VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY (VSSUT), ODISHA
Even Mid Semester Examination for session 2023-24

COURSE NAME: B. Tech   SEMESTER: 4th

BRANCH NAME: Information Technology
SUBJECT NAME: Computer Organization and Architecture

FULL MARKS: 30   TIME: 90 Minutes

Answer All Questions.
The figures in the right hand margin indicate Marks. *Symbols carry usual meaning*

Q1.   Answer all Questions.   [2×3]

a)   What will be the range of n-bit binary number if the number is represented in Signed 1's   - CO1
     complement representation and Signed 2's complement representation?

b)   What is Subroutine? How Stack is used in a Nested subroutine call? Explain with example.   - CO2

c)   What do you mean by Random access? Is it different from Direct access? Justify your answer   - CO3
     with proper example.

Q2.   [8]
     What is restoring division algorithm? How it is different from a non-restoring division   - CO1
     algorithm? Explain with example.

                                              OR

a)   We have a 4-bit ALU. Consider the operation 6 + 1, assuming the numbers are in signed 2's   - CO1
     complement representation. After the operation, what will be the status of Zero, Sign, Carry and
     Parity Flags?

b)   Represent $(2.5)_{10}$ in single precision IEEE floating point format.

Q3.   [8]
     What is an Instruction cycle? Draw the flow diagram of an Instruction cycle and explain.   - CO2

                                              OR

a)   In a single bus CPU organization, what will the control steps to complete the operation of an - CO2
     instruction "MOV R0, 3000" (i.e., move the contents of memory location 3000 to R0)?

b)   For a 0-address instruction format, what would be the top element of the stack following the
     sequences of instructions? PUSH 100; PUSH 20; PUSH 50; ADD; SUB; PUSH 20; MUL..

Q4.   [8]
     A disk system has 16 data recording surfaces with 1024 tracks per surface. There are 16 sectors - CO3
     per track, each containing 1024 bytes. The diameter of inner cylinder is 6 inches and outer
     cylinder is 10 inches.

     (i)   Find out the capacity of the disk.
     (ii)   Find out transfer rate if rotational speed is 3000 rpm.

                                              OR

a)   What do you mean by DRAM? Explain the working principles of DRAM with cell diagram.   - CO3

b)   What do you mean by Locality of Reference? Explain different types of Locality of Reference
     with example.

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