# 5 years Integrated M.Sc (IT): 2nd Semester

## Practical Problem and Assessment Policy

## 060010203: Object Oriented Programming

| Group Allocation For Practical Journal | | | |
|---|---|---|---|
| | **Set A** | **Set B** | **Set C** |
| **Div- A** | 201306100110001 | 201306100110002 | 201306100110006 |
| | 201306100110008 | 201306100110009 | 201306100110011 |
| | 201306100110012 | 201306100110013 | 201306100110016 |
| | 201306100110017 | 201306100110018 | 201306100110019 |
| | 201306100110021 | 201306100110022 | 201306100110024 |
| | 201306100110028 | 201306100110033 | 201306100110036 |
| | 201306100110037 | 201306100110038 | 201306100110039 |
| | 201306100110043 | 201306100110044 | 201306100110045 |
| | 201306100110046 | 201306100110052 | 201306100110053 |
| | 201306100110054 | 201306100110057 | 201306100110058 |
| | 201306100110059 | 201306100110061 | 201306100110064 |
| | 201306100110068 | 201306100110069 | 201306100110072 |
| | 201306100110073 | 201306100110078 | 201306100110081 |
| | 201306100110083 | 201306100110084 | 201306100110085 |
| | 201306100110087 | 201306100110089 | 201306100110092 |
| | 201306100110093 | 201306100110099 | 201306100110100 |
| | 201306100110103 | 201306100110107 | 201306100110108 |
| | 201306100110110 | 201306100110114 | 201306100110115 |
| | 201306100110116 | 201306100110128 | 201306100110129 |
| | 201306100110133 | 201306100110134 | 201306100110136 |
| | 201306100110138 | 201306100110140 | 201306100110141 |
| | 201306100110143 | 201306100110145 | 201306100110147 |
| | **Set D** | **Set E** | **Set F** |
| **Div- B** | 201306100110004 | 201306100110003 | 201306100110005 |
| | 201306100110010 | 201306100110007 | 201306100110014 |
| | 201306100110020 | 201306100110015 | 201306100110025 |
| | 201306100110027 | 201306100110026 | 201306100110029 |
| | 201306100110031 | 201306100110030 | 201306100110032 |
| | 201306100110035 | 201306100110034 | 201306100110040 |
| | 201306100110042 | 201306100110041 | 201306100110047 |
| | 201306100110050 | 201306100110049 | 201306100110051 |
| | 201306100110062 | 201306100110060 | 201306100110063 |
| | 201306100110066 | 201306100110065 | 201306100110067 |
| | 201306100110071 | 201306100110070 | 201306100110076 |
| | 201306100110090 | 201306100110086 | 201306100110091 |

# 5 years Integrated M.Sc (IT): 2nd Semester

## Practical Problem and Assessment Policy

## 060010203: Object Oriented Programming

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|---|---|---|---|
| | 201306100110096 | 201306100110094 | 201306100110097 |
| | 201306100110102 | 201306100110101 | 201306100110104 |
| | 201306100110106 | 201306100110105 | 201306100110109 |
| | 201306100110113 | 201306100110112 | 201306100110117 |
| | 201306100110119 | 201306100110118 | 201306100110120 |
| | 201306100110122 | 201306100110121 | 201306100110123 |
| | 201306100110126 | 201306100110125 | 201306100110127 |
| | 201306100110131 | 201306100110130 | 201306100110132 |
| | 201306100110137 | 201306100110135 | 201306100110139 |
| | 201306100110144 | 201306100110142 | 201306100110146 |
| | | 201306100110148 | |

# 5 years Integrated M.Sc (IT): 2nd Semester
## Practical Problem and Assessment Policy
## 060010203: Object Oriented Programming

| **Practical No.** 1 | **Enrollment No.** | **Group :** A |
|---|---|---|
| **Practical Problem** | Write a program to display the following output using single cout statement. (No need to take any input from user.)<br>Maths = 90<br>Physics = 77<br>Chemistry = 69 | |
| **Objective(s)** | Want to make students familiar with C++ environment and with cin and cout statements. | |
| **Pre-requisite** | Usage of cout and cin objects. | |
| **Duration for completion** | 1 Hour | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between cout and printf statements.<br>2. How one can take input from user in C++ ?<br>3. What changes should be made in the logic so that the same program generates the same output in a single line?<br>4. Which error shall be raised if we use printf statements instead of cout? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester
## Practical Problem and Assessment Policy
## 060010203: Object Oriented Programming

| | | |
|---|---|---|
| **Practical No.** 2 | **Enrollment No.** | **Group :** A |
| **Practical Problem** | Write a program to take input of Principal Amount, Rate Of Interest and Time in years from the user. Calculate Simple Interest, Compound Interest and display it on the screen. | |
| **Objective(s)** | Want to make students familiar with C++ environment and with cin and cout statements. | |
| **Pre-requisite** | Usage of cout and cin objects. | |
| **Duration for completion** | 1 Hour | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between cin and scanf statements.<br>2. How one can take input from user in C++?<br>3. What changes should be made in the logic so that the same program takes the input from the user using a single line of code?<br>4. Which error shall be raised if we use scanf statements instead of cin? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester
## Practical Problem and Assessment Policy
## 060010203: Object Oriented Programming

| | | |
|---|---|---|
| **Practical No**. 3 | **Enrollment No.** | **Group :** A |
| **Practical Problem** | Write a program to read two numbers as input from the keyboard and display the larger number on the screen. | |
| **Objective(s)** | Clear the concept of conditional statements and loops. | |
| **Pre-requisite** | Usage of cout,cin, different looping constructs and conditional statements. | |
| **Duration for completion** | 1 Hour | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Apart from If condition statements, which statements can we use to solve this problem?<br>2. How one can compare two integers in C++?<br>3. What changes should be made in the logic so that the same program checks the larger number from the given three integer values?<br>4. Which error shall be raised if we write condition as follow? if(int x=10 && int y=20) | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester

## Practical Problem and Assessment Policy

## 060010203: Object Oriented Programming

| **Practical No**. 4 | **Enrollment No.** | **Group :** A |
|---|---|---|
| **Practical Problem** | Write a program to print the following output using **for** loop.<br><br>1<br>22<br>333<br>4444<br>55555<br>…… | |
| **Objective(s)** | Clear the concept of conditional statements and loops. | |
| **Pre-requisite** | Usage of cout,cin, different looping constructs and conditional statements. | |
| **Duration for completion** | 1 Hour | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between for and do..while() loop constructs.<br>2. How one can develop the same program without using for construct?<br>3. What changes should be made in the logic so that the same program prints the same pattern but in descending order as follow?<br>5<br>44<br>333<br>2222<br>11111<br>4. Which error shall be raised if we don't provide any condition in for loop construct? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester
## Practical Problem and Assessment Policy
## 060010203: Object Oriented Programming

| | | |
|---|---|---|
| **Practical No.** 5 | **Enrollment No.** | **Group :** A |
| **Practical Problem** | Write a program to define a class called Cone and find its area and volume. The area and volume of cone are evaluated using the formula shown below:<br>a. Slant height = sqrt($r^2 + h^2$)<br>b. Volume = 1/3 pi*$r^2$*h<br>c. Note: value of radius and height should be taken from user. | |
| **Objective(s)** | Clear the concept of Class and Objects. | |
| **Pre-requisite** | Usage of cout,cin, different looping constructs and conditional statements along with struct, class and object. | |
| **Duration for completion** | 2 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between structure and class<br>2. How one can execute the same program without creating object?<br>3. What changes should be made in the logic so that program will calculates slant height at the time of object creation?<br>4. Which error shall be raised if we don't provide semicolon (;) at the end of class? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester

## Practical Problem and Assessment Policy

## 060010203: Object Oriented Programming

| **Practical No.** 6 | **Enrollment No.** | **Group :** A |
|---|---|---|
| **Practical Problem** | Define a class baby with the following attributes.<br>a. Name<br>b. Date of Birth<br>c. Date on which bcg injection has to be given(60 days from date of birth)<br>d. Date on which polio drops to be given.(45 days from date of birth)<br>Write a constructor to construct the baby object. The constructor must find out bcg and polio drops dates from the date of birth. In the main function define a baby and display its details. | |
| **Objective(s)** | Clear the concept of Class and Objects. | |
| **Pre-requisite** | Usage of cout,cin, different looping constructs and conditional statements along with struct, class and object. | |
| **Duration for completion** | 2 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between constructor and destructor.<br>2. How one can print “Bye Bye Baby” message when program execution gets terminate?<br>3. What changes should be made in the logic so data should not be accessible outside the class?<br>4. Which error shall be raised if we don’t provide any access modifier to any data member and we try to call that member from main function using object? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester
## Practical Problem and Assessment Policy
## 060010203: Object Oriented Programming

| | | |
|---|---|---|
| **Practical No.** 7 | **Enrollment No.** | **Group :** A |
| **Practical Problem** | Write a function that creates a vector of user-given size **M** using **new** operator. | |
| **Objective(s)** | Clear the concept of new and delete operators. | |
| **Pre-requisite** | Usage of cout,cin, different looping constructs and conditional statements along with class & object. | |
| **Duration for completion** | 1 Hour | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between new and constructor.<br>2. How one can free the resources which have been allocated during the program execution?<br>3. What changes should be made in the logic so we can allocate memory without using new operator?<br>4. What will happen if we don't free the resources that have been allocated during the program execution? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester

