

15. (a) (i) Describe the actions of the ML filter function. (7)
(ii) Write a scheme function that takes a simple list of numbers as its parameter and returns the largest and smallest numbers in the list. (6)

OR

- (b) Explain the two approaches to matching goals to facts in a database. (13)

PART – C (1 × 15 = 15 Marks)

16. (a) Design a skeletal program and a calling sequence that results in an activation record instance in which the static and dynamic links point to different activation-recorded instances in the run-time stack. (15)

OR

- (b) The reader-writer problem can be stated as follows : A shared memory location can be concurrently read by any number of tasks, but when a task must write to the shared memory location, it must have exclusive access. Write a Java program for the reader-writer problem. (15)

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Question Paper Code : **86344**

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M.E./M.Tech. DEGREE EXAMINATION, MAY/JUNE 2016
Second Semester

Computer Science and Engineering

CP 7203 – PRINCIPLES OF PROGRAMMING LANGUAGES

(Common to M.Tech. Information Technology)

(Regulations 2013)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions.

PART – A (10 × 2 = 20 Marks)

1. Why does C++ include the features of C that are known to be unsafe ?
2. What are the two factors must be defined for each language entity in order to construct a denotational description of the language ?
3. What is the l-value of a variable ? What is the r-value ?
4. Define functional side effect.
5. What is the difference between an activation record and an activation record instance ?
6. What are the design issues for subprograms ?
7. What is the difference between physical and logical concurrency ?
8. How can an exception be explicitly raised in Ada ?
9. What does a lambda expression specify ?
10. What are antecedents and consequents ?

PART - B (5 x 13 = 65 Marks)

11. (a) Using the following grammar show a parse tree and a leftmost derivation for the following statement :
 $A = A * (B + (C * A))$ (13)
- $\langle \text{assign} \rangle \rightarrow \langle \text{id} \rangle = \langle \text{expr} \rangle$
 $\langle \text{id} \rangle \rightarrow A | B | C$
 $\langle \text{expr} \rangle \rightarrow \langle \text{id} \rangle + \langle \text{expr} \rangle$
 $|\langle \text{id} \rangle * \langle \text{expr} \rangle$
 $|\langle \text{expr} \rangle$
 $|\langle \text{id} \rangle$
- OR
- (b) (i) Write an EBNF rule that describes the while statements of Java or C++. (7)
 (ii) Write the recursive-descent subprogram in Java or C++ for this rule. (6)
12. (a) Analyse and write a comparison of using C++ pointers and Java reference variables to refer to fixed heap-dynamic variables. Use safety and convenience as the primary considerations in the comparison. (13)
- OR
- (b) Describe three specific programming situations that require a posttest loop. (13)
13. (a) Write short note on :
 (i) Generic methods in java (7)
 (ii) Coroutines (6)
- OR

- (b) Show the stack with all activation record instances, including static and dynamic chains, when execution reaches position 1 in the following skeletal program. Assume Bigsub is at level 1. (13)
- Procedure Bigsub is
 Procedure A is
 Procedure B is
 begin -- of B
 ...1
 end; -- of B
 procedure C is
 begin -- of C
 ...
 B;
 ...
 end; -- of C
 begin -- of A
 ...
 C;
 ...
 end; -- of A
 begin -- of Bigsub
 ...
 A;
 ...
 end; -- of Bigsub
14. (a) (i) Discuss the various design issues for object oriented programming languages. (8)
 (ii) A reference variables can be defined for an abstract class ? Explain. (5)
- OR
- (b) Explain the cooperation synchronization using shared buffer for implementing producer and consumer problem. (13)