

END TERM EXAMINATION

THIRD SEMESTER [BCA] DECEMBER-2014

Paper Code: BCA203	Subject: Computer Architecture (2011 onwards)
Time : 3 Hours	Maximum Marks : 75
Note: Attempt any five questions including Q.no.1 which is compulsory. Select one question from each unit.	

- Q1
- (a) What is a three-state buffer? Explain its working. (2)
 - (b) What is insert operation? Give one example. (2)
 - (c) A digital computer has a common bus system for 16 registers of 32 bits each. The bus is constructed with multiplexes. (3)
 - (i) How many selection inputs are there in each multiplexer?
 - (ii) What size of multiplexers are needed?
 - (iii) How many multiplexers are there in the bus?
 - (d) Explain direct and indirect addressing modes using examples. (2)
 - (e) Which addressing modes need no address fields? Explain them. (2)
 - (f) What are 3 types of pipeline conflicts? Discuss them in brief. (3)
 - (g) Design 2-bit by 2-bit array multiplier. (2)
 - (h) What is the need of input-output interface? (2)
 - (i) Write a short note on memory hierarchy. (3)
 - (j) An instruction is stored at location 300 with its address field at location 301. The address field has the value 400. A processor register R1 contains the number 200. Evaluate the effective address if the addressing mode of the instruction is (i) direct (ii) immediate (iii) relative and (iv) indirect. (4)

UNIT-I

- Q2
- (a) What is a bus? Design and explain a bus system using multiplexers regarding 4 registers of 4 bits each. (7.5)
 - (b) Draw and explain the flowchart for interrupt cycle. (5)

OR

- Q3
- (a) Starting from an initial value of R=11110110, determine the sequence of binary values of R after a logical shift-left, followed by a circular shift-right, followed by a logical shift-right and a circular shift-left. (6)
 - (b) What are input-output instructions? Explain all input-output instructions. (6.5)

UNIT-II

- Q4
- (a) Write a program to evaluate the arithmetic statement-
 $X = (A - B + C * (D * E - F)) / (G + H * K)$. (8)
 - (i) Using a general register computer with 3-address instruction.
 - (ii) Using a general register computer with 2-address instructions.
 - (iii) Using an accumulator type computer with 1-address instructions.
 - (iv) Using a stack organized computer with zero address operation instructions.
 - (b) What is pipelining/pipeline processing? Discuss with the help of suitable example. (4.5)

OR

- Q5
- (a) What are addressing modes? Explain all addressing modes. (8.5)
 - (b) Write a short note on memory interleaving. (4)

UNIT-III

- Q6
- (a) Show the step-by-step multiplication process using Booth algorithm when the following binary numbers are multiplied. Assume 4-bit registers that hold signed numbers: (i) (+5)x(+3) (ii) (-5)x(-3). (5)
 - (b) What is asynchronous data transfer? Discuss asynchronous data transfer using- (i) strobe control and (ii) handshaking with timing and block diagrams. (7.5)

OR

- Q7
- (a) Show the contents of registers E, A, Q and SC during the process of division of- (i) 10110011 by 1001 (ii) 11110000 by 0011. (use a dividend of 8 bits). (5)
 - (b) Explain DMA. Discuss DMA controller using suitable block diagrams. (7.5)

UNIT-IV

- Q8
- (a) Explain associative memory with suitable block diagram and suitable example. (6.5)
 - (b) Giving suitable block diagrams differentiate between RAM and ROM. (6)

OR

- Q9
- What is memory mapping? Explain various types of memory mapping using suitable block diagrams. (12.5)