## Practical Problem and Assessment Policy

## 060010203: Object Oriented Programming

| **Practical No.** 8 | **Enrollment No.** | **Group :** A |
|---|---|---|
| **Practical Problem** | Define a class Park with attributes length, breadth and area. Define a suitable constructor and method to display the object. | |
| **Objective(s)** | Clear the concept of member functions and how to handle functions with object. | |
| **Pre-requisite** | Usage of class, object and member function. | |
| **Duration for completion** | 2 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between constructor and member method.<br>2. How one can set the initial value of all data members of class?<br>3. What changes should be made in the logic so that initial values will get printed at the time of object creation?<br>4. Which error shall be raised if we don't provide constructor name same as class name? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester
## Practical Problem and Assessment Policy
## 060010203: Object Oriented Programming

| **Practical No.** 9 | **Enrollment No.** | **Group :** A |
|---|---|---|
| **Practical Problem** | Define a class Room with attributes<br>a. Length<br>b. Breadth<br>c. Height<br>d. Floor area<br>e. Wall area<br>f. No of fans<br>g. No of windows<br>h. No of doors<br>Define a suitable constructor and method to display the details of a room. Assume that 20% of the total wall area is occupied by doors and windows. | |
| **Objective(s)** | Clear the concept of member functions and how to handle functions with object. | |
| **Pre-requisite** | Usage of class, object and member function. | |
| **Duration for completion** | 2 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between object and constructor.<br>2. How one can access the private data of class?<br>3. What changes should be made in the logic so that initial values of one object will get assign to another object?<br>4. Which error shall be raised if we don't provide destructor name same as class name? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester

## Practical Problem and Assessment Policy

## 060010203: Object Oriented Programming

| **Practical No**. 10 | **Enrollment No.** | **Group :** A |
|---|---|---|
| **Practical Problem** | Create two classes TC and TF which store the value of temperature. TC stores temperature in Celsius and TF in Fahrenheit. Write a program that can read values for the class objects and add one object of TC with another object of TF.<br>Use a friend function to carry out the addition operation. The object that stores the results may be a TC object or TF Object, depending on the units in which the result is required.<br>The display should be in the format of Celsius or Fahrenheit depending on the object on display | |
| **Objective(s)** | Clear the concept of friend function | |
| **Pre-requisite** | Usage of class, object and member function. | |
| **Duration for completion** | 2 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between virtual function and friend function?<br>2. How one can one set the default value to the function parameter?<br>3. What changes should be made in the logic so that we can carry out subtraction operation?<br>4. Which error shall be raised if we don't provide forward declaration of class when we are implementing concept of Friend function? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester

## Practical Problem and Assessment Policy

## 060010203: Object Oriented Programming

| **Practical No**. 11 | **Enrollment No.** | **Group :** A |
|---|---|---|
| **Practical Problem** | Write a menu driven program that can perform the following functions on strings. (Use overloaded operators where possible). (Do not use predefined string class )<br>a. Compare two strings for equality (== operator)<br>b. Check whether first string is smaller than the second (<= operator) | |
| **Objective(s)** | Clear the concept of operator overloading. | |
| **Pre-requisite** | Usage of class, object and member function. | |
| **Duration for completion** | 1 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors.<br>3. To understand the concept of polymorphism and implement static (compile time) polymorphism in programs by overloading operators. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between function overloading and operator function?<br>2. How one can overload (: :) operator?<br>3. What changes should be made in the logic so that we can concatenate two strings?<br>4. Which error shall be raised if we don't overload operator function to concatenate two strings? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester

## Practical Problem and Assessment Policy

## 060010203: Object Oriented Programming

| **Practical No**. 12 | **Enrollment No.** | **Group :** A |
|---|---|---|
| **Practical Problem** | Write a program to create a class called Float. Display the addition of two Float objects. | |
| **Objective(s)** | Clear the concept of operator overloading. | |
| **Pre-requisite** | Usage of class, object and member function. | |
| **Duration for completion** | 1 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors.<br>3. To understand the concept of polymorphism and implement static (compile time) polymorphism in programs by overloading operators. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between operator function and cast operator function?<br>2. How one can overload (->) operator?<br>3. What changes should be made in the logic so that we can divide two Float objects?<br>4. Which error shall be raised if we don't provide return type in operator function? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester

## Practical Problem and Assessment Policy

## 060010203: Object Oriented Programming

| **Practical No**. 13 | **Enrollment No.** | **Group :** A |
|---|---|---|
| **Practical Problem** | Write a tree class to represent the trees in a farm. A Tree has the following attributes:<br>a.) Tree Code b.)Height c.)Base Width<br>Write a method annualUpdate(), which updates the height, base width and the amount spent so far on this tree.<br>Define a Mango class which is a derived class of Tree class. In addition to the attributes of a Tree, the mango class has yield attribute. Override the displayTree() and annualUpdate() methods suitably.<br>A Garden has two trees and two Mango trees. Define a class called Garden and create these trees and display them. | |
| **Objective(s)** | Clear the concept of Inheritance. | |
| **Pre-requisite** | Usage of class, object and member function, function overriding, access modifiers. | |
| **Duration for completion** | 2 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors.<br>3. To understand the concept of polymorphism and implement static (compile time) polymorphism in programs by overloading operators.<br>4. To understand and implement the concept of inheritance and overriding functions. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between multiple inheritance and multilevel inheritance?<br>2. How one can inherit tree class by private accessibility?<br>3. What changes should be made in the logic so that mango class cannot use attributes and methods of Tree class?<br>4. Which error shall be raised if we don't provide access modifiers for inheritance? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester

## Practical Problem and Assessment Policy

## 060010203: Object Oriented Programming

| **Practical No**. 14 | **Enrollment No.** | **Group :** A |
|---|---|---|
| **Practical Problem** | Create a base class called shape. Use this class to store two double type values that could be use to compute the area of figures. Derive two specific classes called triangle and rectangle from the base shape. Add get_data() member function to the base class to compute and display the area of figure. Make display_area() as a virtual function and redefine this function in the derived classes to suit their requirements.<br>Using these classes design a program that will accept dimensions of the triangle or a rectangle interactivly and display the area. | |
| **Objective(s)** | Clear the concept of Virtual Function. | |
| **Pre-requisite** | Usage of class, object and member function, function overriding, access modifiers and inheritance. | |
| **Duration for completion** | 1 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors.<br>3. To understand the concept of polymorphism and implement static (compile time) polymorphism in programs by overloading operators.<br>4. To understand and implement the concept of inheritance and overriding functions.<br>5. To understand concept of dynamic polymorphism using virtual functions, overriding functions and abstract class. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between virtual function and pure virtual function?<br>2. How one can access the current copy of base class by calling function using derive class object?<br>3. What changes should be made in the logic so that display_area() method can calculate area of circle?<br>4. Which error shall be raised if we don't provide virtual keyword to create pure virtual function? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Marks Secured** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester

## Practical Problem and Assessment Policy

## 060010203: Object Oriented Programming

| **Practical No**. 15 | **Enrollment No.** | **Group :** A |
|---|---|---|
| **Practical Problem** | Write a program which reads a text from keyboard and displays the following information on the screen in two columns:<br>**a.)** Number of lines. **b.)** Number of words.<br>**c.)** Number of characters. **d.)** String should be left – justified and the numbers should be right – justified in a suitable field width. | |
| **Objective(s)** | Learn how to format output using i/o functions. | |
| **Pre-requisite** | Usage of class, object and member function, function overriding, access modifiers, inheritance and formatting function and header files. | |
| **Duration for completion** | 1 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors.<br>3. To understand the concept of polymorphism and implement static (compile time) polymorphism in programs by overloading operators.<br>4. To understand and implement the concept of inheritance and overriding functions.<br>5. To understand concept of dynamic polymorphism using virtual functions, overriding functions and abstract class.<br>6. To understand I/O operations and hierarchy of File Stream classes and able to develop programs to perform File and I/O operations. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between get() and put() function of istream and ostream.<br>2. How do the I/O facilities in C++ differ from that in C?<br>3. What changes should be made in the logic so that we can calculate how many consonant are there in input?<br>4. Which error shall be raised if we don't provide iomanip header file in this program? | |

**Assessment**

| | **Solution achieves the desired bjective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Marks Secured** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester

## Practical Problem and Assessment Policy

## 060010203: Object Oriented Programming

| **Practical No**. 16 | **Enrollment No.** | **Group :** A |
|---|---|---|
| **Practical Problem** | Create on Employee class which is inherited by FileHandle class. Using FileHandle class store the information about employees in sorted order of their employee numbers in the file. Read an employee number from the keyboard and display the corresponding employee details. | |
| **Objective(s)** | Clear the concepts of handling file in C++ | |
| **Pre-requisite** | Usage of class, object and member function, function overriding, access modifiers, inheritance and formatting function and header files, file classes for I/O in file. | |
| **Duration for completion** | 1 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors.<br>3. To understand the concept of polymorphism and implement static (compile time) polymorphism in programs by overloading operators.<br>4. To understand and implement the concept of inheritance and overriding functions.<br>5. To understand concept of dynamic polymorphism using virtual functions, overriding functions and abstract class.<br>6. To understand I/O operations and hierarchy of File Stream classes and able to develop programs to perform File and I/O operations. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between ostraem and ofstream?<br>2. How one can create a new file usinf program?<br>3. What changes should be made in the logic so that if file already exists, it should delete all content of that file at the time of file creation?<br>4. Which header file we need to include for file handling? | |

