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MCA/DX **5530**

PRINCIPLES OF PROGRAMMING LANGUAGES

Paper : MCA-305

Time : Three Hours] [Maximum Marks : 80

Note : Attempt *five* questions in all. Q. No. 1 is compulsory. Attempt *four* more questions selecting *one* question from each unit.

(Compulsory Question)

1. (i) Write a regular grammar to identify a string consisting of characters *a-z* and 0-9. The first character of the string is to be a letter only. 3

(ii) Define Orthogonality principle. 3

(iii) What do you understand by strong and weak typing ? What are their merits and demerits ? 3

(iv) Show that following grammar is ambiguous :

<E> → <E> + <E> | <E> * <E> | <N>

<N> → 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 3

(v) Differentiate between Implicit and Explicit type conversion. 3

(vi) Compare struct in C and C++.

(vii) What is a Destructor ? 3

(viii) What is anonymous variable in PROLOG ? 3

UNIT–I

2. What do you understand by Binding ? Explain the name, address, value and type binding using suitable examples. 14

3. What do you understand by Type-equivalence ? Differentiate between Name equivalence and Structural equivalence. Also discuss their advantages and disadvantages. 14

UNIT–II

4. (a) What do you understand by Call by name parameter passing technique ? Explain using suitable example. 7

   (b) What do you understand by Chomsky hierarchy of formal languages ? Explain. 7

5. Write a Context free grammar that can recognize the string $a^n b^n$. Also design the Push Down Automata (PDA) for the same. 14

UNIT–III

6. (a) What is Inheritance ? What types of inheritance are supported by C++ ? Explain how you can pass parameters to the constructor of base class. 7

   (b) Discuss the scope of public, private and protected members of a class using suitable examples. 7

7. What is Referential transparency ? What is Lazy evaluation ? Explain. 14

8. (a) What is Refutation system ? Show that Horn clause logic with resolution is a refutation system. 7

   (b) Describe how the busy-wait implementation of semaphore can cause starvation. 7

9. (a) What are the different problems that should be avoided when scheduling cooperating processes ? Explain. 7

   (b) What is Rendezvous ? What is its use in Remote Procedure Calls (RPC) ? Explain. 7
