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**Sixth Semester B.E. Degree Examination, June/July 2014**  
**Microprocessors**

Time: 3 hrs.

Max. Marks: 100

**Note: 1. Answer any FIVE full questions, selecting  
atleast TWO questions from each part.  
2. Make suitable assumptions for any missing data.**

**PART – A**

- 1 a. Determine the appropriate register/memory locations that are used to compute the 5 digit hex address when the processor needs to address the contents of
  - i) Data segment memory.
  - ii) Program segment memory.
  - iii) Stack segment memory.
  - iv) Extra segment memory. (08 Marks)
- b. Explain the flag register of the processor in accordance with the respective bit positions. (05 Marks)
- c. Write an 8086 assembly code to copy the contents of flag register into accumulator register following any arithmetic or logical operation. (07 Marks)
  
- 2 a. Explain the meaning of the following independent bits of 8086 assembly instruction templates: i) W-bit; ii) d-bit; iii) v-bit; iv) s-bit; v) z-bit. (10 Marks)
- b. Write an optimum number of assembly instructions for the following objectives. Also indicate the type of addressing mode used in each case.
  - i) Shift the contents of accumulator register 4 bits left.
  - ii) Rotate the contents of base register right by 2 bits.
  - iii) Divide the contents of accumulator register by 2.
  - iv) Multiply the contents of base register by 4.
  - v) If AL register contains a two digit BCD number, display the same on monitor using necessary DOS interrupts. (10 Marks)
  
- 3 a. Consider that a symbolic memory address 'DISPTBL' contains a BCD to seven segment code starting from 4000H to 400AH. Design an assembly code to meet the following objectives:
  - i) Send a message to screen 'PRESS ANY KEY 0 to 9'.
  - ii) Read the key pressed from the key board.
  - iii) If invalid key is found, the program to loop back to step (i) with a suitable warning message.
  - iv) On correct key press, compute BCD to 7 segment code and store into memory location "DISPCODE".
  - v) Use XLAT assembly instruction to achieve your objective.
  - vi) Design a suitable flow diagram to show your approach. (10 Marks)
- b.
  - i) Differentiate between the usage of assembler directives MACRO and PROCEDURE.
  - ii) Develop a suitable MASM code to display minimum of 3 different line text message by using MACRO directive and PRINTF as macro name. (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

- 4 a. With reference to the internal architecture of 8086 processor, explain:
- The different external sources external sources of hardware interrupts.
  - How the processor checks to see an interrupt have been occurred.
  - List of major actions performed to process an interrupt. (10 Marks)
- b. Explain the following internal interrupts generated within the processor while executing the program:
- TYPE-0 divide by zero interrupt.
  - TYPE-1 single step interrupt. (10 Marks)

**PART – B**

- 5 a. With respect to programmable peripheral interface (PPI) 8255A:
- Draw a neat block schematic showing its functional description.
  - Draw mode definition format the control word.
  - Explain various possible modes of operation. (10 Marks)
- b. Design an 8255 based event counting system. Port A is connected to 8LEDs and Port B is connected to a toggling switch having 2 positions for binary and BCD. Draw the interfacing diagram and a program for binary or BCD count as selected by switch. Given that the control port address is 50B3, assume safe current to glow each LED is 25mA. A suitable delay between counts is considered. (10 Marks)
- 6 a. What is meant by numeric data processor 8087 (NDP)? What are the benefits of interfacing the same with the host processor? (04 Marks)
- b. Explain briefly the role played by the following pins of 8087 during interaction.
- Bus high enable (BHE/S7).
  - Status pins ( $\overline{s2}, \overline{s1}, \overline{s0}$ ).
  - Request/Grant ( $\overline{RQ}/\overline{GT}$ ). (06 Marks)
- c. Consider the given decimal number 178.625 convert it into
- Short – real format (single precision representation).
  - Long-real format (double precision representation). (04 Marks)
- d. Write a program to calculate the volume of a sphere having radius of the sphere is specified. The result is to be stored in the memory location VOLUME. Volume of a sphere is given by  $(4/3) * (Pi) * (r^{**3})$ . (06 Marks)
- 7 a. Draw a schematic diagram when 8086 processor is operating in maximum mode configuration. (06 Marks)
- b. Explain the function performed by pins exclusive for minimum mode configuration.
- HOLD and HLDA ; ii)  $M/\overline{IO}$ ; iii)  $\overline{RD}$ ; iv)  $\overline{WR}$ ; v)  $MN/\overline{MX}$ . (08 Marks)
- c. What is meant by PCI bus system? List out the significant characteristics of the PCI bus system. (06 Marks)
- 8 a. Explain the memory bank system architecture for the 80386DX microprocessor with a block schematic. Explain how interleaved memory system is used for speed improvement. (10 Marks)
- b. Draw the block schematic of the control register of 80386 microprocessor and explain the following special control bits of operation i) PG; ii) ET; iii) TS; iv) EM; v) MP; vi) PE. (10 Marks)

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