**Assessment**

| | **Solution achieves the desired bjective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Marks Secured** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester
## Practical Problem and Assessment Policy
## 060010203: Object Oriented Programming

| | | |
|---|---|---|
| **Practical No.** 1 | **Enrollment No.** | **Group :** B |
| **Practical Problem** | Write a program to read the values of a, b and c from the user and display the value of x, where, **x = a / b – c**<br>Test your program for the following values:<br>a. a=250, b=85, c= 25<br>b. A=300, b=70, c=70 | |
| **Objective(s)** | Want to make students familiar with C++ environment and with cin and cout statements. | |
| **Pre-requisite** | Usage of cout and cin objects. | |
| **Duration for completion** | 1 Hour | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 2. To understand the basic terminology of object oriented programming. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 5. Give two points of differences between cout and printf statements.<br>6. How one can take input from user in C++?<br>7. What changes should be made in the logic so that the value of x always returns positive value?<br>8. Which error shall be raised if we use printf statements instead of cout? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester
## Practical Problem and Assessment Policy
## 060010203: Object Oriented Programming

| | | |
|---|---|---|
| **Practical No.** 2 | **Enrollment No.** | **Group :** B |
| **Practical Problem** | Write a program to take input of number. If the number is even, print its square value , otherwise print its cube value. | |
| **Objective(s)** | Want to make students familiar with C++ environment and with cin and cout statements. | |
| **Pre-requisite** | Usage of cout and cin objects. | |
| **Duration for completion** | 1 Hour | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 2. To understand the basic terminology of object oriented programming. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between cin and scanf statements.<br>2. How one can take input from user in C++?<br>3. What changes should be made in the logic so that the displays forth root value if number is even else displays number with message “odd number”.<br>4. Which error shall be raised if we use scanf statements instead of cin? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester
## Practical Problem and Assessment Policy
## 060010203: Object Oriented Programming

| | | |
|---|---|---|
| **Practical No**. 3 | **Enrollment No.** | **Group :** B |
| **Practical Problem** | Write a program to take input of an integer value from keyboard and display on the screen "WELL DONE" that many times. | |
| **Objective(s)** | Clear the concept of conditional statements and loops. | |
| **Pre-requisite** | Usage of cout,cin, different looping constructs and conditional statements. | |
| **Duration for completion** | 1 Hour | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 2. To understand the basic terminology of object oriented programming. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Apart from for looping construct, which looping construct can we use to solve this problem?<br>2. What is difference between do…while and while looping contructs?<br>3. What changes should be made in the logic so that it prints "WELLDONE" one times less than inputed number?<br>4. Which output shall be displayed if we write cout as follow? Cout<<"WELLDONE i ", where i is inputed value. | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester
## Practical Problem and Assessment Policy
## 060010203: Object Oriented Programming

| | | |
|---|---|---|
| **Practical No**. 4 | **Enrollment No.** | **Group :** B |
| **Practical Problem** | Write a program to generate n lines of the following pattern on the computer screen:<br>1<br>121<br>12321<br>1234321 | |
| **Objective(s)** | Clear the concept of conditional statements and loops. | |
| **Pre-requisite** | Usage of cout,cin, different looping constructs and conditional statements. | |
| **Duration for completion** | 1 Hour | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 2. To understand the basic terminology of object oriented programming. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between for and do..while() loop constructs.<br>2. How one can develop the same program without using for construct?<br>3. What changes should be made in the logic so that the same program prints the same pattern as follow?<br>*<br>* *<br>* * *<br>* * * *<br>4. Which error shall be raised if we don't provide any condition in for loop construct? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester
## Practical Problem and Assessment Policy
## 060010203: Object Oriented Programming

| **Practical No.** 5 | **Enrollment No.** | **Group :** B |
|---|---|---|
| **Practical Problem** | Write a program to input the radius of a circle and find its area, diameter and circumference using class called Radius. The class Radius will have following attributes and methods<br>a. radius<br>b. pi =3.14<br>c. calculateArea()<br>d. calculateDiameter()<br>e. calculateCircumference() | |
| **Objective(s)** | Clear the concept of Class and Objects. | |
| **Pre-requisite** | Usage of cout,cin, different looping constructs and conditional statements along with struct, class and object. | |
| **Duration for completion** | 2 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between structure and class<br>2. How one can execute the same program without creating object?<br>3. What changes should be made in the logic so that program will calculates area of circle at the time of object creation?<br>4. Which error shall be raised if we don't provide semicolon (;) at the end of class? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester
## Practical Problem and Assessment Policy
## 060010203: Object Oriented Programming

| | | |
|---|---|---|
| **Practical No.** 6 | **Enrollment No.** | **Group :** B |
| **Practical Problem** | Write a program that will ask for a measurement in Feet and display it in Inches using a class called measurement and member functions. | |
| **Objective(s)** | Clear the concept of Class and Objects. | |
| **Pre-requisite** | Usage of cout,cin, different looping constructs and conditional statements along with struct, class and object. | |
| **Duration for completion** | 2 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between constructor and destructor.<br>2. How one can print "Bye Bye" message when program execution gets terminate?<br>3. What changes should be made in the logic so data should not be accessible outside the class?<br>4. Which error shall be raised if we don't provide any access modifier to any data member and we try to call that member from main function using object? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester
## Practical Problem and Assessment Policy
## 060010203: Object Oriented Programming

| | | |
|---|---|---|
| **Practical No.** 7 | **Enrollment No.** | **Group :** B |
| **Practical Problem** | A book shop maintains the inventory of books that are been sold at the shop. The list includes the details such as Author, Title, Price, Publisher & Stock position. Whenever a customer wants a book, the sales person inputs the title and author and the system searches the list & display whether it is available or not. If it is not, an appropriate message is displayed. If it is, then the system displays the book detail and request for the number of copies required. If the requested copies are available, the total cost of the requested copies is displayed; otherwise the message "\|Required copies not in stock" is displayed. Design a system using a class called **books** with suitable member functions & constructors. Use **new** operator in constructors to allocate memory space required. | |
| **Objective(s)** | Clear the concept of new and delete operators. | |
| **Pre-requisite** | Usage of cout,cin, different looping constructs and conditional statements along with class & object. | |
| **Duration for completion** | 1 Hour | |
| **PEO(s) to be achieved** | <PEO no. and description> | |
| **PO(s) to be achieved** | <PO no. and description> | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between new and constructor.<br>2. How one can free the resources which have been allocated during the program execution?<br>3. What changes should be made in the logic so we can allocate memory without using new operator?<br>4. Which will happen if we don't free the resources that have been allocated during the program execution? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester

## Practical Problem and Assessment Policy

## 060010203: Object Oriented Programming

| **Practical No.** 8 | **Enrollment No.** | **Group :** B |
|---|---|---|
| **Practical Problem** | Define a class to represent a bank account. Include the following members:<br>Data members<br>a. Name of the depositor<br>b. Account number<br>c. Type of Account<br>d. Balance amount in the account<br>Member functions<br>a. To assign initial values<br>b. To deposit an amount<br>c. To withdraw an amount after checking the balance<br>d. To display name and balance<br>Write a main program to test the program | |
| **Objective(s)** | Clear the concept of member functions and how to handle functions with object. | |
| **Pre-requisite** | Usage of class, object and member function. | |
| **Duration for completion** | 2 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between constructor and member method.<br>2. How one can set the initial value of all data members of class?<br>3. What changes should be made in the logic so that initial values will get printed at the time of object creation?<br>4. Which error shall be raised if we don't provide constructor name same as class name? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester
## Practical Problem and Assessment Policy
## 060010203: Object Oriented Programming

| **Practical No.** 9 | **Enrollment No.** | **Group :** B |
|---|---|---|
| **Practical Problem** | Write a class to represent a vector (a series of float value). Include member function to perform the following tasks:<br>To create the vector<br>To modify the value of a given element<br>To multiply by a scalar value<br>To display the vector in the form (10, 20,30,....)<br><br>Write a program to test your class | |
| **Objective(s)** | Clear the concept of member functions and how to handle functions with object. | |
| **Pre-requisite** | Usage of class, object and member function. | |
| **Duration for completion** | 2 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between object and constructor.<br>2. How one can access the private data of class?<br>3. What changes should be made in the logic so that initial values of one object will get assign to another object?<br>4. Which error shall be raised if we don't provide destructor name same as class name? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester

## Practical Problem and Assessment Policy

## 060010203: Object Oriented Programming

| **Practical No**. 10 | **Enrollment No.** | **Group :** B |
|---|---|---|
| **Practical Problem** | Create two classes DM and DB which store the value of distance. DM stores distances in meters and centimeter and DB in feet and inches. Write a program that can read values for the class objects and add one object of DM with another object of DB.<br>Use a friend function to carry out the addition operation. The object that stores the results may be a DM object or DB Object, depending on the units in which the result are required.<br>The display should be in the format of feet and inches or meters and centimeters depending on the object on display. | |
| **Objective(s)** | Clear the concept of friend function | |
| **Pre-requisite** | Usage of class, object and member function. | |
| **Duration for completion** | 2 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between virtual function and friend function?<br>2. How one can one set the default value to the function parameter?<br>3. What changes should be made in the logic so that we can carry out subtraction operation?<br>4. Which error shall be raised if we don't provide forward declaration of class when we are implementing concept of Friend function? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester

## Practical Problem and Assessment Policy

## 060010203: Object Oriented Programming

| **Practical No**. 11 | **Enrollment No.** | **Group :** B |
|---|---|---|
| **Practical Problem** | Write a program to overload stream operators for reading or displaying contents of vector class's object as follow<br>c. Cin >> v1; cout << v2 | |
| **Objective(s)** | Clear the concept of operator overloading. | |
| **Pre-requisite** | Usage of class, object and member function. | |
| **Duration for completion** | 1 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors.<br>3. To understand the concept of polymorphism and implement static (compile time) polymorphism in programs by overloading operators. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between function overloading and operator function?<br>2. How one can overload (: :) operator?<br>3. What changes should be made in the logic so that we can add two object of vector?<br>4. Which error shall be raised if we don't overload operator function to add two vector objects? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester

## Practical Problem and Assessment Policy

## 060010203: Object Oriented Programming

| | | |
|---|---|---|
| **Practical No**. 12 | **Enrollment No.** | **Group :** B |
| **Practical Problem** | Create a class index with overloaded prefix and postfix binary operators. | |
| **Objective(s)** | Clear the concept of operator overloading. | |
| **Pre-requisite** | Usage of class, object and member function. | |
| **Duration for completion** | 1 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors.<br>3. To understand the concept of polymorphism and implement static (compile time) polymorphism in programs by overloading operators. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between operator function and cast operator function?<br>2. How one can overload (->) operator?<br>3. What changes should be made in the logic so that we can divide two index objects?<br>4. Which error shall be raised if we don't provide return type in operator function? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester

