****Kathmandu BernHardt College****

**Bafal, Kathmandu**

**First Term Examination -2071**

**Time:3 hour Level: B.Sc CSIT (2nd Semester) FM: 60**

**Date: 2071/04/14 PM: 24**

**Subject: *Data Structure and Algorithm*** [**Set-A**]

*Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full marks*

**Section A**

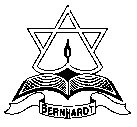
**Attempt any TWO questions. (2x10=20)**

1. What do you mean by recursion? Explain the implementation of factorial and Fibonacci sequences with example.
2. Write a menu program to demonstrate the simulation of stack operations in array implementation.
3. Write an algorithm to convert infix expression into postfix expression. Trace this algorithm to convert the expression: A \* B/D + (C - D / E)\*F into postfix.

**Section B**

**Attempt any EIGHT questions: ( 8x5 = 40 )**

1. Define the term array. Write a function to insert a new value into an array at given position.
2. What are major characteristics of algorithms?
3. How can you use Queue as ADT?
4. What do you mean by big Oh notation? What is its use?
5. Explain Tower of Hanoi problem with algorithm.
6. Trace evaluation of prefix expression: \*-A/BC-\*DEF, where A =2, B=1, C=4, D=3, E=5 and F=1.
7. Write a C function to insert an item into linear queue.
8. Define circular queue. Write an algorithm for deleting an item from circular queue.
9. Write C function to display all elements in circular queue in array implementation. Write assumptions, you need.
10. Compare and contrast linked list with contiguous list.

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**Section A**

**Attempt any TWO questions. (2x10=20)**

1. What do you mean by recursion? Write a C function to implement tower of Hanoi problem. Trace function call: TOH(3,’L’,R’, ‘ C ’) , where L is source Peg, R is destination peg and C is auxiliary peg.
2. Write a menu program to demonstrate the simulation of queue operations in array implementation.
3. Write an algorithm to convert infix expression into postfix expression. Trace this algorithm to convert the expression: ((A – ( B+C))\*D)$ (E –F) into postfix.

**Section B**

**Attempt any EIGHT questions: (8x5 =40)**

1. What is difference between structure and union? Write a C function to search a value in given array.
2. What is data structure? Why it is important to study data structure?
3. Define stack as ADT. Write a C function to push an item into the stack.
4. Define the term Big O. What is its use?
5. Write an algorithm to delete an item from linear queue.
6. Trace evaluation of the postfix expression ABC+-D\*EF+$ for A =1, B=2, C=3, D=5, E=7, F=8.
7. Define circular queue. Write a C function to insert an item into circular queue.
8. Write C function to display all elements in circular queue in array implementation. Write assumptions, you need.
9. What is priority queue? How is it implemented using ordered array?
10. Write a C function to find sum of n natural number by using recursion.