



VIT[®]

Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

KEY

**SCHOOL OF COMPUTER SCIENCE AND ENGINEERING
CONTINUOUS ASSESSMENT TEST - I
WINTER SEMESTER 2024-2025**

SLOT: B1+TB1

Programme Name & Branch : B.Tech CSE
Course Code and Course Name : BECE204L- Microprocessors and Microcontrollers
Faculty Name(s) : Gerardine Immaculate Mary (Course Co-ordinator)
Class Number(s) : VL2024250504038/4040/4042/4045/4047/4049/4051/5054/
4057/4059/4061/4063/4065/4068/4071/
4073/4075/4077/4078/4080/4082/4084/4086/4088/4191/4199
Date of Examination : 28-01-2025
Exam Duration : 90 minutes **Maximum Marks: 50**

General instruction(s):

- Answer All Questions
- M - Max mark; CO – Course Outcome; BL – Blooms Taxonomy Level (1 – Remember, 2 – Understand, 3 – Apply, 4 – Analyse, 5 – Evaluate, 6 – Create)
- Course Outcomes
CO1 Comprehend the various microprocessors including Intel Pentium Processors
CO3 Comprehend the architectures and programming of 8051 microcontroller

Q. N	Question	M	CO	BL
1.	Analyze the following 8051 assembly program and show the stack and stack pointer during the execution of the program. Assume the default stack area. MOV R6, #25H MOV R1, #12 MOV R4, #0F3H PUSH 6 PUSH 1 PUSH 4 POP 7 POP 5 POP 3 END	10	3	4



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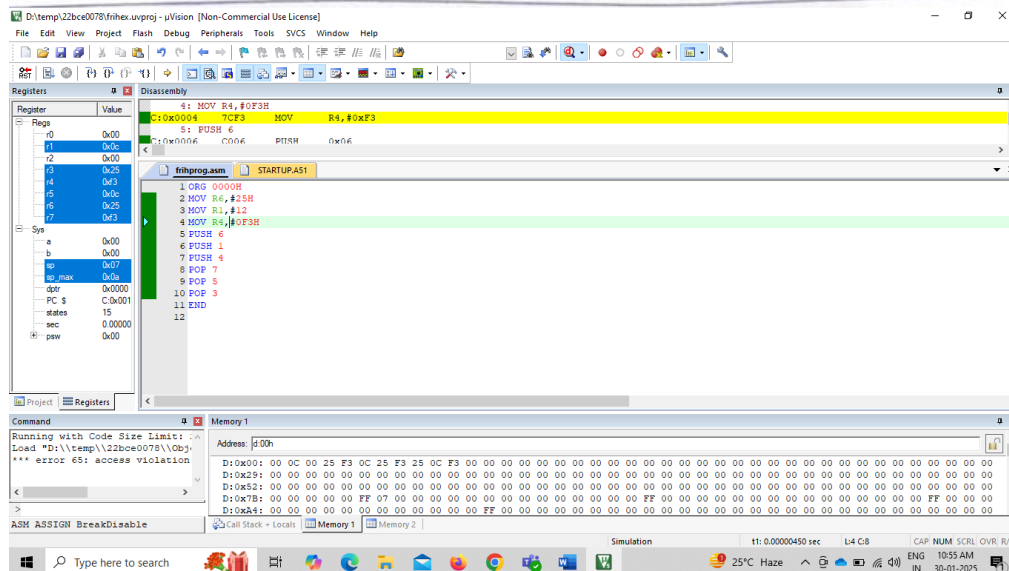
Key:

Winter 24-25
show stack

```

1. MOV R6, #25H
   MOV R1, #12
   MOV R4, #0F3H
   PUSH 6  -> SP=08H
   PUSH 1  -> SP=09H
   PUSH 4  -> SP=0AH
   POP 7   -> SP=09H
   POP 5   -> SP=08H
   POP 3   -> SP=07H
   END
  
```

0EH	
0DH	
0CH	
0BH	
0AH	: F3H
09H	: 0CH
08H	: 25H
07H	: F3H
06H	: 25H
05H	: 0CH
04H	: F3H
03H	: 25H
02H	: 0CH
01H	: 08H
00H	: 00H



2. Assume that 8051 internal RAM locations 30H – 34H have the following values, write an assembly program to find the sum of the values. At the end of the program, register A should contain the low byte and R7 the high byte of the sum.