## Practical Problem and Assessment Policy

## 060010203: Object Oriented Programming

| **Practical No**. 13 | **Enrollment No.** | **Group :** B |
|---|---|---|
| **Practical Problem** | An educational institution wishes to maintain a database of its employees. The database is divided into a number of classes whose hierarchical relationships are shown in Figure. The figure also shows the minimum information required for each class. Specify all the classes and define functions to create the database and retrieve individual as and when required   | |
| **Objective(s)** | Clear the concept of Inheritance. | |
| **Pre-requisite** | Usage of class, object and member function, function overriding, access modifiers. | |
| **Duration for completion** | 2 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors.<br>3. To understand the concept of polymorphism and implement static (compile time) polymorphism in programs by overloading operators.<br>4. To understand and implement the concept of inheritance and overriding functions. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between hybrid inheritance and hierarchical inheritance?<br>2. How one can inherit typist class by private accessibility?<br>3. What changes should be made in the logic so that casual class cannot use attributes and methods of typist class?<br>4. Which error shall be raised if we don't provide access modifiers for inheritance? | |

**Assessment**

| | **achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

| **Practical No**. 14 | **Enrollment No.** | **Group :** B |
|---|---|---|

# 5 years Integrated M.Sc (IT): 2nd Semester

## Practical Problem and Assessment Policy

## 060010203: Object Oriented Programming

| | |
|---|---|
| **Practical Problem** | Create a base class called shape. Use this class to store two double type values that could be use to compute the area of figures. Derive two specific classes called triangle and rectangle from the base shape. Add get_data() member function to the base class to compute and display the area of figure. Make display_area() as a virtual function and redefine this function in the derived classes to suit their requirements.<br>Using these classes design a program that will accept dimensions of the triangle or a rectangle interactivly and display the area. |
| **Objective(s)** | Clear the concept of Virtual Function. |
| **Pre-requisite** | Usage of class, object and member function, function overriding, access modifiers and inheritance. |
| **Duration for completion** | 1 Hours |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors.<br>3. To understand the concept of polymorphism and implement static (compile time) polymorphism in programs by overloading operators.<br>4. To understand and implement the concept of inheritance and overriding functions.<br>5. To understand concept of dynamic polymorphism using virtual functions, overriding functions and abstract class. |
| **Solution must contain** | Program and Output |
| **Nature of submission** | Handwritten |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. |
| **Post Laboratory questions** | 1. Give two points of differences between virtual function and pure virtual function?<br>2. How one can access the current copy of base class by calling function using derive class object?<br>3. What changes should be made in the logic so that display_area() method can calculate area of circle?<br>4. Which error shall be raised if we don't provide virtual keyword to create pure virtual function? |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Marks Secured** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester

## Practical Problem and Assessment Policy

## 060010203: Object Oriented Programming

| **Practical No**. 15 | **Enrollment No.** | **Group :** B |
|---|---|---|
| **Practical Problem** | Write a program to read a list containing item name, item code, and cost interactively and produce a three column output as shown below.<br>NAME CODE COST<br>Turbo C++ 1001 250.95<br>C Primer 905 95.70<br>Note that the name and code are left – justified and the cost is right – justified with a precision of two digits. Trailing zeros are shown. | |
| **Objective(s)** | Learn how to format output using i/o functions. | |
| **Pre-requisite** | Usage of class, object and member function, function overriding, access modifiers, inheritance and formatting function . | |
| **Duration for completion** | 1 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors.<br>3. To understand the concept of polymorphism and implement static (compile time) polymorphism in programs by overloading operators.<br>4. To understand and implement the concept of inheritance and overriding functions.<br>5. To understand concept of dynamic polymorphism using virtual functions, overriding functions and abstract class.<br>6. To understand I/O operations and hierarchy of File Stream classes and able to develop programs to perform File and I/O operations. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between get() and put() function of istream and ostream.<br>2. How do the I/O facilities in C++ differ from that in C?<br>3. What changes should be made in the logic so that we can calculate how many consonant are there in input?<br>4. Which error shall be raised if we don't provide iomanip header file in this program? | |

**Assessment**

| | **Solution achieves the desired bjective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Marks Secured** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester

## Practical Problem and Assessment Policy

## 060010203: Object Oriented Programming

| **Practical No**. 16 | **Enrollment No.** | **Group :** B |
|---|---|---|
| **Practical Problem** | Write a program to delete the 6th line in a file. Do not change the 6th line to a blank line; delete it completely. | |
| **Objective(s)** | Clear the concepts of handling file in C++ | |
| **Pre-requisite** | Usage of class, object and member function, function overriding, access modifiers, inheritance and formatting function and header files, file classes for I/O in file. | |
| **Duration for completion** | 1 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors.<br>3. To understand the concept of polymorphism and implement static (compile time) polymorphism in programs by overloading operators.<br>4. To understand and implement the concept of inheritance and overriding functions.<br>5. To understand concept of dynamic polymorphism using virtual functions, overriding functions and abstract class.<br>6. To understand I/O operations and hierarchy of File Stream classes and able to develop programs to perform File and I/O operations. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between ostraem and ofstream?<br>2. How one can create a new file using program?<br>3. What changes should be made in the logic so that if file already exists, it should delete all content of that file at the time of file creation?<br>4. Which header file we need to include for file handling? | |

**Assessment**

| | **Solution achieves the desired bjective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Marks Secured** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester
## Practical Problem and Assessment Policy
## 060010203: Object Oriented Programming

| | | |
|---|---|---|
| **Practical No.** 1 | **Enrollment No.** | **Group :** C |
| **Practical Problem** | Write a C++ program that will ask for a temperature in Fahrenheit and display it in Celsius. | |
| **Objective(s)** | Want to make students familiar with C++ environment and with cin and cout statements. | |
| **Pre-requisite** | Usage of cout and cin objects. | |
| **Duration for completion** | 1 Hour | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between cout and printf statements.<br>2. How one can take input from user in C++?.<br>3. What changes should be made in the logic so that the same program generates the same output without using cout statement?<br>4. Which error shall be raised if we use printf statements instead of cout? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester
## Practical Problem and Assessment Policy
## 060010203: Object Oriented Programming

| | | |
|---|---|---|
| **Practical No.** 2 | **Enrollment No.** | **Group :** C |
| **Practical Problem** | Write a program to take input of choice (1 or 2). If the choice is 1, print the area of a circle otherwise print the perimeter of a circle. Accept the radius of the circle from the user | |
| **Objective(s)** | Want to make students familiar with C++ environment and with cin and cout statements. | |
| **Pre-requisite** | Usage of cout and cin objects. | |
| **Duration for completion** | 1 Hour | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between cin and scanf statements.<br>2. How one can take input from user in C++?<br>3. What changes should be made in the logic so that the same program takes the input from the user using a single line of code?<br>4. Which error shall be raised if we use scanf statements instead of cin? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester
## Practical Problem and Assessment Policy
## 060010203: Object Oriented Programming

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|---|---|---|
| **Practical No**. 3 | **Enrollment No.** | **Group :** C |
| **Practical Problem** | Write a program that obtains the largest value of three numbers. Take input of three numbers from the user. | |
| **Objective(s)** | Clear the concept of conditional statements and loops. | |
| **Pre-requisite** | Usage of cout,cin, different looping constructs and conditional statements. | |
| **Duration for completion** | 1 Hour | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Apart from If condition statements, which statements can we use to solve this problem?<br>2. How one can compare two integers in C++?<br>3. What changes should be made in the logic so that the same program checks the larger number from the given two integer values?<br>4. Which error shall be raised if we write condition as follow? if(int x=10 && int y=20) | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester
## Practical Problem and Assessment Policy
## 060010203: Object Oriented Programming

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|---|---|---|
| **Practical No**. 4 | **Enrollment No.** | **Group :** C |
| **Practical Problem** | WAP to generate 2n+1 lines of the following pattern on the computer screen:<br>*<br>@@@<br>* * * * *<br>@@@@@@@ | |
| **Objective(s)** | Clear the concept of conditional statements and loops. | |
| **Pre-requisite** | Usage of cout,cin, different looping constructs and conditional statements. | |
| **Duration for completion** | 1 Hour | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between for and do..while() loop constructs.<br>2. How one can develop the same program without using for construct?<br>3. What changes should be made in the logic so that the same program prints the same pattern as follow?<br>@<br>* *<br>@ @ @<br>* * * *<br>4. Which error shall be raised if we don't provide any condition in for loop construct? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester
## Practical Problem and Assessment Policy
## 060010203: Object Oriented Programming

| | | |
|---|---|---|
| **Practical No.** 5 | **Enrollment No.** | **Group : C** |
| **Practical Problem** | Write a program that will ask for a measurement in Meter and display it in Centimetres using a class called measurement and member functions. | |
| **Objective(s)** | Clear the concept of Class and Objects. | |
| **Pre-requisite** | Usage of cout,cin, different looping constructs and conditional statements along with struct, class and object. | |
| **Duration for completion** | 2 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between structure and class<br>2. How one can execute the same program without creating object?<br>3. What changes should be made in the logic so that program will calculates measurement in centimeter at the time of object creation?<br>4. Which error shall be raised if we don't provide semicolon (;) at the end of class? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester
## Practical Problem and Assessment Policy
## 060010203: Object Oriented Programming

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|---|---|---|
| **Practical No.** 6 | **Enrollment No.** | **Group :** C |
| **Practical Problem** | A class called Television has the following attributes:<br>a. Make<br>b. Size of the screen<br>c. Date of purchase of the TV<br>d. Is it a color TV<br><br>Define a class Television. Define a method for displaying the attribute values of a TV. | |
| **Objective(s)** | Clear the concept of Class and Objects. | |
| **Pre-requisite** | Usage of cout,cin, different looping constructs and conditional statements along with struct, class and object. | |
| **Duration for completion** | 2 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between constructor and destructor.<br>2. How one can print "Hello" message when program execution gets start?<br>3. What changes should be made in the logic so data should not be accessible outside the class?<br>4. Which error shall be raised if we don't provide any access modifier to any data member and we try to call that member from main function using object? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester
## Practical Problem and Assessment Policy
## 060010203: Object Oriented Programming

