

Code No: 124CN

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****B.Tech II Year II Semester Examinations, December - 2017****COMPUTER ORGANIZATION****(Computer Science and Engineering)****Time: 3 Hours****Max. Marks: 75****Note:** This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit.

Each question carries 10 marks and may have a, b, c as sub questions.

**PART- A****(25 Marks)**

- 1.a) Give an example each of Zero-address, One-address, two-address and three-address instruction. [2]
- b) Write a program that can evaluate the expression  $A * B + C * D$ , in a single-accumulator processor. Assume that the processor has Load, store, Multiply, and Add instructions and that all values fit in the accumulator. [3]
- c) What is the basic advantage of using interrupt-initiated data transfer over transfer under program control without an interrupt? [2]
- d) What are the functions of typical I/O interface? [3]
- e) Explain the terms Hit Ratio and Miss ratio. [2]
- f) How many  $128 \times 8$  RAM chips are needed to provide a memory capacity of 2048 bytes? How many lines of address bus must be used to access 2048 bytes of memory? How many of these lines will be common to all chips? [3]
- g) In Intel microprocessor what is meant by segment register? [2]
- h) What are the functions of flag registers in 8086 microprocessor? [3]
- i) List few branch and call instructions. [2]
- j) What are assembler directives? [3]

**PART-B****(50 Marks)**

- 2.a) Explain different functional units of a digital computer.
- b) Mention the four types of operations to be performed by an instruction in a computer. What are the basic types of instruction formats? Give examples. [5+5]

**OR**

- 3.a) What is an interrupt? What are the uses of interrupts? Explain about the different type of interrupts?
- b) What is an addressing mode? List the different types of addressing modes. Explain index addressing mode with example program. [5+5]

- 4.a) A CPU with a 20-MHz clock is connected to a memory unit whose access time is 40 ns. Formulate a read and write timing diagram using a READ strobe and a WRITE strobe. Include the address in the timing diagram.

- b) Describe in detail about IOP organization. [4+6]

**OR**

- 5.a) Describe the data transfer method using DMA.
- b) Why are the read and write control lines in a DMA controller bi-directional? Under what condition and for what purpose are they used as inputs? Under what condition and for what purpose they used as outputs? [5+5]

- 6.a) Consider a processor running a program. 30% of the instructions of which require a memory read or write operation if the cache hit ratio is 0.95 for instructions and 0.9 for data. When a cache hit occurs for instruction or for data, only one clock is needed while the cache miss penalty is 17 clocks to read/write on the main memory. Work out the time saved by using the cache, given the total number of instructions executed is 1 million.
- b) Explain in detail about associative mapping technique. [4+6]

**OR**

- 7.a) A magnetic disk system has the following parameters:  
 $T_s$  = average time to position the magnetic head over a track  
 $R$  = rotation speed of disk in revolutions per second  
 $N_t$  = number of bits per track  
 $N_s$  = number of bits per sector  
Calculate the average time  $T_a$  that it will take to read bits per inch?
- b) Explain in detail about virtual memory. [4+6]

- 8.a) What is pipelining? What are its principles?
- b) Describe with examples how a 20 bit physical address of an instruction is generated in 8086 microprocessor? Explain the functions of following pins in 8086 microprocessor:
- NMI
  - DEN
  - $QS_0 - QS_1$ .
- [5+5]

**OR**

- 9.a) Write the special functions of general purpose registers.
- b) Register R5 is used in a program to point to the top of a stack. Write a sequence of instructions using the Index, Autoincrement, and Autodecrement addressing modes to perform each of the following tasks:
- Pop the top two items of the stack, add them, and then push the result onto the stack.
  - Copy the fifth item from the top into register R3.
  - Remove the top ten items from the stack. [4+6]

10. Write an ALP for sorting Ascending and Descending order of a series. [10]

**OR**

11. Describe with the neat diagram the architecture of 8086 Microprocessor. [10]

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