

**PROGRAMMING LANGUAGES**

*Time: Three Hours*

*Maximum Marks: 100*

*Answer five questions, taking ANY TWO from Group A, any two from Group B and all from Group C.*

*All parts of a question (a, b, etc. ) should be answered at one place.*

*Answer should be brief and to-the-point and be supplemented with neat sketches.*

*Unnecessary long answer may result in loss of marks.*

*Any missing or wrong data may be assumed suitably giving proper justification.*

*Figures on the right-hand side margin indicate full marks.*

**Group A**

1. (a) List five high level programming languages. State one feature of each of the five high level languages. 6
- (b) What is structured programming? Explain the relevant constructs using pseudo-code. Highlight the advantages and disadvantages of structured programming. 8
- (c) Explain the difference between static and dynamic binding by giving suitable examples. 6
2. (a) Define calling a function. What is “call by value” parameter passing in C program? How is it differ from “call by reference”. Write a program segment to show these two types of parameter missing. 8
- (b) What is algorithm? Develop an algorithm to test whether a given number is a prime number. 6
- (c) What are the various storage classes available in “C”? Give one example of each. 6
3. (a) What are default constructor, copy constructor, dynamic constructor, conversion constructor and explicit constructor? What is scope resolution operator? 8

- (b) What is the basic concepts of object oriented programming? Define polymorphism and encapsulation in respect to object oriented programming. 6
- (c) What are dynamic binding and early binding? What are the differences between new and malloc? 6
4. (a) Write a C/C++ program to print 1 to 100 numbers without using loop. 8
- (b) Write a C/C++ program to print Fibonacci series of given range. 6
- (c) Write a C program to print Pascal triangle. 6

**Group B**

5. (a) Explain CAR, CDR and CONS operators to manipulate lists in LISP. 8
- (b) For a given list L = (W X Y Z), what is output/effect of the following LISP expression? 6  
 $(\text{car L}) (\text{cdr L}) (\text{caddr L}) \text{setq} (\text{car (L)}, 23) (\text{rplacd L } 45)$
- (c) Write a LISP function that uses COND to write a function which multiplies a number 5 if it is greater than 7, subtracts 2 if it equals 3, and adds 23 to it otherwise. 6
6. (a) Express the following expression in LISP: 8  
 $A + B * C + D \div (E + F)$
- (b) Write a LISP function which uses DO loops to print out the first ten products of the multiples of 3 and 4 i.e.  $(3 \times 4) = 12$ ,  $(6 \times 8) = 48$ . 6
- (c) What is LISP meta language? Give the set of rules. 6
7. (a) What is execution? How is it handled in JAVA? 6
- (b) What are the applications of wrapper classes? 6
- (c) What is a thread in Java? Describe the complete life-cycle of a thread. Explain your answer using a labelled state model. 8
8. (a) Discuss the steps involved in loading and running a remote applet. 6
- (b) Write a Java program to implement bubble sort algorithm. 8

- (c) Write a Java program to find second highest number in an integer list 6  
without sorting the array.

*Group C*

9. Answer the following in brief: 20

- (i) What is thunk?
- (ii) What is the difference between reference and pointer data type in C++ ?
- (iii) What is associativity of operators? Give an example?
- (iv) What is garbage?
- (v) What is the output of the following code:

```
# include <stdio.h>
int main ( )
{
    int a, b, c, d;
    a = 3;
    b = 5;
    c = a, b ;
}
    d = (a, b);
printf("c = %d", c
printf("\n\nd = %d", d);
return 0;
```

- (vi) Determine the output of following code:

```
int main ()
{
    char for * p1, *p2 ;
printf ("p1 : % d\n\n p2 : %d",
size of (p1), size of (p2));
return 0;
}
```

- (vii) Write the output of code given below ;

```
# include <stdio.h>
int main ()
{
    inta [5]= {1,2,3,4,5};
int * ptr = (int *) (a + 1);
```

```
printf("%d%d", *(a + 1), *(ptr - 1));  
return 0;  
}
```

- (viii) What is a Java virtual machine?
- (ix) Write any four attributes of a good language.
- (x) What are the C++ tokens?

*(Refer our course material for answers)*