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|---|---|---|
| **Practical No.** 7 | **Enrollment No.** | **Group :** C |
| **Practical Problem** | Create a class **Counted** that contains an int id. There should be default constructor in class Counted. It should print its id and message like "It is being created", when an object is being created using **new** operator. It should also print its id and message like "It is being destroyed", when object is being destroyed using **delete** operator. | |
| **Objective(s)** | Clear the concept of new and delete operators. | |
| **Pre-requisite** | Usage of cout,cin, different looping constructs and conditional statements along with class & object. | |
| **Duration for completion** | 1 Hour | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between new and constructor.<br>2. How one can free the resources which have been allocated during the program execution?<br>3. What changes should be made in the logic so we can allocate memory without using new operator?<br>4. Which will happen if we don't free the resources that have been allocated during the program execution? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester
## Practical Problem and Assessment Policy
## 060010203: Object Oriented Programming

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|---|---|---|
| **Practical No.** 8 | **Enrollment No.** | **Group :** C |
| **Practical Problem** | Write a program to create Student class with the following attributes.<br>Register Number, Name of the student, Mark in Subject 1, Mark in subject 2, Mark in subject 3, Total Marks<br><br>The total of the three marks must be calculated only when the student passes in all three subjects. The pass marks for each subject is 50. If a candidate fails in any one of the subjects, his total marks must be declared as 0. Using this conditions, write a constructor for this class. Write a method displayStudent() to display the details of the student object. In main method create an array of three Student objects and display the object details. | |
| **Objective(s)** | Clear the concept of member functions and how to handle functions with object. | |
| **Pre-requisite** | Usage of class, object and member function. | |
| **Duration** | 2 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between constructor and member method.<br>2. How one can set the initial value of all data members of class?<br>3. What changes should be made in the logic so that initial values will get printed at the time of object creation?<br>4. Which error shall be raised if we don't provide constructor name same as class name? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester
## Practical Problem and Assessment Policy
## 060010203: Object Oriented Programming

| | | |
|---|---|---|
| **Practical No.** 9 | **Enrollment No.** | **Group :** C |
| **Practical Problem** | Considered the Student class defined in the previous program(08), write a method bestStudent() which returns the student with the highest total marks and print the detail of that student. | |
| **Objective(s)** | Clear the concept of member functions and how to handle functions with object. | |
| **Pre-requisite** | Usage of class, object and member function. | |
| **Duration for completion** | 2 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between object and constructor.<br>2. How one can access the private data of class?<br>3. What changes should be made in the logic so that initial values of one object will get assign to another object?<br>4. Which error shall be raised if we don't provide destructor name same as class name? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester

## Practical Problem and Assessment Policy

## 060010203: Object Oriented Programming

| **Practical No**. 10 | **Enrollment No.** | **Group :** C |
|---|---|---|
| **Practical Problem** | Create two classes called Class_1 & Class_2. Class_1 will have private attribute named int value1 & Class_2 will have private attribute named int value2.<br>Create one function named Swap(), which will swap the values of value1 & value2 attributes of Class_1 & Class_2. | |
| **Objective(s)** | Clear the concept of friend function | |
| **Pre-requisite** | Usage of class, object and member function. | |
| **Duration for completion** | 2 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between virtual function and friend function?<br>2. How one can one set the default value to the function parameter?<br>3. What changes should be made in the logic so that we can carry out swap operation?<br>4. Which error shall be raised if we don't provide forward declaration of class when we are implementing concept of Friend function? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester

## Practical Problem and Assessment Policy

## 060010203: Object Oriented Programming

| **Practical No**. 11 | **Enrollment No.** | **Group :** C |
|---|---|---|
| **Practical Problem** | Write a menu driven program that can perform the following functions on strings. (Use overloaded operators where possible). (Do not use predefined string class)<br>a. Reverse the string<br>b. Concatenate two strings (+ operator) | |
| **Objective(s)** | Clear the concept of operator overloading. | |
| **Pre-requisite** | Usage of class, object and member function. | |
| **Duration for completion** | 1 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors.<br>3. To understand the concept of polymorphism and implement static (compile time) polymorphism in programs by overloading operators. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between function overloading and operator function?<br>2. How one can overload (: :) operator?<br>3. What changes should be made in the logic so that we can print the string object by overloading cout<< ?<br>4. Which error shall be raised if we don't overload operator function to reverse the string? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester
## Practical Problem and Assessment Policy
## 060010203: Object Oriented Programming

| | | |
|---|---|---|
| **Practical No**. 12 | **Enrollment No.** | **Group :** C |
| **Practical Problem** | Create a class FLOAT that contains one float data member. Overload all the four arithmetic operators so that they operate on the objects of FLOAT | |
| **Objective(s)** | Clear the concept of operator overloading. | |
| **Pre-requisite** | Usage of class, object and member function. | |
| **Duration for completion** | 1 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors.<br>3. To understand the concept of polymorphism and implement static (compile time) polymorphism in programs by overloading operators. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between operator function and cast operator function?<br>2. How one can overload (->) operator?<br>3. What changes should be made in the logic so that we can increment float objects by 1 value?<br>4. Which error shall be raised if we don't provide return type in operator function? | |

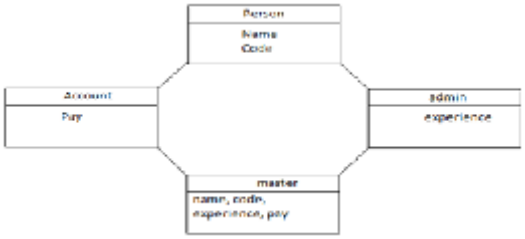
**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester

## Practical Problem and Assessment Policy

## 060010203: Object Oriented Programming

| **Practical No**. 13 | **Enrollment No.** | **Group :** C |
|---|---|---|
| **Practical Problem** | Consider a class network of below figure. The class master derives information from both account and admin classes which in turn derive information from the class person. Define all the four classes and write a program to create update and display the information contained in master objects   | |
| **Objective(s)** | Clear the concept of Inheritance. | |
| **Pre-requisite** | Usage of class, object and member function, function overriding, access modifiers. | |
| **Duration for completion** | 2 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors.<br>3. To understand the concept of polymorphism and implement static (compile time) polymorphism in programs by overloading operators.<br>4. To understand and implement the concept of inheritance and overriding functions. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between hybrid inheritance and hierarchical inheritance?<br>2. How one can inherit typist class by private accessibility?<br>3. What changes should be made in the logic so that master class cannot use attributes and methods of admin class?<br>4. Which error shall be raised if we don't provide access modifiers for inheritance? | |

**Assessment**

| | **achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

| **Practical No**. 14 | **Enrollment No.** | **Group :** C |
|---|---|---|

# 5 years Integrated M.Sc (IT): 2nd Semester

## Practical Problem and Assessment Policy

## 060010203: Object Oriented Programming

| | |
|---|---|
| **Practical Problem** | Create a base class called shape. Use this class to store two double type values that could be use to compute the area of figures. Derive two specific classes called triangle and rectangle from the base shape. Add get_data() member function to the base class to compute and display the area of figure. Make display_area() as a virtual function and redefine this function in the derived classes to suit their requirements.<br>Using these classes design a program that will accept dimensions of the triangle or a rectangle interactivly and display the area. |
| **Objective(s)** | Clear the concept of Virtual Function. |
| **Pre-requisite** | Usage of class, object and member function, function overriding, access modifiers and inheritance. |
| **Duration for completion** | 1 Hours |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors.<br>3. To understand the concept of polymorphism and implement static (compile time) polymorphism in programs by overloading operators.<br>4. To understand and implement the concept of inheritance and overriding functions.<br>5. To understand concept of dynamic polymorphism using virtual functions, overriding functions and abstract class. |
| **Solution must contain** | Program and Output |
| **Nature of submission** | Handwritten |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. |
| **Post Laboratory questions** | 1. Give two points of differences between virtual function and pure virtual function?<br>2. How one can access the current copy of base class by calling function using derive class object?<br>3. What changes should be made in the logic so that display_area() method can calculate area of circle?<br>4. Which error shall be raised if we don't provide virtual keyword to create pure virtual function? |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Marks Secured** | | |
| **Signature** | | |
| **Date** | | |

| | | |
|---|---|---|
| **Practical No**. 15 | **Enrollment No.** | **Group :** C |
| **Practical Problem** | Design a manipulator to provide the following output specifications for printing float values | |

# 5 years Integrated M.Sc (IT): 2nd Semester

## Practical Problem and Assessment Policy

## 060010203: Object Oriented Programming

| | |
|---|---|
| | a. 15 column width.<br>b. Right justified.<br>c. 2 digits precision.<br>d. Filling unused spaces with +.<br>e. Showing trailing zeros. |
| **Objective(s)** | Learn how to format output using i/o functions. |
| **Pre-requisite** | Usage of class, object and member function, function overriding, access modifiers, inheritance and formatting function . |
| **Duration for completion** | 1 Hours |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors.<br>3. To understand the concept of polymorphism and implement static (compile time) polymorphism in programs by overloading operators.<br>4. To understand and implement the concept of inheritance and overriding functions.<br>5. To understand concept of dynamic polymorphism using virtual functions, overriding functions and abstract class.<br>6. To understand I/O operations and hierarchy of File Stream classes and able to develop programs to perform File and I/O operations. |
| **Solution must contain** | Program and Output |
| **Nature of submission** | Handwritten |
| **References for solving the problem** | Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. |
| **Post Laboratory questions** | 1. Give two points of differences between get() and put() function of istream and ostream.<br>2. How do the I/O facilities in C++ differ from that in C?<br>3. What changes should be made in the logic so that we can calculate how many fraction points are there in input?<br>4. Which error shall be raised if we don't provide iomanip header file in this program? |

