U.S.N | | | | | | | | | | |

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; March - 2021

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.	Write a RISC style program that computes the *SUM = 580 + A*.	2
b.	Explain any two registers used in keyboard interface.	2
c.	List the different approaches used to generate control signals.	2
d.	Define memory latency.	2
e.	List the various parallel computing platforms in Flynn's taxonomy.	2
	II : PART - B	**90**
	UNIT - I	**18**
1 a.	Analyze and write the steps needed to execute the machine instruction; *Add LOCA, R_0* Assume that the instruction itself stored in the memory at location INSTR and this address is initially in register PC. The first step might be expressed as *Transfer the contents of register PC to register MAR Remember to include the steps needed to update the contents of PC from INSTR to INSTR + 1 so that, the next insertion is fetched.	9
b.	Explain the different functional units of computer with neat schematic representation.	9
c.	Define overflow. Represent the following numbers in 6-bit binary form and perform the operations and check whether there is a overflow or not: i) (+26) – (–30) ii) (–31) – (+29) iii) (+7) – (–8) iv) (–9) + (–7)	9
	UNIT - II	**18**
2 a.	Define parameter nesting. Write the RISC program using subroutine with parameter passing to add sum of three numbers and store the result in sum memory locations.	9
b.	Define Interrupt. Explain the working of Interrupt.	9
c.	Produce the value of Register R_0 after executing the instructions given below with carry flag given the initial value of C =1 and R_0 = 10110110 i) LShiftL #3, R_0 ii) LShiftR #3, R_0 iii) RotateL #3, R_0 iv) RotateLC #3, R_0 v) RotateR #3, R_0 vi) RotateRC #3, R_0	9

Contd… 2

UNIT - III **18**

3 a. Produce and explain the sequence of action needed to fetch and execute the instruction: Branch__if__[R3] ≠ [R7] Loop. 9

b. Explain the main hardware components of a processor used for execution of instruction. 9

c. Produce the sequence of actions needed to fetch and execute the instruction; *SUB R6, R7, #5*. 9

UNIT - IV **18**

4 a. With neat schematic representation, explain a synchronous DRAM. 9

b. Illustrate how a static RAM cell is implemented with its read and write operations. 9

c. Explain and design the organization of memory chip consisting of 8-word / 4-bits each. 9

UNIT - V **18**

5 a. Explain the different processor architectures. 9

b. Apply Booth and Bit pair recording algorithms to find the product of two 6-bit multiplicand and multiplier. Where multiplicand = 110101 and multiplier = 011011. 9

c. Apply restoring division algorithm for the number 43/9. 9

* * *