

BALLARI INSTITUTE OF TECHNOLOGY & MANAGEMENT

(Autonomous Institute under Visvesvaraya Technological University, Belagavi)

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Course Code

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Fourth Semester B.E. Degree Examinations, July 2026

MICROCONTROLLER

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. Draw and explain the internal block diagram of CPU and also the function of data bus, address bus and control bus.	10	(2 :1: 1.3.1)
	b. What is embedded system and explain the criteria for choosing a microcontroller for an embedded application.	10	(2 :1: 1.3.1)
(OR)			
2.	a. Distinguish between microprocessor and microcontroller with block diagram and example for each.	10	(2 :1: 1.3.1)
	b. Draw the neat block diagram of 8051 microcontroller and explain the functioning of each block.	10	(2 :1: 1.3.1)
<u>Module-2</u>			
3.	a. What are the uses of addressing modes and explain the addressing modes in 8051 microcontroller.	10	(2 :2: 1.3.1)
	b. Explain the operation of following instructions and state the addressing mode: (i) DA A (ii) CJNE A,25H, LOOP (iii) MOVC A,@A+DPTR (iv) SWAP A (v) ANL A,#0FFH	10	(2 :2: 1.3.1)
(OR)			
4.	a. Explain the steps in assembling and running the 8051 code with flow diagram.	10	(2 :2: 1.3.1)
	b. Explain the following assembler directives with examples: DB, EQU, SET, IDATA and XDATA	10	(2 :2: 1.3.1)
<u>Module-3</u>			
5.	a. Why “C” is preferred over assembly language? Briefly explain the different data types supported by 8051 microcontroller in C.	10	(2 :3: 1.3.1)
	b. Write an 8051C program to monitor the door sensor connected to pin P0.5, when door opens, turn ON the red LED for 250 ms which is connected to pin P1.2.	10	(3 :3: 2.1.2)

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

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| 6. | a. | Explain the bit pattern of TMOD register and also steps to program timer in Mode-2 with instructions and block diagram. | 10 | (2 :3: 1.3.1) |
| | b. | Illustrate an ALP program to create 1500 Hz frequency on P1.7 pin continuously. Use timer-1, in Mode-1. | 10 | (3 :3: 2.1.2) |

Module-4

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| 7. | a. | What is the importance of SBUF register and explain the programming steps to transfer data serially with instructions. | 10 | (2 :4: 1.3.1) |
| | b. | Illustrate an 8051C program to receive bytes of data serially and put them on P0, P1 and P2 and continuously, set baud rate at 9800, 8-bit data and 1-stop bit. | 10 | (3 :4: 2.1.2) |

(OR)

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| 8. | a. | What is the importance of using interrupts? List the interrupt vector table and how the interrupts are enabled, explain with example. | 10 | (2 :4: 1.3.1) |
| | b. | Illustrate an interrupt-driven Assembly Language Program (ALP) that continuously reads 8-bit data from Port 2 and outputs it to Port 0, while simultaneously generating a 2.5 kHz square wave on pin P1.7 using Timer 0. | 10 | (3 :4: 2.1.2) |

Module-5

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| 9. | a. | Illustrate DAC interfacing with 8051 and write an 8051C program to generate square waveform with 66 % duty cycle. | 10 | (3 :5: 2.1.2) |
| | b. | Illustrate the interfacing of an SPST relay with an 8051 microcontroller, and write an 8051C code to control a lamp by energizing and de-energizing the relay with a delay of 2 seconds between switching operations. | 10 | (3 :5: 2.1.2) |

(OR)

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| 10. | a. | Describe how a 16×1 LCD is interfaced with an 8051 microcontroller with the help of a neat diagram, and develop an 8051 C program to display the message “Save Earth” on the LCD screen. | 10 | (3 :5: 2.1.2) |
| | b. | Explain the interfacing of a DC motor with an 8051-microcontroller using an L293 H-bridge driver with a suitable diagram, and write an 8051C code to read the status of a switch connected to pin P2.7 such that when SW = 0 the motor rotates in clockwise direction, and when SW = 1 it rotates in anticlockwise direction. | 10 | (3 :5: 2.1.2) |

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