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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Third Semester, B.E. - Computer Science and Engineering

Semester End Examination; March - 2021

Computer Organization

Time: 3 hrs

Max. Marks: 100

Note: Answer FIVE full questions, selecting ONE full question from each unit.

UNIT - I

- 1 a. Define addressing modes. Explain any four types of addressing modes. 10
- b. Translate the following pair of decimal number to 5-bit 2's complement numbers and hence perform addition and subtraction on each pair. Indicate whether overflow occur or not in each case; i) 7 and 13 ii) -12 and 9. 10
- 2 a. Construct sequence of instructions to perform the PUSH and POP operations in stack. 8
- b. Explain Big Endian and Little Endian assignments. 8
- c. Define assembler directive. Give example. 4

UNIT - II

- 3 a. Illustrate how PC and link register are affected by the call and return instructions in subroutine? 10
- b. Explain boot-strapping process. 7
- c. Examine the concept of enabling and disabling of interrupts with example. 3
- 4 a. Describe how operating system manages the execution of multiple application programs? 10
- b. Explain the use of interrupts in operating system. 10

UNIT - III

- 5 a. What is Instructions Cycle (IC)? Explain generation of the hardware control signals with neat diagram. 10
- b. Explain Universal Serial Bus with neat block diagram. 10
- 6 a. Demonstrate the following with required diagram: 13
- i) Handshake control of data transfer during an input operation
- ii) Handshake control of data transfer during an output operation
- b. Design I/O interface for an input device with explanation. 7

UNIT - IV

- 7 a. Organize 1K×1 memory chip. Outline the details. 10
- b. When page faults occur? Explain virtual memory address translation with a neat diagram. 10
- 8 a. Explain the following memory mapping with a neat block diagram: 17
- i) Direct mapping ii) Associative mapping iii) Set Associative mapping

- b. Calculate the number of bits in each of the Tag, Set and Word fields of the memory address from the following:

A computer system uses 32-bit memory address and it has a main memory consisting of 1 GB. It has a 4 K byte each organized in the block set associative manner, with 4 block per set and 64 bytes per blocks. 3

UNIT - V

- 9 a. Convert the following decimal number to binary number: 6
(927.45)₁₀.
- b. Construct Booth's algorithm. Multiply (+13, -6). [5-bit representation] using Booth's algorithm. 10
- c. Distinguish between multiplication of signed numbers and multiplication of unsigned numbers. 4
- 10 a. Explain IEEE basic format for 32-bit representation. Show the IEEE basic format for following floating points using single precision: 10
 $1.00101000110011110011000 \times 2^{-87}$
- b. Solve and perform $1000\%11$ using restoring division method. 5
- c. What is bit-pair recoding of multiplier? Explain its benefits with an example. 5

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