30H = (7DH)
 31H = (EBH)
 32H = (C5H)
 33H = (5BH)

3 3
 10



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	<p>34H = (30H)</p> <p>Key: Sum is A=B8H, R7=02H</p> <p>CODE: ORG 0000H MOV 30H,#7DH MOV 31h,#0EBH MOV 32h,#0C5H MOV 33H,#5BH MOV 34H,#30H MOV A,30H ADD A,31H JNC L1 INC R7 L1:ADD A,32H JNC L2 INC R7 L2:ADD A,33H JNC L3 INC R7 L3:ADD A,34H JNC L4 INC R7 L4:SJMP L4 END</p>			
3.	<p>a) Indicate the addressing modes for the following 8051 instructions</p> <ul style="list-style-type: none"> (i) MOV R0, #56H (ii) MOVC A, @A+DPTR (iii) MOV 38H, R0 (iv) MOV R0, 38H (v) ADD A, @R1 <p>Key:</p> <ul style="list-style-type: none"> (i) MOV R0, #56H - IMMEDIATE ADDRESSING (ii) MOVC A, @A+DPTR - INDEXED INDIRECT (iii) MOV 38H, R0 - REGISTER ADDRESSING (iv) MOV R0, 38H - DIRECT ADDRESSING (v) ADD A, @R1 - INDIRECT ADDRESSING 	5	3	3
	<p>b) Identify if the following 8051 instruction have any error, if so give the correct instructions</p> <ul style="list-style-type: none"> (i) MOV @R2, A (ii) DEC DPTR (iii) CPL R3 (iv) AND A, B (v) MUL A,B 	5		



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	<p>Key:</p> <ul style="list-style-type: none"> (i) MOV @R2, A - MOV @R1, A (ii) DEC DPTR - INC DPTR (iii) CPL R3 - CPL A (iv) AND A, B - ANL A, B (v) MUL A,B - MUL AB 															
4.	<p>a) For the given 8051 assembly program, find out the time required to execute it, if XTAL frequency is 10 MHz.</p> <table border="1"> <tr><td>MOV R4, #78H</td><td>1 machine cycle</td></tr> <tr><td>L1: ADD A, R4</td><td>1 machine cycle</td></tr> <tr><td>MOV 67H, 79H</td><td>1 machine cycle</td></tr> <tr><td>SUBB A, 67H</td><td>1 machine cycle</td></tr> <tr><td>INC A</td><td>1 machine cycle</td></tr> <tr><td>DJNZ R4, L1</td><td>2 machine cycle</td></tr> </table> <p>KEY: 721 MACHINE CYCLES IN DECIMAL L1 loop = (6x78H) = 02D0H = 720(DECIMAL) INCUDING THE FIRST INSTRUCTION = 720 +1 = 721 (DECIMAL) IN HEXA IT IS 02D1H XTAL =10MHZ $f = 10\text{MHZ}/12 = 0.833 \times 10^6$ $t = 1.2 \text{ microsecs}$ total time = 1.2 microsecs x 721 = 865.54 microsecs</p>	MOV R4, #78H	1 machine cycle	L1: ADD A, R4	1 machine cycle	MOV 67H, 79H	1 machine cycle	SUBB A, 67H	1 machine cycle	INC A	1 machine cycle	DJNZ R4, L1	2 machine cycle	5	3	3
MOV R4, #78H	1 machine cycle															
L1: ADD A, R4	1 machine cycle															
MOV 67H, 79H	1 machine cycle															
SUBB A, 67H	1 machine cycle															
INC A	1 machine cycle															
DJNZ R4, L1	2 machine cycle															
	<p>(b) Determine the value of A and B and status of the flag register after the execution of the following instructions:</p> <pre> ORG 0000H MOV A, #25H MOV B, #1FH MUL AB SUBB A, #0FCH RRC A END </pre> <p>KEY: A=BFH B=04H PSW = C1H [11000001] that is CY=1, AC=1, P=1, OV=0</p>	5														



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5.	<p>(a) Examine the content of flags after performing logical OR operation of the following $(F1)_{16}$ OR $(1F)_{16}$</p> <p>KEY: ALL FLAGS are 0</p>	5	1	2
	<p>(b) Explain why microcontrollers are preferred over microprocessors for small to medium appliance applications.</p> <p>Key: descriptive answer.</p>	5		
