



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

PAPER ID : 0110

Roll No.

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### B.Tech.

(SEM. IV) EVEN THEORY EXAMINATION 2012-13

### COMPUTER ORGANIZATION

Time : 3 Hours

Total Marks : 100

Note :- Attempt all questions.

1. Attempt any four of the following : (4×5=20)
  - (a) What do you mean by overflow ? Describe the overflow detection.
  - (b) Explain various methods of bus arbitration. Write the advantages and disadvantages of daisy chaining method.
  - (c) Convert the following decimal numbers to the bases indicated :
    - (i) 7625 to Octal
    - (ii) 1983 to Hexa decimal
    - (iii) 174.5 to Binary
    - (iv) 6279 to Octal
    - (v) 3001 to Hexa decimal.
  - (d) Represent  $(1460.125)_{10}$  in Single Precision and Double Precision formats.
  - (e) Show the hardware that implements the following statements. Include the logic gates for the control function



and a block diagram for the binary counter with a count enable input.

$$xy T_0 + T_1 + y' T_2 : AR \leftarrow AR + 1$$

(f) Define the significance of Hamming Code with example.

2. Attempt any two of the following : (2×10=20)

(a) Explain Booth's algorithm with its flow chart and hardware configuration.

Multiply (-7) and (+3) using Booth's algorithm. Convert into binary equivalent.

(b) Write a program to evaluate the arithmetic statement

$$X = (A + B * C) / (D - E/F)$$

(i) Using general register computer with 3-address instruction.

(ii) Using general register computer with 2-address instruction.

(iii) Using an accumulator type computer with 1-address instruction.

(iv) Using a stack organized computer with 0-address operation instruction.

(c) Determine the micro operations that will be executed in a system having 7 register, ALU and 2 multiplexers of size 8×1 each, when the following 14-bit control words are applied.

(i) 00101001100101

(ii) 00000000000000



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(iii) 01001001001100

(iv) 00000100000010

(v) 11110001110000

3. Attempt any two of the following : (2×10=20)

(a) What is interrupt cycle? Write short note on interrupt types.

(b) Explain Hardwired and Microprogrammed control and compare them.

(c) Write short notes on :

(i) Instruction cycle

(ii) RISC

(iii) CISC.

4. Attempt any two of the following : (2×10=20)

(a) A computer employs RAM chips of 256 × 8 and ROM chips of 1024 × 8. The computer system needs 2K bytes of RAM, 4K bytes of ROM and 4 interface unit each with 4 registers. A memory mapped configuration is used. The 2-highest order bits of address bus are assigned '00' for RAM, '01' for ROM and '10' for interface registers.

(i) How many RAM and ROM chips are needed?

(ii) Draw a memory address map for the system.

(iii) Give the address range in hexadecimal for RAM, ROM and interface.

(b) Write short notes on following :

(i) Locality of reference



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- (ii) Hit Ratio
  - (iii) Associative memory
  - (iv) Virtual memory.
- (c) Explain various cache mapping techniques. A 2-way set associative cache memory uses blocks of 4 words. The cache can accommodate a total of 2048 words from the main memory. The main memory size is  $128\text{ K} \times 32$ .
- (i) Formulate all pertinent information required to construct the cache memory.
  - (ii) What is the size of the cache memory ?
5. Attempt any **two** of the following : **(2×10=20)**
- (a) Explain Asynchronous data transfer using both strobe pulse and handshaking. Support your answer with Block Diagram, Timing Diagram and Sequence of Events.
  - (b) Write short notes on following :
    - (i) Programmed I/O.
    - (ii) Interrupt Initiated I/O.
  - (c) Explain the working of DMA controller.



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