Printed Pages : 4

Roll No. .....

322454(22)

BE (4th Semester)
Examination, April-May, 2018

(New Scheme)

Computer Systems Architecture

Time Allowed : 3 hours *Maximum Marks :* 80
Minimum Pass Marks : 28

Note : (*i*) Part (*a*) of each question is compulsory. Attempt any **two** parts from (*b*), (*c*) and (*d*).

(*ii*) The figures in the right-hand margin indicate marks.

1. (*a*) What is instruction cycle of a computer? [2]

(*b*) What is the importance of bus system? Consider a bus system created for 16 registers of 8 bits each and answer the following : [7]

(*i*) How many multiplexers are used to create the bus system?

(*ii*) What is the size of each multiplexer?

(*iii*) The select line of multiplexer consists of how many lines?

(*iv*) The bus consists of how many lines?

(Turn Over)

(*c*) What do you understand by a subroutine? Discuss about parameter passing in subroutines. [7]

(*d*) An instruction is stored in memory at location 400. The address part of the instruction is stored at location 401. The address field of the instruction has the value 500 in it. A processor register *R* contains the number 200. Evaluate the effective address with the following addressing modes : [7]

(*i*) Direct mode

(*ii*) Immediate mode

(*iii*) Relative mode

(*iv*) Register indirect mode

(*v*) Index mode with *R* as the index register

2. (*a*) In a computer with 48-bit words, one bit is reserved for the sign. What will be the range of fixed-point integer number? [2]

(*b*) Describe a technique used to make the process of addition and subtraction by 2's complement number faster. [7]

(*c*) Write the Booth's algorithm for multiplication. Show the content of registers *E*, *A*, *Q* and *SC* during the process of multiplication of two binary numbers 1111 (multiplicand) and 10101 (multiplier). The signs are not included. [7]

(Continued)

(*d*) Explain integer division using restoring method and non-restoring method. [7]

3. (*a*) Hardwired control unit is faster than the microprogrammed control unit. Why? [2]

(*b*) How many 128-byte RAM chips are required to provide a memory of 2048 bytes? Show details of connection clearly indicating address, data and decoder configuration. [7]

(*c*) What do you mean by virtual memory? An address space is specified by 24 bits and corresponding memory space by 16 bits.

(*i*) How many words are there in the address space?

(*ii*) How many words are there in the memory space?

(*iii*) If a page consists of 2K words, how many pages and blocks are there in the system? [7]

(*d*) Explain the working of associative memory with neat diagram. [7]

4. (*a*) Why is main memory faster than secondary memory? [2]

(*b*) Explain Direct Memory Access (DMA) transfer in a computer system with a neat diagram. [7]

(*c*) Explain the working of Daisy chaining priority interrupt with diagram. [7]

(*d*) What do you understand by computer peripherals? Explain any two computer peripherals. [7]

5. (*a*) What is data dependency? [2]

(*b*) What is the use of pipelining? Prove that an M-stage linear pipeline can be at most M times faster than that of a non-pipelined serial processor. [7]

(*c*) What do you understand by parallel processing? Describe Flynn's classification of parallel processing. [7]

(*d*) Write short notes on : [7]

(*i*) Vector processing

(*ii*) Array processing

———