Name:.....
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MAR ATHANASIUS COLLEGE OF ENGINEERING (AUTONOMOUS),
KOTHAMANGALAM - 686666
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.TECH FIRST SERIES EXAMINATION, AUGUST 2026 (S5 CS)
B24CS3T01 MICROPROCESSOR SYSTEMS

Max. Marks: 40 Duration: 1.5 Hours

PART A

Answer all questions. Each question carries 3 marks.

1. After executing the following program on the 8086 microprocessor, show the final contents of the AX register and the status (set or cleared) of the Carry Flag (CF), Parity Flag (PF), and Auxiliary Carry Flag (AF) in the flag register.

   MOV AX, 009AH
   MOV BX, 1278H
   ADD AX, BX
   HLT **(CO1)**

2. How do the higher four address lines of the 8086 microprocessor differ in functionality from the lower sixteen address lines with respect to memory addressing and data transfer? . **(CO1)**

3. What is the role of the AH register when using INT 21h? **(CO2)**

4. What is the relationship between the ASSUME directive and the SEGMENT directive? Why are both needed? **(CO2)**

(P.T.O)

VISION

Mould competent professionals to serve as a valuable resource for society in pursuit of excellence.

MISSION

- Provide quality education tuned to the challenging phases of technology.
- Mould disciplined and Socially Committed engineers capable of professional leadership.
- Promote theoretical and practical understanding, along with critical thinking and logical reasoning.

PART B

Answer all questions. Each question carries 14 marks.

5. (a) A programmer writes the following three instructions in sequence:

I1: MOV AX, [SI]
I2: MOV BX, [BX + 200H]
I3: MOV CX, [DI + 1000H]

For each instruction:

(i) Identify the addressing mode.

(ii) If DS = 1000H, ES = 2000H, SS = 3000H, BX = 0100H, SI = 0020H, BP = 0050H, DI = 0040H, calculate the physical address accessed.

(CO1)(5 marks)

(b) Describe the instruction encoding mechanism in the 8086 microprocessor with an example. Consider the following 8086 instruction: MOV AX, [BX]. Explain:

(i) What would the opcode byte look like with D and W bit?

(ii) How is the [Mod REG R/M] byte encoded to specify AX as the destination and [BX] as the source.

(CO1)(9 marks)

6. (a) Describe rotate and shift instructions in 8086 microprocessor with suitable examples.

(CO2)(7 marks)

(b) Write an 8086 assembly program to add two 16-bit numbers stored in memory locations DS:1000H and DS:1002H. Store the result in DS:1004H. **(CO2)**(7 marks)