Course Code	**:**	**BCSL-032**
Title	**:**	**C++ Programming Lab**
Assignment Number	**:**	**BCA (III)/L-032/Assignment/2026-27**
Maximum Marks	**:**	**50**
Weightage	**:**	**25%**
Last date of Submission	**:**	**31st October, 2026 (for July 2026 Session)**
	:	**30th April, 2027 (for January 2027 Session)**

This assignment has two questions. Answer both the questions. These questions carry 40 marks. Rest 10 marks are for viva-voce. Write C++ program and take its output as part of solution. Please go through the guidelines regarding the assignments given in the programme guide for the format of presentation.

Q1: **(20 Marks)**

Write a C++ program to create a class Employee with data members empId, name, basicSalary, and department. Include member functions to:

- Input details for an array of 5 employees
- Calculate gross salary (basic salary + 20% HRA + 10% DA)
- Display all employee details in tabular format, sorted by gross salary in descending order

Use appropriate constructors to initialize objects and demonstrate the use of both default and parameterized constructors in your program. Make assumptions, if necessary.

Q2: **(20 Marks)**

Write a C++ program that demonstrates the use of inheritance and polymorphism by creating a base class Shape with a virtual function area(). Derive three classes, namely, Circle, Rectangle, and Triangle from Shape, each overriding the area() function to calculate and return the respective area.

Your program should:

- Use an array of base class pointers to store objects of the derived classes
- Call the area() function through the base class pointer to demonstrate runtime polymorphism
- Display the area of each shape with appropriate labels

Q1: (20 Marks)

Write a C++ program to create a class Employee with data members empId, name, basicSalary, and department. Include member functions to:

• Input details for an array of 5 employees

• Calculate gross salary (basic salary + 20% HRA + 10% DA)

• Display all employee details in tabular format, sorted by gross salary in descending order

Use appropriate constructors to initialize objects and demonstrate the use of both default and parameterized constructors in your program. Make assumptions, if necessary.

Answer

The program uses an **Employee** class to hold each employee's ID, name, basic salary and department. An array of five objects stores the records. When this array is declared, the **default constructor** initializes all five objects with empty or zero values. Each object then calls its **input()** function to read one employee's details.

Inside **input()**, a temporary object is made using the **parameterized constructor** and assigned to the current array element. This demonstrates both constructor types while allowing details of all five employees to be entered. The **grossSalary()** function calculates HRA as 20% of basic salary and DA as 10%. Hence, gross salary is basic salary + HRA + DA, or 1.30 times the basic salary.

The program applies **stable_sort()** with a comparison function that places a higher gross salary first. It then prints the employee ID, name, department, basic salary and gross salary in aligned columns. For the example run, five sample employee records have been used. The salary figures are monthly amounts and no deductions are included, since the question specifies only HRA and DA.

C++ Program

```
#include <iostream>
#include <iomanip>
#include <string>
#include <limits>
#include <algorithm>
using namespace std;

class Employee {
private:
    int empId;
    string name;
```