**Assessment**

| | **Solution achieves the desired bjective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Marks Secured** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester

## Practical Problem and Assessment Policy

## 060010203: Object Oriented Programming

| **Practical No**. 16 | **Enrollment No.** | **Group :** C |
|---|---|---|
| **Practical Problem** | A file contains a list of telephone numbers in the following form::<br>John 23456<br>Ahmed 34567<br>The name contains only one word and the names and telephone number are separated by white spaces. Write a program to read the file and output the list in two columns. The names should be left-justified and the numbers right-justified. | |
| **Objective(s)** | Clear the concepts of handling file in C++ | |
| **Pre-requisite** | Usage of class, object and member function, function overriding, access modifiers, inheritance and formatting function and header files, file classes for I/O in file. | |
| **Duration for completion** | 1 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors.<br>3. To understand the concept of polymorphism and implement static (compile time) polymorphism in programs by overloading operators.<br>4. To understand and implement the concept of inheritance and overriding functions.<br>5. To understand concept of dynamic polymorphism using virtual functions, overriding functions and abstract class.<br>6. To understand I/O operations and hierarchy of File Stream classes and able to develop programs to perform File and I/O operations. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between ostraem and ofstream?<br>2. How one can create a new file using program?<br>3. What changes should be made in the logic so that if file already exists, it should delete all content of that file at the time of file creation?<br>4. Which header file we need to include for file handling? | |

**Assessment**

| | **Solution achieves the desired bjective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Marks Secured** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester

## Practical Problem and Assessment Policy

## 060010203: Object Oriented Programming

| **Practical No.** 1 | **Enrollment No.** | **Group :** D |
|---|---|---|
| **Practical Problem** | Write a program to take input of two numbers ***m*** and ***n***. Then display first ***m*** multiples of **n** *number.* | |
| **Objective(s)** | Want to make students familiar with C++ environment and with cin and cout statements. | |
| **Pre-requisite** | Usage of cout and cin objects. | |
| **Duration for completion** | 1 Hour | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between cout and printf statements.<br>2. How one can take input from user in C++?.<br>3. What changes should be made in the logic so that the same program generates the same output in a single line?<br>4. Which error shall be raised if we use printf statements instead of cout? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester
## Practical Problem and Assessment Policy
## 060010203: Object Oriented Programming

| | | |
|---|---|---|
| **Practical No.** 2 | **Enrollment No.** | **Group :** D |
| **Practical Problem** | Write a program using while loop to reverse the digits of a given number. (for example, If number is=12345 then output number is= 54321) | |
| **Objective(s)** | Want to make students familiar with C++ environment and with cin and cout statements. | |
| **Pre-requisite** | Usage of cout and cin objects. | |
| **Duration for completion** | 1 Hour | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between cin and scanf statements.<br>2. How one can take input from user in C++?<br>3. What changes should be made in the logic so that we can reverse the inputed number up to (length of inputed number-1) digits only ?<br>4. Which error shall be raised if we use scanf statements instead of cin? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester

## Practical Problem and Assessment Policy

## 060010203: Object Oriented Programming

| **Practical No**. 3 | **Enrollment No.** | **Group :** D |
|---|---|---|
| **Practical Problem** | WAP that reads in a character <ch> from the keyboard and then displays one of the following messages:<br>a. If <ch> is a lower case alphabet, the message "The upper case character corresponding to <ch> is …"<br>b. If <ch> is an upper case alphabet, the message "The lower case character corresponding to <ch> is …"<br>c. If <ch> is not an alphabet, the message "<ch> is not an alphabet" | |
| **Objective(s)** | Clear the concept of conditional statements and loops. | |
| **Pre-requisite** | Usage of cout,cin, different looping constructs and conditional statements. | |
| **Duration for completion** | 1 hour | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Apart from If condition statements, which statements can we use to solve this problem?<br>2. How one can take compare two character in C++?<br>3. What changes should be made in the logic so that the same program checks the choice <ch> for special symbols and displays <ch > is Special Symbol.<br>4. Which error shall be raised if we write condition as follow? if(char ch="abc" && char ch="xyz") | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester

## Practical Problem and Assessment Policy

## 060010203: Object Oriented Programming

| **Practical No**. 4 | **Enrollment No.** | **Group :** D |
|---|---|---|
| **Practical Problem** | Write a program to take input of a number. If the number is negative, then again input the number. Keep on doing so until the user enters a positive number. | |
| **Objective(s)** | Clear the concept of conditional statements and loops. | |
| **Pre-requisite** | Usage of cout,cin, different looping constructs and conditional statements. | |
| **Duration for completion** | 1 Hour | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between for and do..while() loop constructs.<br>2. How one can develop the same program without using for construct?<br>3. What changes should be made in the logic so that the same program prints message as “Inputed number is negative” and asks for input again, else displays “number is positive”.<br>4. Which error shall be raised if we don’t provide any condition in for loop construct? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester
## Practical Problem and Assessment Policy
## 060010203: Object Oriented Programming

| **Practical No.** 5 | **Enrollment No.** | **Group :** D |
|---|---|---|
| **Practical Problem** | Define a class of employees. It should contain employee number, name, address and number of dependents for the employee. It should also contain functions to insert and display information about employees. Define an array of 10 employees. At the end, display all employees with more than two dependents. | |
| **Objective(s)** | Clear the concept of Class and Objects. | |
| **Pre-requisite** | Usage of cout,cin, different looping constructs and conditional statements along with struct, class and object. | |
| **Duration for completion** | 2 hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between structure and class<br>2. How one can execute the same program without creating object?<br>3. What changes should be made in the logic so that program will calculates slant height at the time of object creation?<br>4. Which error shall be raised if we don't provide semicolon (;) at the end of class? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester
## Practical Problem and Assessment Policy
## 060010203: Object Oriented Programming

| | | |
|---|---|---|
| **Practical No.** 6 | **Enrollment No.** | **Group :** D |
| **Practical Problem** | A class called Television has the following attributes:<br>e. Make<br>f. Size of the screen<br>g. Date of purchase of the TV<br>h. Is it a color TV<br><br>Define a class Television. Define a method for displaying the attribute values of a TV | |
| **Objective(s)** | Clear the concept of Class and Objects. | |
| **Pre-requisite** | Usage of cout,cin, different looping constructs and conditional statements along with struct, class and object. | |
| **Duration for completion** | 2 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between constructor and destructor.<br>2. How one can print "Bye Bye Baby" message when program execution gets terminate?<br>3. What changes should be made in the logic so data should not be accessible outside the class?<br>4. Which error shall be raised if we don't provide any access modifier to any data member and we try to call that member from main function using object? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester

## Practical Problem and Assessment Policy

## 060010203: Object Oriented Programming

| **Practical No.** 7 | **Enrollment No.** | **Group :** D |
|---|---|---|
| **Practical Problem** | Create a class **Counted** that contains an int id. There should be default constructor in class Counted. It should print its id and message like "It is being created", when an object is being created using **new** operator. It should also print its id and message like "It is being destroyed", when object is being destroyed using **delete** operator. | |
| **Objective(s)** | Clear the concept of new and delete operators. | |
| **Pre-requisite** | Usage of cout,cin, different looping constructs and conditional statements along with class & object. | |
| **Duration for completion** | 1 Hour | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between new and constructor.<br>2. How one can free the resources which have been allocated during the program execution?<br>3. What changes should be made in the logic so we can allocate memory without using new operator?<br>4. Which will happen if we don't free the resources that have been allocated during the program execution? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester

## Practical Problem and Assessment Policy

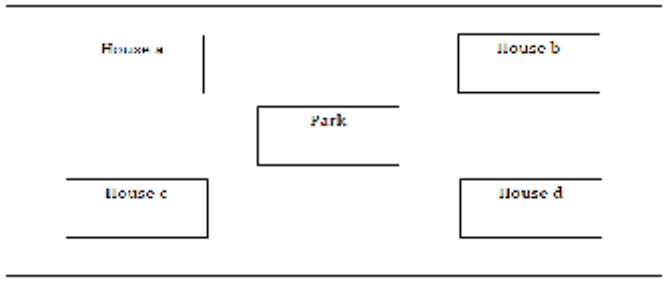
## 060010203: Object Oriented Programming

| **Practical No.** 8 | **Enrollment No.** | **Group :** D |
|---|---|---|
| **Practical Problem** | A house has a bed room, drawing room, hall, dining room and kitchen. It also has a Television. Other attributes of a house are door no., date of construction, total plinth area and ground area. Define a class House and define a suitable constructor and a method to display the details of the house. | |
| **Objective(s)** | Clear the concept of member functions and how to handle functions with object. | |
| **Pre-requisite** | Usage of class, object and member function. | |
| **Duration for completion** | 2 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between constructor and member method.<br>2. How one can set the initial value of all data members of class?<br>3. What changes should be made in the logic so that initial values will get printed at the time of object creation?<br>4. Which error shall be raised if we don't provide constructor name same as class name? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester
## Practical Problem and Assessment Policy
## 060010203: Object Oriented Programming

| **Practical No.** 9 | **Enrollment No.** | **Group :** D |
|---|---|---|
| **Practical Problem** | A Block is a collection of 4 Houses and a Park, another attribute is area. Define a class. Create a Block in the main method and display its details.<br>  | |
| **Objective(s)** | Clear the concept of member functions and how to handle functions with object. | |
| **Pre-requisite** | Usage of class, object and member function. | |
| **Duration for completion** | 2 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between object and constructor.<br>2. How one can access the private data of class?<br>3. What changes should be made in the logic so that initial values of one object will get assign to another object?<br>4. Which error shall be raised if we don't provide destructor name same as class name? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester

