

[This question paper contains 4 printed pages.]

Sr. No. of Question Paper : 1442 F-7 Your Roll No.....

Unique Paper Code : 2511302

Name of the Paper : C++ and Data Structures

Name of the Course : B.Tech (Electronics) (FYUP)

Semester : III

Duration : 3 Hours

Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Question number 1 is compulsory.
3. Attempt **any four** from the remaining six.
4. All questions carry equal marks.
5. Write answers of all parts of a question at one place only.

1. (a) What do you understand by preprocessor commands?

(b) What are storage classes? Explain any two of the storage-classes with example.

(c) Rewrite the following code using one if statement:

```
if (achar=='E')  
  
    c++;  
  
else  
  
    cout<<("Value is E")<<endl;
```

P.T.O.

(d) Which data structure implements LIFO technique? Also declare its structure.

(e) Construct a binary tree for the inputs:

14,15,4,9,7,18,3,5,16,4,20,17,9,14,5. (5×3)

2. (a) What is the difference between static and dynamic memory allocation? Explain with example.

(b) What are the rules for a valid identifier name? Identify the legal names for variables in C++ from following (if a name is illegal also explain why):

(i) 1999_art

(ii) WATSON

(iii) _ate

(iv) iNteL

(c) If originally $x=2$, $y=3$ and $z=2$, what is the value of the following expressions:

(i) $x+y-- - x + x++ + - --y$:

(ii) $x*z-- + ++y*z$ (5+6+4)

3. (a) Differentiate between structure and union?

(b) Give the output of the given code:

```
#include<iostream.h>

#include<ctype.h>

void main()

{

char Mystring[]="What@OUTPUT!!";

for(int I=0;Mystring(I)!='\0';I++)

{
```

```

if(!isalpha(Mystring[I]))
    Mystring[I]='*';
else if(isupper(Mystring[I]))
    Mystring[I]=Mystring[I];
else
    Mystring[I]=Mystring[I+1];
}
cout<<(Mystring);
}

```

(c) A C++ program contains the following declaration:

```
static int x[8]={100, 200, 300, 400, 500, 600, 700, 800};
```

(i) What does (x+2) indicate?

(ii) What will be the value of the following:

(1) *x

(2) (*x+2)

(5+4+6)

4. (a) What are linked lists? Differentiate between linear and circular linked lists.
- (b) Show all the intermediate steps to sort the following list using merge sort.
5,25,6,19,8,25,17,55.
- (c) What is stack? Show how a stack can be implemented using linked lists.
(5+5+5)
5. (a) What do you understand by a binary search tree? List various operations that can be performed on a binary search tree. Write a c++ code to define a node in binary search tree.

- (b) Preorder traversal of a certain binary tree produces:
A D F G H K L P Q R W Z

And in order traversal produces:
G F H K D L A W R Q P Z

Using Pre-order and in-order traversal draw the corresponding binary tree.

- (c) Draw the heap that results from adding 12, 7, 11, 9, 15, 10, 8 in that order to an initially empty heap? (5+5+5)
6. (a) What do you understand by fall through situation? What is the benefit of fall through situation? How it is implemented in C++?
- (b) Trace the linear search algorithm on the following list.
List: 7 2 4 0 8 15 34 6
- (c) What is the difference between compiling and running the program? (6+6+3)
7. Differentiate between following:
- (a) Implicit and explicit type conversions
- (b) Breadth first traversal and depth first traversal
- (c) Function overloading and operator overloading (4+6+5)