R13

SET - 1

III B. Tech I Semester Regular/Supplementary Examinations, October/November - 2016
PRINCIPLES OF PROGRAMMING LANGUAGES
(Computer Science and Engineering)

Time: 3 hours   Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**
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PART –A

1	a)	Define Left Recursive Grammar Rule.	[4M]
	b)	Define Binding and Binding Time.	[3M]
	c)	Which languages allow variable number of parameters?	[3M]
	d)	What is an overriding method?	[4M]
	e)	What data types were parts of original LISP?	[4M]
	f)	What are two parts of a compound term?	[4M]

PART -B

2   Using this grammar <assign>$\rightarrow$<id>=<expr>   [16M]
             <id>$\rightarrow$A|B|C
             <expr>$\rightarrow$<id>+<expr>|<id>*<expr>| (<expr>)|<id>
Show parse tree and Left most derivation for following:
  (a) A= (A+B)*C   (b) A=B*(C*(A+B))

3	a)	Define name and structure type compatibility. What are relative merits of these two?	[8M]
	b)	Define Coercion, Typeerror, Typechecking and Strong Typing.	[8M]
4	a)	Explain design issues of functions.	[6M]
	b)	Explain about Co-Routines with an example.	[10M]
5	a)	What is Co-Operation Synchronization?	[6M]
	b)	Implement Producer and Consumer problem using Semaphores.	[10M]
6	a)	Explain about data objects in LISP.	[12M]
	b)	Write factorial function using COMMON LISP.	[4M]
7	a)	Explain Inferencing process of PROLOG.	[10M]
	b)	Write differences between procedural and non-procedural languages.	[6M]

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PART –A

1	a)	Define Lexeme and Token.	[3M]
	b)	Define row major order and column major order in arrays.	[3M]
	c)	Write differences between function and procedure.	[4M]
	d)	Briefly describe advantage of monitor over semaphores.	[4M]
	e)	Write difference between EQ and EQV.	[4M]
	f)	What are forms of Horn Clauses?	[4M]

PART -B

2 a) Prove that the following grammar is ambiguous   [8M]
<S> →<A>
<A>→<A>+<A>|<id>
<id>-→a|b|c

   b) What is primary use of attribute grammar?   [8M]

3 a) Explain Categories of Arrays.   [8M]
   b) Explain Array Operations.   [8M]

4   Explain different parameter passing methods with an example.   [16M]

5 a) Explain Thread class in JAVA and its methods.   [10M]
   b) Explain how concurrency is provided in ML.   [6M]

6 a) Explain about Predicate functions in Scheme.   [8M]
   b) How functions are defined in Scheme?   [8M]

7 a) Explain about fact and rule statements in PROLOG   [8M]
   b) Explain how backtracking works in PROLOG   [8M]

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SET - 3

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PART –A

1	a)	Draw Parse tree for expression a=b/ (a+c).	[3M]
	b)	Define narrowing and widening conversions.	[3M]
	c)	What is parameter profile?	[4M]
	d)	Write differences between logical and physical concurrency.	[4M]
	e)	What does a lambda expression specify?	[4M]
	f)	What are three forms of PROLOG Term?	[4M]

PART -B

2	a)	Describe purpose of ACTION and GOTO table in an LR Parser with example.	[10M]
	b)	Describe differences between Top-Down and Bottom-Up Parsers.	[6M]
3	a)	What is mixed mode assignment? Explain mixed mode assignments in Ada, Java and ML.	[10M]
	b)	Explain structure of an associative array.	[6M]
4	a)	What is an overloaded subprogram? Explain with an example.	[8M]
	b)	Explain two methods for implementing blocks.	[8M]
5		What is exception handling? How exceptions are handled in C++ and JAVA.	[16M]
6	a)	Explain about list functions in Scheme.	[8M]
	b)	Explain about primitive functions in Scheme.	[8M]
7	a)	Write deficiencies of PROLOG.	[10M]
	b)	Explain generate and test programming strategy in PROLOG.	[6M]

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PART –A

1	a)	What is primary task of a Lexical Analyzer?	[3M]
	b)	What are design issues of Two-Way Selection Statement?	[3M]
	c)	Define scope and Lifetime.	[4M]
	d)	Explain wait () and release () methods of semaphores.	[4M]
	e)	What are antecedents and consequents?	[4M]
	f)	What are two forms of DEFINE?	[4M]

