(3 Hours)   **(Total Marks: 80)**

N.B.: 1. Question No.1 is compulsory.
       2. Answer any three out of remaining questions.
       3. Assume suitable data if necessary.
       4. Figures to the right indicate full marks.

Q1. a) What are the different programming paradigms?   **(05)**
     b) What are the different problem domains of scripting languages?   **(05)**
     c) Explain List comprehension in Haskell with suitable examples.   **(05)**
     d) Explain function overloading as one of the types of Polymorphism with a suitable   **(05)**
       example code.

Q2. a) What is exception handling? What is the difference between checked and unchecked exceptions?
       Explain with suitable example.   **(10)**
     b) Write a Haskell function to find factorial of a number using   **(10)**
         i. Recursion with pattern matching
         ii. If then else and Recursion
         iii. Gated Expressions and Recursion

Q3. a) What are the parameter passing methods? Explain each with suitable example.   **(10)**
     b) What is the need of synchronization in multi-threading? Write a Java program to explain how
       multiple threads are executed simultaneously   **(10)**

Q4. a) What is type checking? Also explain the difference between type equality, compatibility and   **(10)**
       Inference.
     b) Represent following statements in prolog   **(10)**
         i. Ram studies in SE class.
         ii. Shyam studies in SE classmate.
         iii. Students who study in same class are called classmates.
         iv. Find out if Ram and Shyam are classmates.
         v. Find out who is classmate of Ram.
     Mention which of the above are facts, rules and queries.

Q5. a) Explain different storage allocation mechanisms.   **(10)**
     b) Explain Type and Type classes in Haskell.   **(10)**

Q6.   Short note on: **(Any 4)**   **(20)**

     a) Lambda Calculus
     b) Message passing
     c) Database manipulation in prolog
     d) Types of Inheritance in OOP
     e) Innovative features of scripting languages