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

Time: 3 Hours *Total Marks: 70*

Note: 1. Attempt all Sections.

SECTION A

1. Attempt *all* questions in brief. **2 x 7 = 14**

a. Differentiate between Error and Exception.
b. Define Class and Object briefly.
c. Enlist the different times at which Binding can take place.
d. Describe Aliasing for Data Objects with an example.
e. Differentiate between Widening and Narrowing conversion.
f. Define co-routines.
g. Write a function in ML to find the maximum of two numbers.

SECTION B

2. Attempt any *three* of the following: **7 x 3 = 21**

a. Describe basic syntactic elements of a language.
b. List and describe the various mechanisms for storage representation of Structured Data types. Also describe the various specifications of Structures Data types.
c. Describe Overloaded Methods and Generic Method in detail along with the examples.
d. Discuss about Semaphores and Monitors.
e. Describe facts and rules in Prolog with examples. Write a program that describes relationships of the members in a family.

SECTION C

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

(a) Explain the various programming language paradigms.
(b) Describe the structure or the different phases of a compiler.

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

(a) Using suitable examples, illustrate the difference between:
1) Static and Dynamic Type Checking
2) Implicit and Explicit Type Conversion
(b) How a pointer can be useful for programmers. Also define Dangling pointer and void pointer with examples.

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

(a) Illustrate the different parameter passing techniques along with the example of each technique. Using an example, show the difference between call by reference and call by Value-result.

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(b) Describe Associations and Referencing Environment. Explain the different components of Referencing Environment. With respect to the given program, write down the Referencing Environment for S1 and main.

```
program main;
var A, B, C: real;
procedure S1(A : real);
var D: real;
begin
-Statements
-Statements
end;
begin
-Statements
S1(A);
-Statements
end;
```

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

(a) Define Abstract classes and Abstract methods with example. Differentiate between Abstraction and Encapsulation.

(b) Describe Inheritance and its types with suitable examples of each type.

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

(a) Describe Functional Programming languages. Write a recursive function in SML to find the sum of digits of a number.

(b) Explain Lambda Calculus. Explain the different reductions possible for evaluating a lambda calculus. Reduce (λ f. λ x. f (f x)) (λ y. y+1) to its normal form.

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