## Practical Problem and Assessment Policy

## 060010203: Object Oriented Programming

| **Practical No**. 10 | **Enrollment No.** | **Group :** D |
|---|---|---|
| **Practical Problem** | Define Time class with string containing seconds elapsed till midnight (12:00A.M) as a single data member. Write AddTime function which adds two different Time objects and return a new Time object. Write a DisplayNormal function which converts the time in seconds and displays in normal fashion HH:MM:SS. | |
| **Objective(s)** | Clear the concept of friend function | |
| **Pre-requisite** | Usage of class, object and member function. | |
| **Duration for completion** | 2 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between virtual function and friend function?<br>2. How one can one set the default value to the function parameter?<br>3. What changes should be made in the logic so that we can carry out subtraction operation of two different time objects?<br>4. Which error shall be raised if we don't provide forward declaration of class when we are implementing concept of Friend function? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester
## Practical Problem and Assessment Policy
## 060010203: Object Oriented Programming

| | | |
|---|---|---|
| **Practical No**. 11 | **Enrollment No.** | **Group :** D |
| **Practical Problem** | Overload + and – for a stack class such that + provides push and – provides pop operation. | |
| **Objective(s)** | Clear the concept of operator overloading. | |
| **Pre-requisite** | Usage of class, object and member function. | |
| **Duration for completion** | 1 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors.<br>3. To understand the concept of polymorphism and implement static (compile time) polymorphism in programs by overloading operators. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between function overloading and operator function?<br>2. How one can overload (: :) operator?<br>3. What changes should be made in the logic so that we can print the stack object by overloading cout<< ?<br>4. Which error shall be raised if we don't overload operator function to push the value in stack? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester
## Practical Problem and Assessment Policy
## 060010203: Object Oriented Programming

| | | |
|---|---|---|
| **Practical No**. 12 | **Enrollment No.** | **Group :** D |
| **Practical Problem** | Write a program to create a class called Float. Display the multiplication of two Float objects. | |
| **Objective(s)** | Clear the concept of operator overloading. | |
| **Pre-requisite** | Usage of class, object and member function. | |
| **Duration for completion** | 1 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors.<br>3. To understand the concept of polymorphism and implement static (compile time) polymorphism in programs by overloading operators. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between operator function and cast operator function?<br>2. How one can overload (->) operator?<br>3. What changes should be made in the logic so that we can increment float objects by 1 value?<br>4. Which error shall be raised if we don't provide return type in operator function? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester
## Practical Problem and Assessment Policy
## 060010203: Object Oriented Programming

| **Practical No**. 13 | **Enrollment No.** | **Group :** D |
|---|---|---|
| **Practical Problem** | Create three class SocialNetwork, FaceBook, and Twitter; SocialNetwork class has data member like username and password; FaceBook class inherit the properties of SocialNetwork class and it has data member like scrap message and group name; Twitter class inherit the properties of SocialNetwork and has data members like twit message and follower and do the following operation<br>a. Insert data through derived class parameterized constructor.<br>There are more than one user of FaceBook and Twitter so use appropriate technique for creating user. | |
| **Objective(s)** | Clear the concept of Inheritance. | |
| **Pre-requisite** | Usage of class, object and member function, function overriding, access modifiers. | |
| **Duration for completion** | 2 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors.<br>3. To understand the concept of polymorphism and implement static (compile time) polymorphism in programs by overloading operators.<br>4. To understand and implement the concept of inheritance and overriding functions. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between hybrid inheritance and hierarchical inheritance?<br>2. How one can inherit typist class by private accessibility?<br>3. What changes should be made in the logic so that twitter class cannot use attributes and methods of socialnetwork class?<br>4. Which error shall be raised if we don't provide access modifiers for inheritance? | |

**Assessment**

| | **achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

| **Practical No**. 14 | **Enrollment No.** | **Group :** D |
|---|---|---|

# 5 years Integrated M.Sc (IT): 2nd Semester

## Practical Problem and Assessment Policy

## 060010203: Object Oriented Programming

| | |
|---|---|
| **Practical Problem** | Create a base class called shape. Use this class to store two double type values that could be use to compute the area of figures. Derive two specific classes called triangle and rectangle from the base shape. Add get_data() member function to the base class to compute and display the area of figure. Make display_area() as a virtual function and redefine this function in the derived classes to suit their requirements.<br>Using these classes design a program that will accept dimensions of the triangle or a rectangle interactivly and display the area. |
| **Objective(s)** | Clear the concept of Virtual Function. |
| **Pre-requisite** | Usage of class, object and member function, function overriding, access modifiers and inheritance. |
| **Duration for completion** | 1 Hours |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors.<br>3. To understand the concept of polymorphism and implement static (compile time) polymorphism in programs by overloading operators.<br>4. To understand and implement the concept of inheritance and overriding functions.<br>5. To understand concept of dynamic polymorphism using virtual functions, overriding functions and abstract class. |
| **Solution must contain** | Program and Output |
| **Nature of submission** | Handwritten |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. |
| **Post Laboratory questions** | 1. Give two points of differences between virtual function and pure virtual function?<br>2. How one can access the current copy of base class by calling function using derive class object?<br>3. What changes should be made in the logic so that display_area() method can calculate area of circle?<br>4. Which error shall be raised if we don't provide virtual keyword to create pure virtual function? |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Marks Secured** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester

## Practical Problem and Assessment Policy

## 060010203: Object Oriented Programming

| **Practical No**. 15 | **Enrollment No.** | **Group :** D |
|---|---|---|
| **Practical Problem** | Write a program which reads a text from keyboard and displays the following information on the screen in two columns:<br>Number of lines, Number of words, Number of characters,<br>String should be left – justified and the numbers should be right – justified in a suitable field width, and also fill unused space with star (*) | |
| **Objective(s)** | Learn how to format output using i/o functions. | |
| **Pre-requisite** | Usage of class, object and member function, function overriding, access modifiers, inheritance and formatting function . | |
| **Duration for completion** | 1 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors.<br>3. To understand the concept of polymorphism and implement static (compile time) polymorphism in programs by overloading operators.<br>4. To understand and implement the concept of inheritance and overriding functions.<br>5. To understand concept of dynamic polymorphism using virtual functions, overriding functions and abstract class.<br>6. To understand I/O operations and hierarchy of File Stream classes and able to develop programs to perform File and I/O operations. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between get() and put() function of istream and ostream.<br>2. How do the I/O facilities in C++ differ from that in C?<br>3. What changes should be made in the logic so that we can calculate how many vovels are there in input?<br>4. Which error shall be raised if we don't provide iomanip header file in this program? | |

**Assessment**

| | **Solution achieves the desired bjective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Marks Secured** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester

## Practical Problem and Assessment Policy

## 060010203: Object Oriented Programming

| **Practical No**. 16 | **Enrollment No.** | **Group :** D |
|---|---|---|
| **Practical Problem** | Write a program to copy only lines beginning with a user specified character from file source.txt to destination.txt | |
| **Objective(s)** | Clear the concepts of handling file in C++ | |
| **Pre-requisite** | Usage of class, object and member function, function overriding, access modifiers, inheritance and formatting function and header files, file classes for I/O in file. | |
| **Duration for completion** | 1 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors.<br>3. To understand the concept of polymorphism and implement static (compile time) polymorphism in programs by overloading operators.<br>4. To understand and implement the concept of inheritance and overriding functions.<br>5. To understand concept of dynamic polymorphism using virtual functions, overriding functions and abstract class.<br>6. To understand I/O operations and hierarchy of File Stream classes and able to develop programs to perform File and I/O operations. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between ostraem and ofstream?<br>2. How one can create a new file using program?<br>3. What changes should be made in the logic so that if file already exists, it should delete all content of that file at the time of file creation?<br>4. Which header file we need to include for file handling? | |

**Assessment**

| | **Solution achieves the desired bjective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Marks Secured** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester

## Practical Problem and Assessment Policy

## 060010203: Object Oriented Programming

| **Practical No.** 1 | **Enrollment No.** | **Group :** E |
|---|---|---|
| **Practical Problem** | WAP to input 10 numbers and then display their sum and average. Also display the largest and the smallest of the numbers entered | |
| **Objective(s)** | Want to make students familiar with C++ environment and with cin and cout statements. | |
| **Pre-requisite** | Usage of cout and cin objects. | |
| **Duration for completion** | 1 Hour | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between cout and printf statements.<br>2. How one can take input from user in C++?.<br>3. What changes should be made in the logic so that the same program generates smallest and largest value using a single function?<br>4. Which error shall be raised if we use printf statements instead of cin? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester
## Practical Problem and Assessment Policy
## 060010203: Object Oriented Programming

| | | |
|---|---|---|
| **Practical No.** 2 | **Enrollment No.** | **Group :** E |
| **Practical Problem** | Write a program to convert a binary number to its corresponding octal number. | |
| **Objective(s)** | Want to make students familiar with C++ environment and with cin and cout statements. | |
| **Pre-requisite** | Usage of cout and cin objects. | |
| **Duration for completion** | 1 Hour | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between cin and scanf statements.<br>2. How one can take input from user in C++?<br>3. What changes should be made in the logic so that the same program takes the input from the user using a single line of code?<br>4. Which error shall be raised if we use scanf statements instead of cin? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester

## Practical Problem and Assessment Policy

## 060010203: Object Oriented Programming

| **Practical No**. 3 | **Enrollment No.** | **Group :** E |
|---|---|---|
| **Practical Problem** | WAP to input a list of numbers and then reverse this list of numbers without using a second array. E.g. if the original list contains 5,2,3,4,1,9, then after reversal the list should contain 9,1,4,3,2,5 | |
| **Objective(s)** | Clear the concept of conditional statements and loops. | |
| **Pre-requisite** | Usage of cout,cin, different looping constructs and conditional statements. | |
| **Duration for completion** | 1 Hour | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Apart from If condition statements, which statements can we use to solve this problem?<br>2. How one can take compare two integers in C++?<br>3. What changes should be made in the logic so that the same program sort the list in ascending order?<br>4. Which error shall be raised if we write condition as follow? if(int x=10 && int y=20) | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester

