

Nepal College of Information Technology

Level: Bachelor

Semester: Spring

Year : 2023

Programme: BE SE (VI)

Full Marks : 100

Pass Mark : 45

Course: Principles of Programming Language

Time : 3 hrs

Candidates are required to give their answers in their own words as far as practicable.

The source code in the relevant programming language in the margin indicates full marks.

Attempt all the questions.

1. a) Mention the different programming paradigm with examples. 7
Discuss the properties of a good programming language.
- b) Discuss the significance of Pseudo-code. Explain the indexing and looping functionalities covered by Pseudo-code. 8
2. a) "FORTRAN allows programs to be divided into disjoint subprograms". Elaborate the Design: Structural Organization of a FORTRAN program. 7
- b) Explain the control structures and the concept of iteration in FORTRAN. 8
3. a) What do you mean by an Activation Record? Discuss the different ways of parameter passing in modular programming. 7
- b) Elaborate the concept of hierarchical structure implemented in ALGOL. Also discuss Impossible Error Principle supported by block structure. 8
4. a) "Blocks permit efficient storage management on stack" justify this statement with supporting diagrams. 7
- b) Differentiate between pure function and pseudo function in LISP. Demonstrate the use of function definition and function application in LISP. 8

- 5 a) Translate the following expressions into S-expressions in LISP and also make the walking-down diagrams. 8

i. $(-1)^k k^{(1/k)}$

ii.
$$\frac{-b - \sqrt{b^2 - 4ac}}{\sqrt[3]{4a^2 - b^2}}$$

- b) How do we implement the concept of property list and association list in LISP? Support your answer with walking-down diagrams 7
- 6 a) What are the basic principles of object oriented programming? Explain in brief about the Message passing in SmallTalk. 7
- b) Explain the object and class representation in SmallTalk. Also discuss the concepts of collecting unused memory locations in SmallTalk. 8

7 Short Notes (Any Two) 2x5

- a) General principles of a programming language
- b) Dangling else statement in ALGOL
- c) Dynamic lookup in SmallTalk
