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**Shiv Nadar Institution of Eminence, Delhi, NCR**

**Mid Semester Examination**

**CSD101 (Introduction to computing and Programming)**

**Semester of Implementation: Monsoon, 2023**

**Full marks: 40; Time: 1.5 hours; Date: 5th October 2023.**

*Instructions:*

1. *Answer all questions. Any kind of malpractice will attract heavy penalty.*
2. *The question has two parts: Part A and Part B. You must answer Part A in the designated space and return the script to the invigilator. Part B must be answered on the answer booklet issued by the invigilator.*
3. *Write the answer of a particular question in one place.*
4. *Put the question numbers clearly.*

**Part A (5 2=10 Marks)**

**Name: Roll number:**

**For each answer, please provide an adequate explanation.**

1. **Which combination of the integer variables x, y and z makes the variable a get the value 4 in the following expression?**

**a=(x>y)? ((x>z)? x: z): ((y>z)? y: z)**

1. x=3, y=4, z=2
2. x=6, y=5, z=3
3. x=6, y=3, z=5
4. x=5, y=4, z=5

Answer:

1. **Consider the following segment of C code:**

**int j, n;**

**j=1;**

**while(j<=n)**

**j=j\*2;**

**The number of comparisons made in the execution of the loop for any n>0 is:**

1. floor(log2n) +1.
2. n.
3. log2n.
4. **ceil(log2n) +1.**

Answer:

1. **Consider the following recursive C function that takes two arguments:**

**unsigned int foo (unsigned int n, unsigned int r)**

**{**

**if (n>0)**

**return (n% foo (n/r, r));**

**else**

**return 0;**

**}**

**What is the return value of the function foo, when it is called as foo (513, 2)?**

1. 9
2. 8
3. 5
4. 2

**Answer:**

1. **An array A[10][20] starts at base address of 1000 decimal. Each element in the array occupies 1 byte and array is stored in row major order (i.e., row wise), then address of A[5][6] is:**
2. 1105
3. 1107
4. 1106
5. 1108

**Answer:**

1. **How long does this loop run:**

**for (x=0; x=3; x++)**

1. Never
2. Three times
3. Forever

**Answer:**

P.T.O

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**Part B (Answer ALL questions, Full marks: 30)**

1. **Write a program in C to implement stack data structure using array. Stack is a Last in first out (LIFO) list where the elements which are inserted at the last is removed first. For example: A pile of books. You may assume that the stack has finite size. Your implementation should have the following functions: [12 Marks]**
2. Push(i): Inserts an element at location i.
3. Pop (): Remove an element from the stack.
4. Overflow (): Checks whether the stack is full or not.
5. Underflow (): Checks whether the stack is empty or not.
6. Write a C program to check whether a given string is palindrome or not. **[8 Marks]**
7. Write a C program to generate the following pyramid of digits: **[10 Marks]**

1

232

34543

4567654

567898765

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