Printed Pages:02 **Subject Code:NCS503**

Paper Id: **110519** **Roll No:** | | | | | | | | | | |

B TECH
(SEM V) THEORY EXAMINATION 2018-19
PRINCIPLES OF PROGRAMMING LANGUAGES

Time: 3 Hours ***Total Marks: 100***

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.
2. Any special paper specific instruction.

SECTION A

1. Attempt *all* questions in brief. **2 x10 = 20**

a. Give an example of prime program.
b. What are the Abstract data types?
c. List the problems that arise in the evaluation of tree representation of expression.
d. Write about the concept of Enumerations with examples.
e. Compare and contrast widening and narrowing?
f. Write a short note on Halting Problem.
g. Discuss the concept of sub typing.
h. State the concept of Bootstrapping?
i. List various characteristics of a good programming language.
j. Illustrate the concept of dangling else?

SECTION B

2. Attempt any *three* of the following: **10 x 3 = 30**

a. What do you mean by typed lambda calculus? Explain the concept of currying.
b. Discuss the difference between records and variant records.
c. What is the difference between type checking and type conversion with examples.
d. List concurrent programming. What is deadlock? What are the necessary conditions for deadlock to occur?
e. Enlist different syntactic elements and explain any three with suitable example.

SECTION C

3. Attempt any *one* part of the following: **10 x 1 = 10**

(a) The "91-function", attributed to John McCarthy, is defined by

Fun f(x) =

If x>100 then x-10 else f(f(x+11)

In this context discuss various approaches to expression evaluation and evaluate the above function using innermost and outermost evaluation of f (100).

(b) What is logic programming? Explain with example. Discuss the normal forms in propositional logic and the conversion procedure to normal form.

4. Attempt any *one* part of the following: 10 x 1 = 10

(a) Differentiate between scope and lifetime of a variable with suitable example.

(b) Language paradigm is based on four basic computational models namely imperative or procedural languages, applicative languages, rule based languages and object oriented languages. Briefly discuss about all these four computational models.

5. Attempt any *one* part of the following: 10 x 1 = 10

(a) Explain attribute grammar. Discuss its significance. What do you understand by denotational semantics?

(b) Explain network programming. How communication is established with remote system using UDP? Write steps for both server and client.

6. Attempt any *one* part of the following: 10 x 1 = 10

(a) Explain the various methods of Parameter transmission with examples.

(b) What is lambda calculus? Write down its uses. Discuss the various reduction operations performed on Lambda expression.

7. Attempt any *one* part of the following: 10 x 1 = 10

(a) **i)** Derive & discuss the generalized formula to calculate the location of an element in 2-D array.
ii) An array VAL [-2…10] [-4…12] is stored in the memory with each element requiring 4 bytes of storage. If the base address of the array VAL is 1500, determine the location of VAL [4] [6] when the array VAL is stored
(i) Row wise **(ii)** Column wise.

(b) Give the complete translation structure of the following statement (**show all steps**):

Result=start*10 + phase *20.