

**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, September/October 2024

**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:PI)</u>
<b><u>Module-1</u></b>			
1.	a. Explain an example of embedded system with the help of block diagram.	06	(2 :1: 1.3.1)
	b. Distinguish between 8051, 8052 and 8031 microcontrollers.	06	(2 :1: 1.3.1)
	c. Explain the architecture of 8051 with neat block diagram.	08	(2 :1: 1.3.1)
(OR)			
2.	a. Explain the bit pattern of PSW register.	06	(2 :1: 1.3.1)
	b. Explain the SFR organization in 8051 $\mu$ C.	06	(2 :1: 1.3.1)
	c. Describe the functions of various pins of 8051 $\mu$ C with pin diagram.	08	(2 :1: 1.3.1)
<b><u>Module-2</u></b>			
3.	a. Explain the addressing modes in 8051 $\mu$ C with examples.	08	(2 :2: 1.3.1)
	b. Explain DA A instruction in correcting the BCD addition.	06	(2 :2: 1.3.1)
	c. Illustrate an ALP to find Fibonacci series.	06	(3 :2: 2.1.2)
(OR)			
4.	a. Sketch and explain the execution of subroutine program using CALL and RETURN instructions.	08	(2 :2: 1.3.1)
	b. Explain the execution after adding following data and the status of CY, AC and P flags: (i) 99h and 64h.      (ii) FFh and 93h.      (iii) ACh and 95h	06	(2 :2: 1.3.1)
	c. Illustrate an assembly language program to find cube of a number.	06	(3 :2: 2.1.2)
<b><u>Module-3</u></b>			
5.	a. Explain the advantages of using C program for 8051 $\mu$ C.	06	(2 :3: 1.3.1)
	b. Explain 8051C logical operators with suitable examples.	06	(2 :3: 1.3.1)
	c. Explain data serialization. And illustrate an 8051C program to send out the value 44H serially one bit at a time via P0.1. The MSB should go first.	08	(3 :3: 2.1.2)
(OR)			
6.	a. Explain the bit pattern of TCON register.	06	(2 :3: 1.3.1)
	b. Explain the steps for timer in mode-2 programming, with instructions.	06	(2 :3: 1.3.1)
	c. Assume that a 1 Hz external clock is being fed into pin P3.5 (T1). Illustrate an 8051C program for counter-1 in mode-1 to count the pulses and display the TH1 and TL1 register on P1 and P0 respectively.	08	(3 :3: 2.1.2)

#### Module-4

7. a. Explain two serial communication methods and three communication links for data transfer. **06** (2 :4: 1.3.1)
- b. Explain SCON registers with bit pattern. **06** (2 :4: 1.3.1)
- c. Illustrate an 8051C program to receive bytes of data serially and put them in P1, set baud rate at 4800, 8-bit data and 1-stop bit. **08** (3 :4: 2.1.2)

(OR)

8. a. Explain Interrupt Service Routines (ISR) and list the interrupt vector table. **06** (2 :4: 1.3.1)
- b. Explain the steps the 8051 follows when interrupt is generated. **06** (2 :4: 1.3.1)
- c. Illustrate an ALP using interrupts, in which the 8051 reads data from P1 and writes it to P2 continuously while giving a copy of it to the serial COM port to be transferred serially. Assume that XTAL=11.0592 MHz and set baud rate at 9600. **08** (3 :4: 2.1.2)

#### Module-5

9. a. Illustrate DAC interfacing with 8051  $\mu$ C and write an 8051C to generate ramp waveform. **10** (3 :5: 2.1.2)
- b. Illustrate electromechanical relay with 8051  $\mu$ C and write an 8051C program to interface show how to drive the relay. **10** (3 :5: 2.1.2)

(OR)

10. a. Illustrate stepper motor interfacing with 8051  $\mu$ C, consider step angle of  $1.8^\circ$  with 8051 and write "8051C" program to rotate 6 times clockwise direction. **10** (3 :5: 2.1.2)
- b. Illustrate of DC motor interfacing with 8051  $\mu$ C and write an 8051C program to control direction using L293 h-bridge. **10** (3 :5: 2.1.2)

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