Mark Scored:

KATHMANDU UNIVERSITY
End Semester Examination
February/March, 2019

Level : B. E.
Year : III

Course : COMP 301
Semester : I

Exam Roll No. :

Time: 30 mins.

F. M. : 10

Registration No.:

Date : 17 FEB 2019

SECTION "A"
[20 Q.× 0.5= 10 marks]

Tick (√) the best answer.

1. The first successful high-level language for business application was
[A] ALGOL 60 [B] FORTRAN
[C] COBOL [D] SIMULA 67

2. ..... in a programming language means that a relatively small set of primitive constructs can be combined in a relatively small number of ways to build the control and data structures of the language.
[A] Operator overloading [B] Orthogonality
[C] Feature multiplicity [D] Abstraction

3. The first language to provide even limited support for data abstraction was
[A] SIMULA 67 [B] Prolog
[C] COBOL [D] ALGOL 60

4. ..... means the ability to define and then use complicated structures or operations in ways that allow many of the details to be ignored.
[A] Expressivity [B] Orthogonality
[C] Feature multiplicity [D] Abstraction

5. Which of the following is the metalanguage for programming language
[A] List [B] Structure
[C] C++ [D] BNF

6. Run time type checking is ..... than compile time type checking.
[A] Cheaper [B] Expensive
[C] Better [D] More Desirable

7. Axiomatic semantics is based on mathematical logic called
[A] Predicates [B] Modal logic
[C] Propositional logic [D] Computational logic

8. Finite automata can be designed to recognize a class of languages called
[A] Regular language [B] Procedural Language
[C] Imperative Language [D] Infinite Language

9. Given a CFG
S→aAS|a, A→SbA|SS|ba
The string produced by above grammar is
[A] baabbab [B] aabaabaab [C] abbaabbaa [D] aabaabbaa

10. Left recursion is not accepted by
[A] SLR parser
[B] LALR parser
[C] Shift-Reduce parser
[D] LL(1) parser

11. Consider the production of the grammar
$S \rightarrow TT$
$T \rightarrow aa$
$T \rightarrow bb$
Which of the following language is produced by the above grammar
[A] L ={ aaaa,aabb,bbaa,bbba}
[B] L ={ aaaa,aabb,bbaa,bbbb}
[C] L ={ aaaa,abab,bbaa,bbba}
[D] L ={ aaaa,aabb,bbaa,baba}

12. What can a compiler check?
[A] Logical Error
[B] Syntax Error
[C] Both Logical and Syntax Error
[D] Not Logical and Syntax Error

13. Nameless (abstract) memory cells that are allocated and deallocated by explicit run-time instructions specified by the programmer is
[A]Explicit Heap-Dynamic Variable
[B] Static Variable
[C] Stack-Dynamic Variable
[D] Implicit Heap-Dynamic Variable

14. The collection of all variables that are visible in the statement is called
[A] Static Variable
[B] Dynamic Variable
[C] Stack-Dynamic Variable
[D] Referencing Environment

15. Named constants in languages that use static binding of values is called
[A] manifest Constant
[B] Readonly Constant
[C] Final Reserved Word
[D] l-value of a variable

16. Data type that is not defined in terms of other type is called
[A] A Descriptor
[B] Array
[C] Primitive Data Types
[D] Reference Substring

17. Variable without name is called
[A] Dynamic Variable
[B] Heap-Dynamic Variable
[C]Anonymous Variable
[D] Referencing Environment

18. A general data-based iteration statement uses a user-defined data structure and a user-defined function to go through the element of a structure. This function is called
[A] Iterator
[B] Iteration
[C] Unconditional Branching
[D] User-Defined Function

19. A subprogram that has the same name as another subprogram in the same referencing environment is known as
[A] Overloaded Subprogram
[B] Generic Subprogram
[C] Subprogram Call
[D] Subprogram Header

20. The issue of referencing environment for executing the passed subprogram where the environment of the call statement that enacts the passed subprogram is called
[A] Deep Binding
[B] Ad Hoc Binding
[C] Shallow Binding
[D] Ad Hoc Polymorphism

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SECTION "B"
[6Q × 4 = 24 marks]

Attempt *ANY SIX* questions.

1. Many contemporary languages allow two kinds of comments: one in which delimiters are used on both ends, and other in which a delimiters marks only the beginning of the comment. Discuss the advantages and disadvantages of each of these with respect to your criteria.

2. Define a syntax. What three extensions are common to most of EBNFs? Explain with example.

3. Consider the following Ada program.

```
procedure Main is
    X, Y, Z : Integer;
    Procedure Sub1 is
        A, Y, Z : Integer;
        begin    -- of Sub1
        ......
        end;    -- of Sub1
    procedure Sub2 is
        A, X, W : Integer;
        procedure Sub3 is
            A, B, Z : Integer;
            begin    -- of Sub3
            ......
            end;   -- of Sub3
        begin    -- of Sub2
        .......
        end;   -- of Sub2
    begin   -- of Main
    ......
    end;   -- of Main
```

Considering static scope, list all the variables along with the program units where they are declared and are visible in the bodies of Sub1, Sub2, and Sub3.

4. What are the design issues of array? Also, state how a decimal value wastes memory space.

5. What is short-circuit evaluation? Define operator precedence and operator associativity.

6. Define a block. What are the design issues for multiple-selection statements?

7. What are the three general characteristics of subprograms? Also, explain about actual parameters.

SECTION "C"

[2 Q × 8 = 16 marks]

Attempt *ALL* questions.

8. With example explain about the reasons for studying concepts of programming language and programming domains.

9. Why syntax analyzers are based on grammars? Describe bottom-up parsers with example. Given the following grammar and the right sentential form, draw a parse tree and show the phrases, simple phrases, and the handle.

$$S \rightarrow aAb \mid bBA$$
$$A \rightarrow ab \mid aAB$$
$$B \rightarrow aB \mid b$$

a) aaAbb
b) aaaAbBb