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TEC-503

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 3087

Roll No.

B. Tech.

**(SEM. V) EXAMINATION, 2007-08
MICROPROCESSORS AND APPLICATIONS**

Time : 3 Hours

[Total Marks : 100

Note : (1) Answer all questions. All questions carry equal marks.

(2) Choices are internal to each question.

(3) Answers must be to the point.

(4) Assume practicable data in case any are missing.

1 Answer any four parts : 5×4=20

(a) An 8-bit microprocessor is using von Neumann architecture having 4 kB memory address space. Explain the specific meaning of this statement.

(b) You want to attach 1 kB ROM with address 0000H-01FFH and 4 kB static RAM with address 2000H-27FFH in a 8085 based system. Is your address allocation correct? Can static RAM be attached to 8085? Can you have a gap in the available memory addresses as shown here? Otherwise, what modifications would you make? Which pins of 8085 will you use for memory interface?

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[Contd...

(c) An 8085 is executing the following program :

```
2000:LXI H 4325H
      LXI SP 3000 H
      MOV A H
      ADD A L
      PUSH PSW
      POP H
      END.
```

At the end of the program execution, what will be the contents of the HL register pair?

- (d) Without referring to any preceding additon operation, explain specifically the operation of the 8085 instruction DAA.
- (e) Through which lines an 8085 may be interrupted? Is there any among them that does not have an associated vector address? How is the device identification done in that case?
- (f) Write a short note on built-in serial data interface of 8085.

2 Answer any **four** parts : 5×4=20

- (a) What are the advantages of the segment registers of 8086/8088? How do they make a programmer's job easier?
- (b) Describe the function of the 8086 instruction queue. How does it speed up processing? Under what circumstances this speed-up is not obtained ?
- (c) Show bit-wise the PSW of 8086 and explain the function of each flag with an example.
- (d) Explain the functions of assembler directives with suitable examples.

- (e) What are the different addressing modes available in 8086? Two instructions have the same mnemonic opcode but the operand part uses different addressing modes. By how much may their execution time differ? Explain with an example.
- (f) Write a note on instruction prefixes for 8086.

3 Answer any **two** parts : 10×2=20

- (a) Two 8251s are communicating with each other in asynchronous mode. Both are using baud rate factor of 16X, 8 bit data and 1 bit even parity. Find the interrelationship between frequencies of the clock inputs of the two 8251s so that no framing errors may occur.

OR

- What error bits are available in the status register of 8251? Where are they detected, at the transmitting or the receiving end? Explain the concept of each error and on what condition these bits are set. Is there any possibility of these bits failing to detect the error they are supposed to detect? Explain with each error.
- (b) With timing diagrams and proper labelling explain in detail the mode-2 of port-A in 8255. When port-A is in mode-2 and port-B in mode-1, how many pins of port-C are available for independent I/O?
- (c) With neat diagram(s) explain the operation and programming of 8257 DMA controller.



4 Answer any **two** parts : 10×2=20

- (a) An 8255 is connected to 8086 bus in such a way that its port-A has a fixed peripheral address 0C4H. The port-B pins of the 8255 are connected to the inputs of DAC (say DAC 0800). Write a program for 8086 to first initialize the 8255 in desired mode and then to generate a triangular waveform at the output of the DAC. There must be provision of changing the frequency of the triangular wave, in your program. Explain the logic behind your program.
- (b) What are the criteria to choose an ADC? What type of ADC would you choose for (i) instrumentation, (ii) audio and (iii) video applications? Justify your answers. If the ADC is connected in a microprocessor based system and the processor is used to further processing of the data in real time, discuss on suitability of 8086 for each application above. Give specific answers.
- (c) Write a note on 8254. Explain programming and modes available.

5 Answer any **two** parts : 10×2=20

- (a) (i) Why is 8051 called a modified Harvard Architecture? 3
- (ii) How do 8051 ports differ from 8255 ports? 5
- (iii) As compared to 8085 why 8051 lacks in some specialized instructions like SIM, EI etc ? 2
- (b) What is RISC architecture? With a neat diagram write a note on Power PC. 10
- (c) Compare technically 8086, 80286 and 80386. 10