



P.E.S. College of Engineering, Mandya - 571 401
 (An Autonomous Institution affiliated to VTU, Belagavi)
Third Semester, B.E. - Information Science and Engineering
Semester End Examination; Dec. - 2019
Computer Organization and Architecture

Time: 3 hrs

Max. Marks: 100

Note: i) PART - A is compulsory. **Two** marks for each question.**ii) PART - B:** Answer any **Two** sub questions (from a, b, c) for Maximum of **18 marks** from each unit.

Q. No.	Questions	Marks										
I : PART - A		10										
I a.	Define pipelining and what is the use of addressing mode?	2										
b.	What is bus arbitration? Give the expansion of INTA.	2										
c.	Name the two techniques used to generate control signals for execution of instructions in a computer.	2										
d.	Name the two types of cache memories.	2										
e.	What is the maximum number of summands that are required to multiply two n -bit numbers in case of fast multiplication method?	2										
II : PART - B		90										
UNIT - I		18										
1 a.	Explain the functional units of computer with diagram.	9										
b.	Consider the memory system of a computer storing the following data :											
	<table style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: left;">Address</th> <th style="text-align: left;">Data</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">4000</td> <td style="text-align: center;">00111000</td> </tr> <tr> <td style="text-align: center;">4001</td> <td style="text-align: center;">00110100</td> </tr> <tr> <td style="text-align: center;">4002</td> <td style="text-align: center;">00110010</td> </tr> <tr> <td style="text-align: center;">4003</td> <td style="text-align: center;">00111001</td> </tr> </tbody> </table>	Address	Data	4000	00111000	4001	00110100	4002	00110010	4003	00111001	9
Address	Data											
4000	00111000											
4001	00110100											
4002	00110010											
4003	00111001											
	Interpret the storage as numbers in the manner indicated below and find their decimal values in each case;											
	i) Big endian storage of 2 Hex words of 4 digits each											
	ii) Big endian storage of 2 BCD words of 4 digits each											
	iii) Little endian storage in ASCII, of a 4 digit signed Hex word											
c.	Give the significance of an addressing mode. Also discuss any four addressing modes.	9										
UNIT - II		18										
2.	Write an Assembly program using index addressing mode to add list of numbers stored in the memory locations Num1, Num2,, Num n . The total number of numbers in the list is present in the memory location N. Store the result in memory location SUM.	9										

- b. Write the code to implement Safe Push and Safe Pop operations on stack. 9
- c. With neat diagrams, explain distributed bus arbitration technique. 9

UNIT - III**18**

- 3 a. Write the control sequence for executing the following instruction using **single bus** organization: 9

Sub R1, -(R2)

- b. With a neat diagram, explain how control signals are generated using micro programmed control? 9
- c. With a neat diagram, explain how control signals are generated using hardwired control? 9

UNIT - IV**18**

- 4 a. Describe the operation of 2M x 8 asynchronous DRAM chip. 9
- b. Explain memory hierarchy in a computer based on speed, cost and size with neat representation. 9
- c. Explain the read / write operation of an SRAM cell designed using CMOS, with the help of neat diagram. 9

UNIT - V**18**

- 5 a. Multiply the following pairs of numbers using fast multiplication method : 9
- i) $+13 \times -6$
- ii) $+09 \times +15$
- b. With an algorithm, compute $8/3$ using restoring division method. 9
- c. Compare single-core, multi-processor and multi-core architectures. 9

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