PART -B

2	Perform Pair wise disjointness test for following rules:	[16M]

A➔aB|b|cBB

B➔aB|bA|aBb

C-➔aaA|b|caB

3	a)	Explain advantages and disadvantages of Java for loop compared to Ada for loop.	[8M]
	b)	Explain about Guarded Command	[8M]

4	Describe deep access and shallow access methods for implementing dynamic scoping.	[16M]

5	a)	Explain features of Object-Oriented Programming Languages.	[6M]
	b)	Explain how Ada supports concurrency.	[10M]

6	Explain how functions are defined in Scheme and ML.	[16M]

7	Explain list structures and Goal statements in PROLOG.	[16M]

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III B. Tech I Semester Supplementary Examinations, May - 2016
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*****

PART –A

1	a)	Explain about parsing.	[3M]
	b)	Write any two design issues for arithmetic expressions.	[3M]
	c)	Explain about generic methods.	[4M]
	d)	Differentiate between procedural languages and object oriented languages.	[4M]
	e)	Write short notes on lambda calculus.	[4M]
	f)	Explain about multi paradigm languages.	[4M]

PART –B

2	a)	Explain in detail about language evaluation criteria.	[4M]
	b)	Explain about lexical analysis.	[8M]
	c)	Write short notes on context free grammer.	[4M]
3	a)	Explain various primitive data types with suitable examples.	[6M]
	b)	Discuss about type-checking.	[6M]
	c)	Explain about control structures.	[4M]
4	a)	Explain how subprograms names are passed as parameters.	[8M]
	b)	Define sub program. What are the distinct categories of Subprograms?	[8M]
5	a)	Discuss the design issues of Exception Handling.	[8M]
	b)	Explain in detail abstract data types in java with examples.	[8M]
6	a)	Explain the principles of ML.	[8M]
	b)	Explain about fundamentals of FPL.	[8M]
7	a)	Explain about Logic programming.	[8M]
	b)	Explain the Basic elements of Prolog.	[8M]

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III B. Tech I Semester Regular Examinations, November - 2015
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PART –A

1	a)	What constitutes a programming environment?	[3M]
	b)	What mixed-mode assignments are allowed in C and Java?	[4M]
	c)	What is an alias? What are the problems associated with it?	[4M]
	d)	What is attribute grammar? Explain how attribute grammar is use for evaluation of the expressions.	[4M]
	e)	What is type inferencing used in ML?	[3M]
	f)	What is the difference between checked and unchecked exception in java?	[4M]

PART -B

2	a)	What is the difference between a sentence and a sentential form in a CFG?	[4M]
	b)	Explain with an example how the weakest precondition for a logical pretest loop is derived.	[8M]
	c)	A concise and understandable description of a programming language is essential to the language's success. Comment on this.	[4M]
3	a)	What are the merits of sub range types?	[3M]
	b)	Explain in detail various design issues of character string types.	[8M]
	c)	What is a variable and what are the attributes of a variable? Elaborate on address of a variable.	[5M]
4	a)	Discuss the following term: i) Dangling pointers, ii) Tail recursion elimination.	[10M]
	b)	Explain associative arrays, their structure and operations.	[6M]
5	a)	What is the difference between the way original C and C89 deal with an actual parameter whose type is not identical to that of the corresponding formal parameter?	[8M]
	b)	Discuss in detail overloaded operators.	[8M]
6		Discuss how producer-consumer problem and Dining philosopher's problem are solved using concurrency in ADA.	[16M]
7	a)	For what sort of application logic programming is useful? Briefly explain.	[8M]
	b)	What are existential queries? Briefly explain.	[8M]

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SET - 2

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*****

PART –A

1   a)   What do you mean by a general purpose language? Is C a general purpose language?   [3M]
     b)   Give an example of left recursive rule in CFG. What is the significance of left   [4M]
          recursive rule?
     c)   What do you mean by binding? Give examples of some of the bindings and their   [4M]
          binding times.
     d)   Consider the following C program: [4M]
          int fun(int _ i) {
          *i+=5;
          return 4;
          }
          void main {
          int x=3;
          x=x+fun (&x)
          }
          What is the value of x after assignment statement in main method assuming i.
          operands are evaluated left to right?
     e)   What are advantages and disadvantages of dynamic local variables?   [3M]
     f)   What is type inferencing used in ML?   [4M]

PART -B

2   a)   Explain the process of compilation in each phase of a compiler.   [8M]
     b)   Give some reasons why computer scientists and professional software developers   [8M]
          should study general concepts of language design and evaluation.

