

**ADVANCED MICROPROCESSOR & MICROCONTROLLER**

Time Allowed: 3 Hours

Full Marks: 70

**Answer to Question No.1 is compulsory and to be answered first.****This answer is to be made in separate loose script(s) provided for the purpose.****Maximum time allowed is 45 minutes, after which the loose answer scripts will be collected and fresh answer scripts for answering the remaining part of the question will be provided.****On early submission of answer scripts of Question No.1, a student will get the remaining script earlier.****Answer any five questions from the rest.  
Show calculations, where applicable.**

1. Answer the following questions (any twenty):

20x1

Fill in blanks:

- i) 8051 is an \_\_\_\_\_ bit microprocessor.
- ii) Reset pin in 8051 is active \_\_\_\_\_ (high/low)
- iii) DIP stands for \_\_\_\_\_.
- iv) TCON in 8051 stands for \_\_\_\_\_.
- v) In 8086 microprocessor, PSW is \_\_\_\_\_ bit register.
- vi) When ALE =1, P0 gives address value of A0 to \_\_\_\_\_.
- vii) If timer ON/OFF is done by software only, GATE bit should be logic \_\_\_\_\_.
- viii) In mode 1 of timer operation, the counter rolls over when it goes from \_\_\_\_\_ to \_\_\_\_\_.
- ix) TF0 and TF1 are part of \_\_\_\_\_ register.
- x) Last instruction of any ISR in assembly is \_\_\_\_\_.
- xi) Upon Reset all interrupts are \_\_\_\_\_ (masked/ unmasked).
- xii) RI and TI in 8051 is \_\_\_\_\_.
- xiii) \_\_\_\_\_ register is responsible for enabling or disabling the interrupts.
- xiv) Upon Reset, TCON.0 and TCON.2 are both logic \_\_\_\_\_.

Answer in brief:

- xv) What is the value of TH1 in hex for the instruction MOV TH1, #-3?
- xvi) Write difference between ACALL and LCALL instructions?
- xvii) What is ISR?
- xviii) Show how to monitor TF1 flag for high in 8051 microcontroller.
- xix) For counter 1 in 8051 which pin is used to input clocks?
- xx) What is interrupt in microcontroller?
- xxi) What is interrupt vector table?
- xxii) Name the two external hardware interrupts.

**Group-A**

2. Draw 8086 CPU architecture. What is the function of Instruction Queue?

8+2

3. a) In 8086 microprocessor, if IP is having 0100H and CS is 1000H calculate the Physical Address of the memory location in CS block.
- b) Write difference between microprocessor and microcontroller?
- c) Explain Multiprogramming and multitasking function in computer.

3+2+5

4. What is Minimum and Maximum mode of operation in 8086? In Pin diagram of 8086, point out the corresponding pins related with Maximum mode. Briefly describe NMI and INTR function? 3+4+3

5. a) Explain function of individual bit of PSW register in 8051 microcontroller.

b) Write a program to save the data from Accumulator to R7 of bank 2.

c) Find the content of register A after the following code in each case.

```
MOV A, #37H
```

```
ANL A, #0CAH
```

5+3+2

6. a) Find CY and AC flags for each of the following:

(i) MOV A, #3FH (ii) MOV A, #99H

ADD A, #45H MOV A, #58H

b) Which register hold overflow flag? Write a program to detect the status of OV flag.

c) Name any four bit addressable registers in 8051.

4+(1+3)+2

7. a) For a 8051 system of 12 MHz find the time delay for the following subroutine.

Machine cycle

```
DELAY : MOV R3, #10 1
```

```
HERE: DJNZ R3, HERE 2
```

```
RET 2
```

b) Assuming that XTAL = 11.0592 MHz, find the time required to set TF0 flag after running the program.

```
MOV TMOD, #01
```

```
MOV TH0, #1CH
```

```
MOV TL0, #00H
```

```
SETB TR0
```

5+5

8. a) Differentiate MODE 1 and MODE2 of Timer operation in 8051 Microcontroller.

b) Write a program to generate a square wave of 2 kHz frequency on pin P1.5.

Assume that XTAL = 11.0592 MHz.

5+5

9. a) Explain the bits and their functions of TCON register of 8051.

b) What is the interrupt? Name different interrupts in 8051.

c) Explain how level-triggered or level-activation interrupt works.

3+(1+2)+4

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