Reg No.									

MANIPAL INSTITUTE OF TECHNOLOGY
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THIRD SEMESTER B.E. (CSE) DEGREE END SEMESTER EXAMINATION
NOV./DEC. 2011
DATA STRUCTURES USING C(CSE 207)
DATE: 30-12-2011

TIME: 3 HOURS   MAX.MARKS: 50

Instructions to Candidates
- Answer **any five** full questions.
- Write question numbers clearly.

1.A. With a step count table find time complexity of the following function and denote it using BigOh notation.

```
void  mult(int a[][SIZE],int b[][SIZE],int c[][SIZE])
{
 int   j,k,i;
for(i=0;i<SIZE;i++)
for(j=0;j<SIZE;j++)
{ c[i][j]=0;
for(k=0;k<SIZE;k++)
c[i][j]=a[i][k]*b[k][j]+c[i][j];
}  }
```

B. Determine the output of following program segment with justification.
```
void main()
{
 int  i,j;
int **dp=(int **)calloc(4,sizeof(int*));

for(i=0;i<4;i++)
        dp[i]=(int*)calloc(3,sizeof(int));

*((*(dp+1))+1)+=2;
 * (*(dp+3)+2)*=2;
dp[0]++;
printf("%d \t %d",dp[0][0],dp[1][1]);

i=10; j=20;
```

```
 dp[1]=&j;
 *dp[2]=i;
printf("%d \t %d",dp[1][0],dp[2][0]);
}
```
C. Explain nested structures with an example program.   (3+5+2)

2.A. Explain the Towers of Hanoi problem. Give and explain the function to find
solution for this problem. Show the role of system stack clearly.

B. Give the functions for converting an infix expression to prefix. Trace the infix to
prefix function for the following expression. Clearly show the contents of various
variables and stack.   (5+5)

$$a\$b*c-d+e/f/(g+h)$$

3.A. Explain the following methods with respect to circular doubly linked list with
headernode.
                  i)insert_rear   ii)delete_front
  B. Write a function to insert a node at the given position in a simple singly linked list.
                                                                          (6+4)
4.A. Write a recursive function to create a binary tree.

  B. Create an AVL tree for the following set of Strings.

    March   May   Nov   Aug April Jan Dec July Feb June Octo Sept
  C. Define almost complete binary tree. Give one example with height=3.
                                                                          (2+6+2)
5.A. Give Dijkstra's shortest path algorithm and explain with an example.

  B. Explain linear probing with algorithm and example.   (6+4)

6.A. Explain how heap sort algorithm works on following list of numbers.

  12 11   55   66   43   34 78 90 38   29   10 13
  B. Explain how radix sort works on above list of numbers in question 6.A.
                                                                          (6+4)

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