

B. E. Third Semester (Computer Technology)/SoE–2018 Examination

Course Code : CT 2201

**Course Name : Computer Architecture
and Organisation**

Time : 3 Hours]

[Max. Marks : 60

Instructions to Candidates :—

- (1) All questions are compulsory.
 - (2) All questions carry marks as indicated.
 - (3) Due credit will be given to neatness and adequate dimensions.
 - (4) Assume suitable data wherever necessary.
 - (5) Illustrate your answers wherever necessary with the help of neat sketches.
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1. (A1) Draw a diagram showing connection between processor and memory. Explain the use of MAR and MDR, 4(CO1)
 - (A2) Differentiate between Two bus structure and single Bus structure with neat diagram. 4(CO1)
 - (A3) Solve $E = (A + B) \times (C + D)$ using zero-addressing method. 2(CO1)
- OR**
- (B1) Discuss any 4 addressing modes used in computer architecture ? 4(CO1)
 - (B2) Explain the ways in which 32-bit word information can be represented in memory. 3(CO1)
 - (B3) The memory contains instructions as well as data. How CPU comes to know a particular word of memory contains data or instruction ? 3(CO1)
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2. (A1) List and explain types of instructions in RISC instruction. 4(CO1)
 - (A2) Explain execution of complete instruction for MOV R1, R2 using single bus organization of a processor. 4(CO1)

- (A3) Why is the "wait for memory function completed (WMFC) signal needed when reading or writing to the memory ? 2(CO1)

OR

- (B1) Explain subroutine linkage method with example. 4(CO1)
(B2) Write any 3 assembler directives with example. 3(CO1)
(B3) Draw three Bus structure of a processor. 3(CO1)

3. (A1) What are the advantages of microprogrammed control over Hard-wired control? 2(CO2)
(A2) Write and explain micro routine for Add (R0), R1. 6(CO2)
(A3) Write note on emulation. 2(CO2)

OR

- (B1) Differentiate between Vertical organization and Horizontal organization schemes. 4(CO2)
(B2) Explain generation of next address field in a microprogram with neat diagram. 4(CO2)
(B3) What is control word and control store w.r. to microprogrammed control? 2(CO2)

4. (A1) What is the disadvantages of Ripple carry adders. How is it overcome by fast adder ? 4(CO2)
(A2) Draw the sequential circuit for multiplication and solve 10×3 . 4(CO2)
(A3) What are the methods of representing positive and negative numbers ? 2(CO2)

OR

- (B1) Using Booth's algorithm solve $(-11) \times (+13)$ 3(CO2)
(B2) Describe array multiplication of positive binary operands. 4(CO2)
(B3) Solve $(-27) \times (+6)$ using fast multiplication. 3(CO2)

5. (A) Use Restoring Division method for following division example :
 Dividend = 11
 Divisor = 3 4(CO2)
- (A2) How semiconductor RAM memories are implemented ? 3(CO3)
- (A3) Give comparative performance analysis of memory based on factors speed, size and cost. 3(CO3)

OR

- (B1) Explain following terms with respect to memory :
 (i) Memory access time.
 (ii) Memory cycle time.
 (iii) Hit and Miss Ratio. 4(CO3)
- (B2) Draw asynchronous DRAM cell. Write as advantages w.r.to SRAM. 3(CO3)
- (B3) Represent $(100)_{10}$ in single precision floating point format. 3(CO2)
6. (A1) Explain direct mapping with suitable sketch and example. 4(CO3)
- (A2) Write note on data hazards. 3(CO2)
- (A3) How DMA can improve the data transfer ? 3(CO4)

OR

- (B1) A block-set-associative cache consists of a total of 64 blocks divided into 4-blocks sets. The main memory contains 4096 blocks, each consisting of 128 words.
 (a) How many bits are there in a main memory address ?
 (b) How many bits are there in each of the TAG, SET and WORD fields ? 4(CO3)
- (B2) Explain the mechanism of interrupt handling. 3(CO4)
- (B3) How pipelining improves performance of a processor ? Explain with suitable example. 3(CO2)