

B.E. Fourth Semester (Information Technology) (C.B.S.)  
**Computer Architecture & Organization Paper - IV**

P. Pages : 2

Time : Three Hours



**KNT/KW/16/7301**

Max. Marks : 80

- Notes :
1. All questions carry marks as indicated.
  2. Solve Question 1 OR Questions No. 2.
  3. Solve Question 3 OR Questions No. 4.
  4. Solve Question 5 OR Questions No. 6.
  5. Solve Question 7 OR Questions No. 8.
  6. Solve Question 9 OR Questions No. 10.
  7. Solve Question 11 OR Questions No. 12.
  8. Due credit will be given to neatness and adequate dimensions.
  9. Assume suitable data whenever necessary.
  10. Illustrate your answers whenever necessary with the help of neat sketches.
  11. Use of non programmable calculator is permitted.

1. a) What are the different functional unit of Basic computer system ? 6  
b) What is addressing mode ? Explain different addressing mode with example. 7

**OR**

2. a) Explain subroutine linkage & parameter passing methods with suitable example. 7  
b) Explain 3-address, 2-address, 1-address & zero-address instruction formats with examples. 6
3. a) Explain the instruction formats of M68000 machine. 6  
b) Write & Explain control sequences for Add ( $R_3$ ),  $R_1$ . 7

**OR**

4. a) Explain single & three Bus CPU structure. 8  
b) Write down the control sequence for fetching a word from memory using single bus organisation. 5
5. a) Differentiate between Hardwired control unit & microprogrammed control unit. 7  
b) Discuss horizontal and vertical microinstruction formats indicating their advantages & disadvantages. 7

**OR**

6. a) Write short note on **any four**: 14  
i) Bit Slices ii) Pre-fetching microinstructions  
iii) Emulation iv) Microinstruction with Next Address field  
v) Microprogram sequencing

7. a) Using Booth's Multiplication algorithm solve the following : 8  
 i)  $(-11) * 13$  ii)  $(-8) * (-10)$   
 b) Represent the decimal values 26, -37, 497 & -123 as signed, 10-bit numbers in the 5  
 following binary formats:  
 a) Sign - & - magnitude b) 1's -Complement  
 c) 2's -Complement

**OR**

8. a) Represent  $1/32$  and  $-1/16$  in IEEE 754 single precision format. 6  
 b) Solve the following using restoring division method: 7  

$$\begin{array}{r} 11 \\ \underline{) 3} \end{array}$$

9. a) A block Set-Associative cache consists of a total of 64 blocks divided in 4 blocks per set. The main memory contain 4096 blocks each of 128 words: 4  
 i) How many bits are there in main memory address ?  
 ii) How many bits are there in each or the WORD, TAG and SET Field ?  
 b) Design a  $8K \times 8$  bits RAM system using a  $1K \times 4$  bits RAM IC's & appropriate decoders. 5  
 c) Differentiate between static RAM & Dynamic RAM. 5

**OR**

10. a) What is virtual memory ? Explain virtual to physical address translation in virtual memory. Explain. 7  
 b) What is Cache Memory ? Different types of memory mapping techniques. 7  
 11. a) Write short notes on:- 7  
 i) Vector processor ii) Array processor  
 b) Give the features of RISC & SISC processor. 6

**OR**

12. a) Write short note on **any three**: 13  
 i) Flynn's classification or parallel structure.  
 ii) Loosely coupled and tightly coupled system.  
 iii) Stack processor.  
 iv) Pipelining.  
 v) DMA.

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