

## END SEMESTER EXAMINATION, MAY-2017

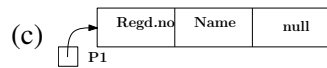
## DATA STRUCTURE AND ALGORITHMS(CSE 2001)

Programme: B.Tech(All Branches)

Semester:Second

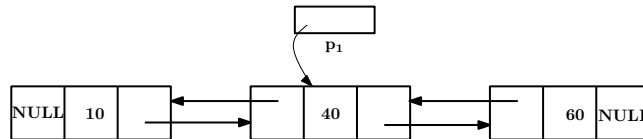
Full marks: 60

Time: 3 hours

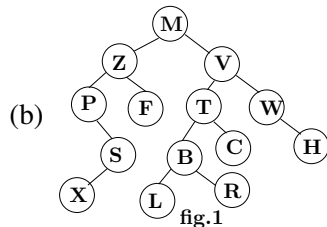
*Answer all Questions. Each Question carries equal mark.*

For the given figure write the java statements to create the structure, then create a node and assign proper information through the keyboard. **2**

8. (a) Write the Java statements to display the node information in reverse order in double linked list. **2**



- (b) Write the Java statements to insert a node after the node that  $p_1$  pointing of the above figure. **2**
- (c) What do you mean by overflow and underflow? Write the overflow and underflow conditions for a double linked list. **2**
9. (a) Differentiate between Complete Binary Tree and Almost Complete Binary Tree with proper examples. **2**



For the given tree in *fig.1* find the set of nodes whose height and depth are same. **2**

- (c) For the given tree in *fig.1* find inorder traversal. **2**
10. (a) What will be the size of the array if we represent the tree in *fig.1* using array representation. **2**
- (b) Inorder: L, N, B, E, A, M, Z, P, X, Q, R, Y  
Postorder: B, N, L, E, M, Z, A, X, R, Y, Q, P  
For the above given Inoder and Postoreder draw the required Binary tree. **2**
- (c) **22, 45, 5, 10, 28, 20, 8, 15, 35, 12, 39** for the given series construct a binary search tree(BST). **2**

Subject/Course Learning Outcome	*Taxonomy Level	Ques. Nos.	Marks
Ability to state and explain the basic programming syntax, semantics, building blocks.	L1	4(c)	2
Ability to develop java programs using programming constructs like conditional statements, looping, array, methods and class.	L3	1(c), 2(a,b,c), 3(a,b)	12
Ability to analyze, debug and test the programs and correctly predict their outputs.	L2,L3	1(a,b)	4
Ability to differentiate the behaviours of different data structures and their memory representations.	L4	5(b), 6(a,c), 7(a,b,c), 8(a,b,c), 9(a,b,c), 10(a,b,c)	30
Ability to choose appropriate data structures that efficiently model the problem of intrest.	L4	5(a,c), 6(b)	6
Ability to apply advanced programming techniques for developing solutions of different problems.	L3	3(c), 4(a,b)	6

\*Blooms taxonomy levels: Knowledge (L1), Comprehension (L2), Application (L3), Analysis (L4), Evaluation (L5), Creation (L6)

1. (a) Find Big-Oh(O) notation for the given code snippet. **2**

```
int sum=0,i,j;
for (i=1;i<=n;i++)
```

```
for(j=1; j<=n; j=j*2)
    sum = sum + 1;
```

- (b) The initial value of  $k = 4$  and  $sum = 0$ . Find the output of the below given code snippet. What is the final value of  $sum$ . **2**

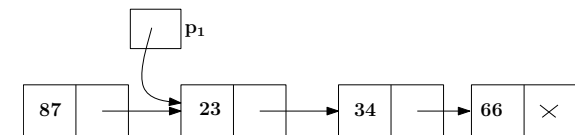
```
public static int fun(int k, int sum)
{ if(k>0)
{
    fun(k-1, sum);
    System.out.println(k);
    sum=sum+k;
} return sum;
}
```

- (c) How abstraction is achieved using abstract class and interface. Explain with proper examples. **2**
2. (a) Write a Java program that outputs all possible strings formed by using the characters 'c', 'a', 'r', 'b', 'o', and 'n' exactly once. **2**
- (b) Write a Java method that takes an array of int values and determines if there is a pair of distinct elements of the array whose product is odd. **2**
- (c) Create a class Point with instance variables x, y to represent coordinates of point and instance method setPoint(). Write a Java program to find distance between two points using a method *findDistance(Point, Point)*. **2**
3. (a) What is the use of finally block in Exception handling? Explain with proper examples. **2**
- (b) Write a java program to enter two integers  $a$ ,  $b$  from the keyboard. Divide  $a$  by  $b$ , if  $b$  is zero then handle ArithmeticException in the program. **2**
- (c) Write a java method using Generics to count the occurrence of an element in an array of any type. The signature of count method is given below. *public static <T>int count(T[] array, T item)* **2**
4. (a) Write a recursive method in Java to return the greatest common divisor(gcd) of two integers  $m$  and  $n$ , given that in general,  $gcd(m, n) = gcd(n, m \bmod n)$ . **2**

- (b) Draw the recursive trace for Binary sum for the given array. **2**

2	9	15	6	27	24	10	9	23	5
0	1	2	3	4	5	6	7	8	9

- (c) Differentiate between multiple and multilevel inheritance. **2**
5. (a) Convert the infix expression  $(P/Q * (M^D - Z) + K)$  into its equivalent postfix expression using stack. **2**  
**Hint:**  $M^D = M^D$ , Precedence from higher to lower:  $^, (*, /), (+, -)$
- (b) Write a Java method for PUSH operation in array implementation of stack. **2**
- (c) Evaluate the postfix expression **29, 6, 4, -, /, 54, -, 6, \*** using stack. In the process of evaluation find how many numbers of PUSH and POP operation takes place in stack. **2**
6. (a) Write a Java method for deletion operation for linked list implementation of queue. **2**
- (b) Consider a stack of fixed size say 4, to store the alphabets. Initially the stack contain the alphabet 'A'. The following operations takes place: **push(M), push(Z), push(U), push(T), pop, pop, push(S), push(L), push(D)**. Show the value of top after each operation and display the contents of the stack.
- (c) Distinguish between Stack and Queue. **2**
7. (a) Write the Java statements to delete the node after the node that  $p_1$  pointing. **2**



- (b) Write a Java method to search for a node in the single linked list. The prototype of the search method is:  
*public static boolean Search(node, int)* **2**