3   a)   Discuss about Context-free grammar and regular expression? Give the parse tree of a   [8M]
          following statement: A = (B+C) * (D / E).
     b)   Consider the following pseudo code.   [8M]
          Procedure P (A, B: real)
          X: real
          Procedure Q (B, C: real)
          Y: real
          . . .
          Procedure R (A, C: real)
          Z: real
          . . . (*)
          . . .
          Assuming static scope, what is the referencing environment at location marked by (*)?

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4	a)	Explain in detail arrays, indices, subscript bindings, and array categories.	[8M]
	b)	What are the problems posed by managing a heap of single-size cell and variable-size cell? Explain in detail various methods for reclaiming garbage.	[8M]
5	a)	Discuss precedence and associativity rules of different programming languages.	[8M]
	b)	Explain in detail multiple selection constructs.	[8M]
6	a)	What are the characteristics of co-routine feature? List the languages which allow co-routines.	[8M]
	b)	How to implement generic functions in C++?	[8M]
7	a)	Define monitor? Explain how cooperation synchronization and competition synchronization are implemented using monitors.	[8M]
	b)	Write a prolog description of your family tree (based only on facts), going back to your grandparents and including all descendants. Be sure to include all relationships.	[8M]

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*****

PART –A

1	a)	Differentiate between Hybrid Interpretation and Pure Interpretation.	[3M]
	b)	Write short notes on Short Cut evaluation.	[4M]
	c)	What are the design issues for exception handling in JAVA?	[3M]
	d)	Differentiate In mode and Out Mode parameter passing mechanisms.	[4M]
	e)	With respect to the object oriented programming, briefly explain virtual functions.	[3M]
	f)	What are the three features of Haskell that makes very different from schema?	[4M]

PART -B

2	a)	What are the main features of the programming paradigm with examples?	[8M]
	b)	Define CFG? What does it mean for CFG to be ambiguous?	[8M]
3	a)	(i) Explain Dijkstra's selection construction and loop structure. (ii) Explain with examples user-located loop control mechanisms provided by various languages.	[8M]
	b)	What is meant by type checking? Differentiate between static type checking and dynamic type checking and give their relative advantages.	[8M]
4	a)	Discuss the significance of holes in the records. Why they do and what problem do they cause?	[8M]
	b)	Explain the difference between virtual and non-virtual methods.	[8M]
5	a)	Describe three alternative means of allocating co-routine stacks. What are their relative strengths and weaknesses?	[8M]
	b)	What is dangling-else problem? Discuss How it can be handled by the programming language.	[8M]
6		Explain the following terms :	
	a)	Message passing	[6M]
	b)	Concurrency in Ada	[5M]
	c)	Monitors.	[5M]
7	a)	For what sort of application logic programming is useful? Briefly explain.	[8M]
	b)	Write a LISP function fib(n) that computes nth Fibonacci number.	[8M]

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PART –A

1	a)	Briefly write about Virtual Machines.	[3M]
	b)	What are the advantages of user-defined data types?	[4M]
	c)	How does C support relational and Boolean expressions?	[3M]
	d)	Explain with example how operand-evaluation order interacts with functional side effects.	[4M]
	e)	Write a short note on 'this' pointer in C++.	[3M]
	f)	Explain about LISP interpreter.	[4M]

PART -B

2		Explain language evaluation criteria and the characteristics that affect them.	[16M]
3	a)	Define syntax and semantics.	[5M]
	b)	The levels of acceptance of any language depend on the language description. Comment on this.	[5M]
	c)	Define grammars, derivation and a parse tree.	[6M]
4	a)	What are dangling pointers and lost heap-dynamic variables? How are they created?	[8M]
	b)	What are the problems posed by managing a heap of single-size cell and variable-size cell? Explain in detail various methods for reclaiming garbage.	[8M]
5		Discuss about the various attributes of a good language and explain the process of evaluating attributes with example.	[16M]
6	a)	Write an analysis of the similarities and differences between java packages and C++ namespaces.	[8M]
	b)	Explain how information hiding in provided in an ADA package.	[8M]
7	a)	Discuss about basic elements of prolog. Give examples.	[8M]
	b)	Explain how data abstraction is implemented in ADA.	[8M]

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