Code: AC78/AC133   **Subject: ADVANCED MICROPROCESSORS**

AMIETE – CS (Current & New Scheme)

Time: 3 Hours   **JUNE 2016**   **Max. Marks: 100**

PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.

NOTE: There are 9 Questions in all.

- **Question 1 is compulsory and carries 20 marks. Answer to Q.1 must be written in the space provided for it in the answer book supplied and nowhere else.**
- **The answer sheet for the Q.1 will be collected by the invigilator after 45 minutes of the commencement of the examination.**
- **Out of the remaining EIGHT Questions answer any FIVE Questions. Each question carries 16 marks.**
- **Any required data not explicitly given, may be suitably assumed and stated.**

Q.1   **Choose the correct or the best alternative in the following:**   **(2×10)**

  a. Which is the correct statement for 8086 µP?
      (A) Support multiprocessing only
      (B) Support multiprogramming only
      (C) Support multiprocessing and multiprogramming both
      (D) None of these

  b. Which 8086 instruction is incorrect?
      (A) MOV [BP+SI], 100H   **(B)** MOV [BP+DI], 100H
      (C) MOV [BP], 100H   **(D)** MOV [BP+10], 100H

  c. Which is an incorrect Rules and Restriction of using the MOV instruction?
      (A) In MOV instruction both operands cannot be a memory operands
      (B) Operand used in MOV instruction must be of same size
      (C) MOV Instruction does not affect any Flag
      (D) MOV instruction allows copying immediate data into the segment register.

  d. Which is NOT a 8086 µP data conversion instruction?
      (A) CBW   **(B)** CWD
      (C) CLC   **(D)** XLAT

  e. Which Flag is unaffected by the SBB (subtract integer with borrow) instruction?
      (A) Zero Flag   **(B)** Auxiliary Carry Flag
      (C) Parity Flag   **(D)** Direction Flag

  f. Instruction used for packed BCD arithmetic is
      (A) AAD   **(B)** DAA
      (C) AAA   **(D)** AAS

  g. In the branch addressing mode the content of IP is replaced with new values of IP and contents of CS with new value of CS specified as a part of instruction as the branching operation takes place from one code segment to another
      (A) Intra segment Direct   **(B)** Intra segment Indirect
      (C)Inter segment Direct   **(D)** Inter segment Indirect

  h. Which 8086 µP interrupt is having the highest priority
      (A) Non Maskable Interrupt (NMI) **(B)** INTR
      (C) Single Step Interrupt   **(D)** Divide by Zero

i. In order to make a command file (.com program), which statement is correct for the required segments size
    (A) (CS, DS, SS, ES) < = 64K
    (B) (CS, DS) <=   and (SS, ES) >= 64K
    (C) (CS, DS) >= 64K and (SS, ES) > = 64K
    (D) (CS, DS, SS, ES) > 64K

j. The maximum memory that can be supported by 80386 in real mode is
    (A) 1 M byte   **(B)** 1 K bytes
    (C) 16 M bytes   **(D)** 1 G byte

Answer any FIVE Questions out of EIGHT Questions.
Each question carries 16 marks.

Q.2 **Answer the following question related to 8086 microprocessor**   **(6+5+5)**

a. The bits combination on the 8086 Status lines indicate the type of operation performed by processor. Complete the following table

S2	S1	S0	Type of operation	Bus Controller Pins/Command
0	0	0		
0	0	1		
0	1	0		
0	1	1		
1	0	0		
1	0	1		
1	1	0		
1	1	1		

b. List out the Interrupt lines used in the 8086 microprocessor and briefly explain their operation.

c. Draw the 8086 Maximum mode operation configuration diagram

Q.3 a. Convert the following 8086 instruction to machine level equivalent. Use 6 bit op-code for MOV instruction as 100010.   **(8)**
        (i) MOV CL, [BX]   (ii) MOV DX, [5075h]

b. Determine whether the following instruction is correct or incorrect with proper justifications   **(8)**
    (i) ADD AL, BX
    (ii) ADD [1020], [BX]
    (iii) ADD 10, BX
    (iv) SUB AX, Byte ptr [BX]

Q.4 a. Complete the following table. Assume content of AL register be AB, i.e., (AL) = 10101011, and CL= 03, i.e. , 00000011 and initial flag value stored at Carry Flag CF is 1for all instructions.   **(8)**

S.No	Instruction	Before Execution		After Execution	
		AL	CF	AL	CF
1	SHL AL, CL				
2	SAL AL, CL				
3	SHR AL, CL				
4	SAR AL, CL				

b. Let the direction flag be DF=0 and a String defined in Data segment as String DB "MICROPROCESSOR" , and the MOVS operation is executed as given in the program below. Complete the program Code segment part that shall read each byte character (because variable is defined as DB) one at a time from source String1 beginning from lower memory area (left hand side) towards higher memory area (right hand side) as the DF is zero, i.e,. DF=0 and copy it to the destination String2. **(8)**

```
Data      Segment
          String1  db   "MICROPROCESSOR"      ; Source string operand
          String2  db   ?                     ; Destination string operand
          Length   Equ  $-String1             ; Length of source string
Data      Ends
Code      Segment
          :
          :
```

Q.5 a. Write the assembly program equivalent code for the following control statement
(8)

```
IF ( (A! = B))
{
     B=B+1;
}
IF (A= = B)
{
 C=D;
}
```

b. Draw the Maximum mode interfacing diagram of 8086 interfaced with 8087 coprocessor and explain it briefly **(8)**

Q.6 a. Write an 8086 assembly language program to sort the following hexadecimal data 44H, 33H, 55H, 22H, 11H using bubble sort technique. **(8)**

b. Explain following directives with one example. **(2x4)**
(i) NAME   (ii) PAGE
(iii) TITLE   (iv) MODEL

Q.7 a. Write an 8086 ALP to search for a given 8 bit value using linear search in an array of 8-bit number. **(8)**

b. Explain approach methodology used to display memory size in kilo bytes using BIOS routine. **(8)**

Q.8 a. Compare 8086 and 8087 processors **(8)**

b. The segmented memory is used in protected mode to allow multiple tasks to reside in the different memory space used by the processor for execution. Explain how the segment selector and segment descriptors are used for memory Segmentation to restrict the programs to access the memory area reserved for the other program. **(8)**

Q.9 Answer the following related to 80386 /486 microprocessors **(6+5+5)**
a. Compare the real mode, protected mode and virtual protected mode operations

b. Flag register used in 80386/486 microprocessors

c. What is Pentium processor's super scalar architecture? Explain the working of pipeline integer unit.