2 :3: 1.3.1)
(OR)			
2.	a. Explain memory controller and interrupt controller in embedded system.	10	(2 :2: 1.3.1)
	b. Explain the architecture and advanced features of STM32L476RG microcontroller.	10	(2 :2: 1.3.1)
<u>Module-2</u>			
3.	a. Explain ARM arithmetic instructions with examples.	06	(2 :2: 1.3.1)
	b. Discuss conditional execution in ARM processors with examples.	06	(2 :2: 1.3.1)
	c. Discuss multiple load and store instructions with suitable examples.	08	(2 :1: 1.3.1)
(OR)			
4.	a. Discuss ARM coprocessor interface and its applications.	06	(2 :2: 1.3.1)
	b. Explain addressing modes in ARM processors.	06	(2 :2: 1.3.1)
	c. Explain the role of DMA controller in embedded systems.	08	(2 :3: 1.3.1)
<u>Module-3</u>			
5.	a. Explain the applications of embedded systems in communication, aerospace, and defence systems.	06	(2 :2: 1.3.1)
	b. Summarize features, advantages, and applications of ASIC.	06	(2 :2: 1.3.1)
	c. Explain actuators in embedded systems and discuss different types with applications.	08	(2 :3: 1.3.1)
(OR)			
6.	a. Summarise different types of sensors used in embedded systems.	10	(2:3:1.3.1)
	b. Explain the working principle, merits & de-merits of stepper motors.	10	(2:3:1.3.1)

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

Module-4

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| 7. | a. | Discuss the applications of embedded systems in industrial automation. | 06 | (2:4:2.4.2) |
| | b. | Summarize the significance of program modeling in embedded system design. | 06 | (2:4:1.3.1) |
| | c. | Describe automotive embedded systems and their applications. | 08 | (2:4:1.3.1) |

(OR)

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| 8. | a. | Describe the steps involved in hardware software co-design. | 06 | (2:4:1.3.1) |
| | b. | Explain Data Flow Diagram (DFD) in embedded system modeling. | 06 | (2:4:1.3.1) |
| | c. | Explain the complete design process of an embedded system from requirement analysis to testing. | 08 | (2:4:2.4.2) |

Module-5

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| 9. | a. | Explain the Support Vector Machine (SVM) model with advantages and disadvantages. | 06 | (2:5:1.3.1) |
| | b. | Compare traditional embedded systems and embedded AI systems. | 06 | (2:5:1.3.1) |
| | c. | Explain edge AI and cloud computing. Compare both approaches with advantages and disadvantages. | 08 | (2:5:2.4.2) |

(OR)

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| 10. | a. | Explain the complete sampling process used in embedded systems. | 06 | (2:5:2.4.2) |
| | b. | Summarize the working of sensor data logger with a neat block diagram. | 06 | (2:5:1.3.1) |
| | c. | Explain the various stages involved in the Edge AI workflow. | 08 | (2:5:1.3.1) |

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