

**Final Assessment Test (FAT) - November/December 2023**

Programme	<b>B.Tech.</b>	Semester	<b>FALL SEMESTER 2023 - 24</b>
Course Title	<b>MICROPROCESSORS AND MICROCONTROLLERS</b>	Course Code	<b>BECE204L</b>
Faculty Name	<b>Prof. Chanthini Baskar</b>	Slot	<b>E2+TE2</b>
		Class Nbr	<b>CH2023240101216</b>
Time	<b>3 Hours</b>	Max. Marks	<b>100</b>

**Section A (4 X 5 Marks)**
**Answer all questions**

01. Differentiate 8085 microprocessor and 8086 microprocessor. [5]
02. In the Intel 8086 microprocessor, assume the register AX contains the data 35ABH. What will be the contents of AX after executing the following programs? Assume that the initial content on the Carry Flag (CF) is one for all the calculations. Also, clearly show the steps in obtaining the final result. [5]
  - (a) MOV CL,04H (3 Marks)  
SHR AX,CL
  - (b) MOV CL,04H (2 Marks)  
RCR AX,CL
03. Write an 8086 assembly language program to solve the following expression.  $Y = (A^2 + B^2 + 2 \cdot A \cdot B) / C$  where A, B, and C are 8-bit hexadecimal numbers. [5]
04. Write an ARM assembly language program to perform the addition of two 64-bit numbers. [5]

**Section B (8 X 10 Marks)**
**Answer all questions**

05. With a neat diagram, explain the architecture of 16-bit 8086 microprocessor in detail. [10]
06. How the memory is organized in 8051 microcontroller? Explain in detail about the data and program memory available in 8051. [10]
07. Write an 8051 assembly language program to convert the given temperature 25°C in degree Celsius (°C) to degree Fahrenheit (°F) scale using the formula  $F = (°C \cdot 9/5) + 32$ . Assume the result does not exceed FFH. [10]
08. Write an 8051 assembly language program to transfer "VIT" serially at 9600 baud rate, 8-bit data, 1 start bit and 1 stop bit. [10]
09. Write an 8051 assembly language program that uses interrupts to implement an intruder alarm system. Assume that the pressure sensor is connected to the INT0 (P3.2) pin. The pin is at 0 when an intruder steps on a special mat and 1 when there is no pressure on the mat. The program should turn on an alarm buzzer which is connected to P3.0 when an interrupt occurs. The program should keep the alarm on until there is no more pressure on the mat. [10]

10. Assume that P1 is connected to the weight machine and receives the weight as a decimal whole number between 00 and 99 when an object is weighed. Write an 8051 assembly language program to display the weight on a 16 x 2 LCD display, specifically in the second row and fourth column, in the format "XX KG." Note: ASCII Value for 0 to 9 is 30 to 39. [10]
11. With a neat diagram, discuss the ARM register set in detail and explain the different operating modes of an ARM processor. [10]
12. Debug the below program to evaluate  $(A + 8B + 7C - 27)/4$  by using ARM assembly instructions. [10]  
Where: A = 25, B = 19, and C = 99. Also write the correct program after debugging the code and explain the codes.
- ```
LDR R0, #25
LDR R1, #19
ADD R0, R0, R1, ASR #3
MOV R1, #99
MOV R2, #7
MUL R0, R1, R2, R0
SUB R0, R0, #27
MOV R0, R0, LSL #2
```

