JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

B.Tech.-II SEMESTER | T1 EXAM - FEBRUARY 2026

COURSE CODE (CREDITS): 25B11CI211 (4) MAX. MARKS: 15

COURSE NAME: Software Development Fundamentals - II (SDF-II) MAX. TIME: 1 Hour

COURSE INSTRUCTORS: A. Kumar, D. Gupta (Coord.), F. Firdous, N. Singla, and P. Aar

***Note:** 1) All questions are compulsory. Marks and COs for each question are indicated. 2) **Answer the questions in the given order.** 3) **Be concise and write neatly.** 4) Use of calculators is not allowed.*

| Q. No. | Question | CO | Marks |
|---|---|---|---|
| Q. 1 | Differentiate procedural programming and object-oriented programming with respect to data organization, modularity, abstraction, encapsulation and access control (data hiding), reusability, and overall program structure. Present the comparison in a clear tabular form, and justify which paradigm is more suitable for developing large-scale software systems. | 1 | 3 |
| Q. 2 | Design and implement a class Student that stores roll number and marks using dynamic memory allocation. Initialize the data members through a constructor with suitable default arguments. Provide a member function display() to display details, and overload the update() function to modify marks both with and without grace marks. Include a destructor to properly deallocate memory. Demonstrate the working with a simple C++ program. | 2 | 3 |
| Q. 3 | Explain the purpose of static data members and friend functions in C++. Then design and implement a class BankAccount that maintains a static interest rate common to all accounts and uses a friend function to compute and compare the final balances of two account holders after applying interest. | 1 | 3 |
| Q. 4 | Design a class Train containing train number and available seat count. Overload the stream extraction (>>) and insertion (<<) operators to support input and output using cin and cout. Illustrate how returning the stream reference enables operator chaining to read or display multiple objects in a single statement. | 1 | 3 |
| Q. 5 | Certain C++ constructs, although useful, may adversely affect program design, maintainability, performance, or memory safety when misused. State the single most significant limitation of each of the following constructs.<br>(a) Header file inclusion using #include<br>(b) Inline functions<br>(c) References<br>(d) Function overloading<br>(e) Macros (#define)<br>(f) Dynamic memory management using new and delete | 1 | 3 |