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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
T-II EXAMINATION- OCTOBER, 2019
B. Tech III Semester

COURSE CODE: 18B11CI311   MAX. MARKS: 25
COURSE NAME: Object Oriented Systems and Programming
COURSE CREDITS: 3   MAX. TIME: 1.5 Hours

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.

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1. *[5 Marks; CO3]* Define a **CompactDisc** class that contains data members as *title, writer* and *price*. Define appropriate member functions as follows:-

   • Define '+' operator such that it will increment the price of the **CompactDisc** by the percent of the amount entered

   • Define both prefix and postfix version of ' - - ' operator such that the prefix version reduced the *price* of the **CompactDisc** by 10% from its of previous while the postfix reduces the *price* by 20%

   • Define '= =' operator such that it checks if two books are of same *writer* and of same *price*. Also overload '= =' operator to check if the *price* of the **CompactDisc** is equal to or within +- 10% of the value entered.

2. *[4 Marks; CO3]* Define a class Staff with its members as: *staffpid, staffname, age,* and *salary*. Perform the following using the concepts of file handling.
   a. Write multiple objects into the file (say "staff.txt")
   b. Read all the records from the file staff.txt.
   c. Modify the salary of the staff by searching his/her identity.

3. *[2+2 Marks; CO4]* Answer the following questions:
   A. What is an Abstract Base Class (ABC)? Explain its significance in implementing polymorphism.
   B. Can *new* and *delete* operator be overloaded in C++? If yes, justify the answer with suitable examples.

4. *[4 Marks; CO4]* What is difference between function template and template function? Define a class template '*Stack*' that has member functions to push and pop the elements. Test this class for *int, float,* and *Complex* type. (*Complex* is a class with data members: real and imaginary).

5. *[4 Marks; CO5]* Write a program in Java that demonstrates handling of exceptions in inheritance tree. For example, create a base class called "**Father**" and derived class called "**Son**" which extends the base class. In Father class, implement a constructor which takes the *age* and throws the exception *WrongAge()* where the input age <0. In **Son** class, implement a constructor that uses both father and son's age and throws an exception if son's age is >= father's age.

6. *[4 Marks; CO5]* Define a class Person in the package MyPackage. The class has data members as: name, age, address and Methods to enter the data through keyboard and display them. Make use of overloaded constructors in the class. Now, import the above class and inherit the class Employee from this. The sub-class should have overloaded functions and also call to the base class constructors. In the main class, define a database of 5 objects and display them.