Roll No											

PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF INFORMATION SCIENCE
END TERM EXAMINATION - JAN 2023

Semester : Semester I - 2022
Course Code : CSA1013
Course Name : Sem I - CSA1013 - Elements of Computing Systems
Program : B.Sc. Data Science

Date : 6-JAN-2023
Time : 9.30AM - 12.30PM
Max Marks : 100
Weightage : 50%

Instructions:
(i) Read all questions carefully and answer accordingly.
(ii) Question paper consists of 3 parts.
(iii) Scientific and non-programmable calculator are permitted.

PART A

ANSWER ALL THE FOLLOWING QUESTIONS **10 X 2 = 20M**

1. Write and explain any four parts of processor briefly.
(CO3) [Knowledge]
2. Explain any two special types of registers.
(CO3) [Knowledge]
3. Write name of different cache mapping techniques. Which mapping technique has only one set in cache memory?
(CO3) [Knowledge]
4. Write any four differences between SRAM and DRAM.
(CO3) [Knowledge]
5. What are the different methods used to represent signed numbers. Explain briefly with suitable examples.
(CO1) [Knowledge]
6. Explain Ex-NOR gate with its truth table.
(CO2) [Knowledge]
7. What is " Don't care condition" in K-Map. Give example of it in the context of R-S Flip flop.
(CO2) [Knowledge]
8. Explain any two protocols used to transfer data from disk drive to main memory briefly.
(CO3) [Knowledge]
9. Explain any four functions of Operating System.
(CO4) [Knowledge]
10. Write the difference between Multitasking and Multiprogramming Operating System. Give example of Multitasking and Multiprogramming Operating System.
(CO4) [Knowledge]

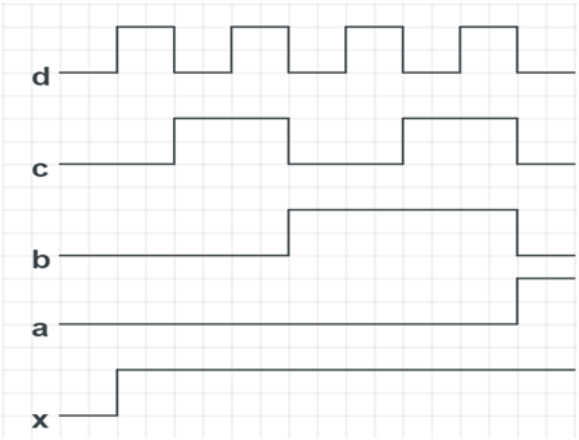
PART B

ANSWER ALL THE FOLLOWING QUESTIONS **5 X 10 = 50M**

11. Given,
Multiplicand = -5
Multipler = -7
a. Calculate minimum number of bits required for given data to perform multipication using Booth Algoritm.
b. How many maximum number of bits do we get in result if we multiply given numbers using Booth Algorithm using 7 bits.
b. Calculate product of above given data using Booth Multiplication algorithm.
d. Verify using Booth multiplication that if we interchange multiplicand and multiplier then answer remains same.

(CO1) [Comprehension]

12. If a, b, c and d are inputs to a gate and x is its output, then as per the following time graph, identify the gate and make the corresponding truth table.



Also draw the time line diagram for complement of X.

(CO2) [Comprehension]

13. Here is a truth table for a specific four-input logic circuit:

A	B	C	D	Out
0	0	0	0	0
0	0	0	1	0
0	0	1	0	0
0	0	1	1	0
0	1	0	0	0
0	1	0	1	0
0	1	1	0	0
0	1	1	1	0
1	0	0	0	0
1	0	0	1	0
1	0	1	0	0
1	0	1	1	0
1	1	0	0	1
1	1	0	1	1
1	1	1	0	1
1	1	1	1	1

Complete the Karnaugh map (K map) according to the values found in the above truth table and simplify it.

(CO2) [Comprehension]

14. Explain S-R Flip Flop using NAND gate with the following tables
a. Truth Table
b. Characteristics Table
c. Excitation table

(CO3) [Comprehension]

15. Given the following binary number in 32 bit (single precision) IEEE-754 format:
11000000110110000000000000000000
Find the decimal value corresponding to the above representation (rounded to 2 decimal places).

(CO1) [Comprehension]

PART C

ANSWER ALL THE FOLLOWING QUESTIONS **2 X 15 = 30M**

16. Consider the 3 processes, P1, P2 and P3 shown in the table.

Process	Arrival time	Time Units Required
P1	0	5
P2	1	7
P3	3	4

Identify the completion order of the 3 processes under the policies FCFS and SJF.

(CO4) [Application]

17. A block-set associative cache memory consists of 128 blocks divided into four block sets . The main memory consists of 16,384 blocks and each block contains 256 eight bit words.
a. How many bits are required for addressing the main memory?
b. Find Tag Directory Size?
c. How many bits are needed to represent the TAG, SET and WORD fields?

(CO3) [Application]

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