



**Final Assessment Test(FAT) - Nov/Dec 2024**

Programme	B.Tech.	Semester	Fall Semester 2024-25
Course Code	BECE204L	Faculty Name	Prof. Chanthini Baskar
Course Title	Microprocessors and Microcontrollers	Slot	D2+TD2
		Class Nbr	CH2024250100313
Time	3 hours	Max. Marks	100

**General Instructions**

- Write only Register Number in the Question Paper where space is provided (right-side at the top) & do not write any other details.

**Course Outcomes**

1. Comprehend the various microprocessors including Intel Pentium Processors
2. Infer the architecture and Programming of Intel 8086 Microprocessor.
3. Comprehend the architectures and programming of 8051 microcontroller.
4. Deploy the implementation of various peripherals such as general purpose input/ output, timers, serial communication, LCD, keypad and ADC with 8051 microcontroller
5. Infer the architecture of ARM Processor
6. Develop the simple application using ARM processor.

**Section - I**

**Answer all Questions (2 × 10 Marks)**

\*M - Marks

Q.No	Question	*M	CO
01.	<p>Draw the block diagram of a "Smart Parking System" with necessary internal modules and peripherals required if the system is implemented using</p> <p>(i) 8086 Microprocessor</p> <p>(ii) 8051 Microcontroller</p> <p>Also compare the two systems and analyze the pros and cons of each system.</p>	10	1
02.	<p>With a neat block diagram, explain the key features and benefits of ARM architecture, and how it differs from other processor architectures like 8086 and 8051</p>	10	5

**Section - II**  
**Answer all Questions (4 × 15 Marks)**

\*M - Marks

\*M CO BL

Q.No

Question

15 3 2

03. (i) Show the stack and stack pointer of 8051 microcontroller for each line of the following program with a neat diagram (7 marks)

```
MOV SP,#70H
MOV R5,#66H
MOV R2,#7FH
MOV R7,#5DH
PUSH 5
PUSH 2
PUSH 7
CLR A
MOV R2,A
MOV R7,A
POP 7
POP 2
POP 5
```

(ii) With a neat block diagram explain the architecture of the 8051 microcontroller, detailing its key components such as the CPU, memory organization, input/output ports, and timers. (8 Marks)

04. (i) Write an 8051 assembly language program to compare two memory block 10h to 15h and 20h to 35h. Find out how many bytes of data are not equal between the blocks of memory. Increase the counter every time, when bytes are not equal and display the count in Port1. Assume the initial location of block 1 is 15h and that of block 2 is 30h (8 Marks)

(ii) Obtain the values to be loaded in the SFR of 8051 microcontroller (7 Marks)

- TMOD to operate Timer 1 in Mode2
- IP to Prioritize External interrupt1
- To start Timer 1
- PCON to double the baud rate
- SCON for serial communication with 1 stop bit
- IE to enable external interrupt 0
- TCON to set external interrupt 1 edge flag

05. (i) Assume two switches are connected at INT0 and INT1 pins of 8051 and LEDs are connected to all pins of Port P2 & P3. Write a program to perform the following:
- If INT0 interrupt generated, make LEDs to glow serially only one at a time starting from P2.0 to P2.7 with the time delay of 0.5 seconds between each.
  - If INT1 interrupt generated, blink all LEDs of port P3 for every 0.5 seconds.
- Write an 8051 assembly language program for the above condition and assume the crystal frequency as 11.0592 MHz. (10 Marks)

(ii) Write an 8051 ALP to send data to the DAC to generate a rectified sine wave. Assume full scale voltage of 5V for DAC output. Also show the calculations for arriving at the look up table. (5 Marks)



06. (i) Write an ARM assembly language program to determine the factorial of the number 5. (7 Marks) 15 6  
(ii) Write an ARM assembly language program to evaluate the polynomial  $P(x)=2x^2+3x+5$  at  $x=4$  (8 Marks)

**Section - III**  
**Answer all Questions (1 × 20 Marks)**

Q.No Question \*M - N \*M C

07. (i) The marks obtained by ten students in a subject are given below. After re-evaluation, all the ten students were awarded with extra ten marks due to out of syllabus question in the question paper. Write an 8086 assembly language program to compute the following 20  
a) Add the extra ten marks for all the students and store the result in an array. (2 Marks)  
b) Determine the topper in the subject. (3 Marks)  
c) Determine the pass percentage and average marks obtained in the subject. Assume the pass mark as 50. (7 Marks)

The details of the marks obtained before reevaluation are given below:

Student	Marks
A	70
B	79
C	63
D	40
E	20
F	75
G	17
H	39
I	65
J	57

- (ii) With neat sketch, discuss in detail the architecture of programmable peripheral interface 8255. (8 Marks)

**BL-Bloom's Taxonomy Levels - (1.Remembering, 2.Understanding, 3.Applying, 4.Analysing, 5.Evaluating, 6.Creating)**

