

Final Assessment Test – April 2026Course: **BECE204L - Microprocessors and Microcontrollers**Class NBR(s): **0874 / 0877 / 0879 / 0881 / 0883 / 0885 /****0888 / 1014 / 1018 / 1020 / 1022 / 1024 /****1028 / 1030 / 1033 / 1035 / 1039 / 1043 /****1046 / 1049 / 1053 / 1055 / 1057 / 1059 /****1061 / 1064 / 1066 / 1068 / 1070 / 1072 /****1074 / 1076 / 1078**Slot: **C1+TC1****VIT**

Vellore Institute of Technology

Time: **Three Hours**Max. Marks: **100**

- **KEEPING MOBILE PHONE/ANY ELECTRONIC GADGETS, EVEN IN 'OFF' POSITION IS TREATED AS EXAM MALPRACTICE**
- **DON'T WRITE ANYTHING ON THE QUESTION PAPER**

COs	CO Statements
CO1	Describe the different generations of microprocessors
CO2	Use Assembly language for 8086 microprocessor programming and its peripheral interface
CO3	Apply 8051 microcontroller instructions to write assembly language programs
CO4	Demonstrate the functionality and interfacing of 8051 peripherals.
CO5	Explain the architecture of ARM Processor.
CO6	Apply ARM processor instructions to write assembly language programs.

BL – Blooms Taxonomy Level (1 – Remember, 2 – Understand, 3 – Apply, 4 – Analyse, 5 – Evaluate, 6 – Create)

Answer ALL Questions**(10 X 10 = 100 Marks)**

1. Compare the features of i3, i5 and i7 processors. CO1 BL2
2. Explain memory segmentation in 8086 microprocessor. Explain how physical address is calculated for each segment, with an example. CO2 BL2
3. For the following 8051 ALP (Assembly Language Program), determine the content of registers, PSW and flags after execution of each line CO3 BL3

ORG 00H

MOV A,#65H

MOV R5,#30H

ADD A,R5

SETB PSW.3

CLR PSW.4

RRC A

SWAP A

PUSH 5

POP 3

CLR PSW.3

MOV A,R3

MOV B,A

MUL AB

END

4. The total delay produced by the DELAY sub-routine given below is 141 ms for a crystal oscillator frequency of 16 MHz. Determine the delay given by HERE and AGAIN LOOP. Also, calculate the value of n.

CO3 BL3

Label	Instructions	Machine cycles
DELAY:	MOV R2,#n	2
AGAIN:	MOV R3,#150	2
HERE:	NOP	1
	NOP	1
	NOP	1
	DJNZ R3,HERE	2
	DJNZ R2, AGAIN	2
	RET	2

5. Develop a program in 8051 to find the smallest number in a given data and store the result in R2. The bytes are stored in ROM space starting at 200H. The data would look as follows:

CO3 BL3

MYDATA: DB 50H, 85H, 66H, 29H, 14H

6. Develop an 8051 Assembly Language Program to generate a square wave of 6 KHz frequency on P2.4 using Timer 1 in Mode 1.

CO4 BL3

Use X_{TAL} frequency = 20 MHz.

- 7.(a) Develop an 8051 Assembly Language Program to send the message "The future depends on what you do today" to the serial port. Assume a switch (SW) is connected at P1.2. Monitor its status and set the baud rate as follows:

CO4 BL3

SW=0, BAUD RATE = 4800

SW=1, BAUD RATE =9600

Use X_{TAL} frequency = 11.0592 MHz. Assume the message to be sent serially, is stored in ROM starting from 200H.

OR

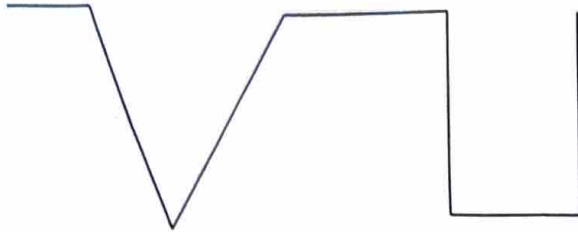
- 7.(b) An 8051 microcontroller is connected to a push-button switch on pin P3.2. Develop an Assembly Language Program to configure and enable the external hardware interrupt. Whenever the switch is pressed (falling edge), the

CO4 BL3

interrupt service routine should increment a register and display its value on Port 1, while simultaneously get a bit from 2.0 and send it to p2.7.

- 8.(a) With a suitable DAC interfacing diagram with the 8051 microcontroller, develop a program to generate a waveform as shown below. The pattern should be repeated continuously.

CO4 BL3



OR

- 8.(b) Develop an assembly language program to interface a 4×4 keyboard with 8051 microcontroller.
9. Examine the different processor modes available in ARM architecture. Examine the structure of the register banks associated with each processor mode and illustrate their organization using suitable diagrams.
10. Explain the following instructions in ARM processor with suitable example.
a) ADC b) TEQ c) RSB d) BL e) MLA

CO4 BL3

CO5 BL2

CO6 BL2

⇔⇔⇔ BG/D/TZ⇔⇔⇔