## Practical Problem and Assessment Policy

## 060010203: Object Oriented Programming

| **Practical No**. 4 | **Enrollment No.** | **Group :** E |
|---|---|---|
| **Practical Problem** | Write a program to generate n lines of the following pattern on the computer screen:<br>1234321<br>12321<br>121<br>1 | |
| **Objective(s)** | Clear the concept of conditional statements and loops. | |
| **Pre-requisite** | Usage of cout,cin, different looping constructs and conditional statements. | |
| **Duration for completion** | 1 Hour | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between for and do..while() loop constructs.<br>2. How one can develop the same program without using for construct?<br>3. What changes should be made in the logic so that the same program prints the same pattern but in descending order as follow?<br>1<br>121<br>12321<br>1234321<br>4. Which error shall be raised if provide only three ; in for loop? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester
## Practical Problem and Assessment Policy
## 060010203: Object Oriented Programming

| **Practical No.** 5 | **Enrollment No.** | **Group :** E |
|---|---|---|
| **Practical Problem** | Write a program that creates an Employee class which contain emp_code, name, designation and salary fields, and three constructor one is default constructor, second constructor contain three filed emp code, name and designation& if designation is clerk set salary of Rs. 5000 if designation is peon set salary of Rs. 2000 and if manager set salary of Rs. 10000 for others set salary of Rs. 1000 and third constructor contain four fileds emp code, name, designation and salary. Display information of employee using display method. | |
| **Objective(s)** | Clear the concept of Class and Objects. | |
| **Pre-requisite** | Usage of cout,cin, different looping constructs and conditional statements along with struct, class and object. | |
| **Duration for completion** | 2 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between structure and class<br>2. How one can execute the same program without creating object?<br>3. What changes should be made in the logic so that program will print employee detail when program will get terminate?<br>4. Which error shall be raised if we don't provide semicolon (;) at the end of class? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester

## Practical Problem and Assessment Policy

## 060010203: Object Oriented Programming

| **Practical No.** 6 | **Enrollment No.** | **Group :** E |
|---|---|---|
| **Practical Problem** | Write a program that create two class one is main method class and another is to represent a bank account that includes the following member:<br>Data Members<br>1. Owner name<br>2. Account number<br>3. Balance amount in the account<br>Methods Members<br>1. To assign initial values.<br>2. To deposit an amount.<br>3. To withdraw an amount after checking balance minimum balance must be Rs.500.<br>4. To Display the owner name and balance | |
| **Objective(s)** | Clear the concept of Class and Objects. | |
| **Pre-requisite** | Usage of cout,cin, different looping constructs and conditional statements along with struct, class and object. | |
| **Duration for completion** | 2 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between constructor and destructor.<br>2. How one can print "Bye Bye Baby" message when program execution gets terminate?<br>3. What changes should be made in the logic so data should not be accessible outside the class?<br>4. Which error shall be raised if we don't provide any access modifier to any data member and we try to call that member from main function using object? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester
## Practical Problem and Assessment Policy
## 060010203: Object Oriented Programming

| | | |
|---|---|---|
| **Practical No.** 7 | **Enrollment No.** | **Group :** E |
| **Practical Problem** | Create a class **CounteID** that contains an float id. There should be default constructor in class CounteID. It should print its id and message like "It is being created", when an object is being created using **new** operator. It should also print its id and message like "It is being destroyed", when object is being destroyed using **delete** operator. | |
| **Objective(s)** | Clear the concept of new and delete operators. | |
| **Pre-requisite** | Usage of cout,cin, different looping constructs and conditional statements along with class & object. | |
| **Duration for completion** | 1 Hour | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between new and constructor.<br>2. How one can free the resources which have been allocated during the program execution?<br>3. What changes should be made in the logic so we can allocate memory without using new operator?<br>4. Which will happen if we don't free the resources that have been allocated during the program execution? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester
## Practical Problem and Assessment Policy
## 060010203: Object Oriented Programming

| | | |
|---|---|---|
| **Practical No.** 8 | **Enrollment No.** | **Group :** E |
| **Practical Problem** | Define a class called Employee with the name and date of appointment. Create 5 employee objects as an array, sort and print them as per their date of an appointment. That is, print them as per their seniority. | |
| **Objective(s)** | Clear the concept of member functions and how to handle functions with object. | |
| **Pre-requisite** | Usage of class, object and member function. | |
| **Duration for completion** | 2 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between constructor and member method.<br>2. How one can set the initial value of all data members of class?<br>3. What changes should be made in the logic so that initial values will get printed at the time of object creation?<br>4. Which error shall be raised if we don't provide constructor name same as class name? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester

## Practical Problem and Assessment Policy

## 060010203: Object Oriented Programming

| **Practical No.** 9 | **Enrollment No.** | **Group :** E |
|---|---|---|
| **Practical Problem** | Modify the class Employee defined in the previous program (13), add two attribute called basic_salary and net_pay & method named calculateBonus().<br>From the date of appointment find the total experience of an employee and calculate bonus according to an experience. The criteria to calculate bonus on basic salary is as follow.<br>a. if experience is 1 year = 10% bonus.<br>b. if experience is 2 year = 20% bonus.<br>c. if experience is 3 year = 30% bonus.<br>d. if experience is more than 3 years = 40% bonus. | |
| **Objective(s)** | Clear the concept of member functions and how to handle functions with object. | |
| **Pre-requisite** | Usage of class, object and member function. | |
| **Duration for completion** | 2 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between object and constructor.<br>2. How one can access the private data of class?<br>3. What changes should be made in the logic so that initial values of one object will get assign to another object?<br>4. Which error shall be raised if we don't provide destructor name same as class name? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester
## Practical Problem and Assessment Policy
## 060010203: Object Oriented Programming

| | | |
|---|---|---|
| **Practical No**. 10 | **Enrollment No.** | **Group :** E |
| **Practical Problem** | Create two classes Inches and Centimeter which store the value of height. Inches stores height in inch and Centimeter in centimeter. Write a program that can read values for the class objects and add one object of Inches with another object of Centimeter. Use a friend function to carry out the addition operation. The object that stores the results may be a Inches object or Centimeter Object, depending on the units in which the result are required.<br>The display should be in the format of Inches or Centimeter depending on the object on display. | |
| **Objective(s)** | Clear the concept of friend function | |
| **Pre-requisite** | Usage of class, object and member function. | |
| **Duration for completion** | 2 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between virtual function and friend function?<br>2. How one can one set the default value to the function parameter?<br>3. What changes should be made in the logic so that we can carry out subtraction operation?<br>4. Which error shall be raised if we don't provide forward declaration of class when we are implementing concept of Friend function? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester

## Practical Problem and Assessment Policy

## 060010203: Object Oriented Programming

| **Practical No**. 11 | **Enrollment No.** | **Group :** E |
|---|---|---|
| **Practical Problem** | Overload + and – for a queue class such that + provides insert and – provides delete operation. | |
| **Objective(s)** | Clear the concept of operator overloading. | |
| **Pre-requisite** | Usage of class, object and member function. | |
| **Duration for completion** | 1 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors.<br>3. To understand the concept of polymorphism and implement static (compile time) polymorphism in programs by overloading operators. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between function overloading and operator function?<br>2. How one can overload (: :) operator?<br>3. What changes should be made in the logic so that we can print the queue object by overloading cout<< ?<br>4. Which error shall be raised if we don't overload operator function to insert the value in queue? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester

## Practical Problem and Assessment Policy

## 060010203: Object Oriented Programming

| **Practical No**. 12 | **Enrollment No.** | **Group :** E |
|---|---|---|
| **Practical Problem** | Write a program to create a class called Double. Display the addition and division of two Double objects. | |
| **Objective(s)** | Clear the concept of operator overloading. | |
| **Pre-requisite** | Usage of class, object and member function. | |
| **Duration for completion** | 1 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors.<br>3. To understand the concept of polymorphism and implement static (compile time) polymorphism in programs by overloading operators. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between operator function and cast operator function?<br>2. How one can overload (->) operator?<br>3. What changes should be made in the logic so that we can increment Double objects by 1.5 value?<br>4. Which error shall be raised if we don't provide return type in operator function? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester

## Practical Problem and Assessment Policy

## 060010203: Object Oriented Programming

| **Practical No**. 13 | **Enrollment No.** | **Group :** E |
|---|---|---|
| **Practical Problem** | Create two class one is Friend and another is Buddy, Friend class has data member like name and email-id, and Buddy class inherit the properties of Friend class and it has data member like dob, mobile no and address and do the following operation.<br>a. Create three constructors for base and derived class.<br>b. Insert data through derived class parameterized constructor.<br><br>Display all the information through parent class reference variable. | |
| **Objective(s)** | Clear the concept of Inheritance. | |
| **Pre-requisite** | Usage of class, object and member function, function overriding, access modifiers. | |
| **Duration for completion** | 2 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors.<br>3. To understand the concept of polymorphism and implement static (compile time) polymorphism in programs by overloading operators.<br>4. To understand and implement the concept of inheritance and overriding functions. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between hybrid inheritance and hierarchical inheritance?<br>2. How one can inherit friend class by private accessibility?<br>3. What changes should be made in the logic so that buddy class cannot use attributes and methods of friend class?<br>4. Which error shall be raised if we don't provide access modifiers for inheritance? | |

**Assessment**

| | **achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester

## Practical Problem and Assessment Policy

## 060010203: Object Oriented Programming

| **Practical No**. 14 | **Enrollment No.** | **Group :** E |
|---|---|---|
| **Practical Problem** | Create a base class called shape. Use this class to store two double type values that could be use to compute the area of figures. Derive two specific classes called triangle and rectangle from the base shape. Add get_data() member function to the base class to compute and display the area of figure. Make display_area() as a virtual function and redefine this function in the derived classes to suit their requirements.<br>Using these classes design a program that will accept dimensions of the triangle or a rectangle interactivly and display the area. | |
| **Objective(s)** | Clear the concept of Virtual Function. | |
| **Pre-requisite** | Usage of class, object and member function, function overriding, access modifiers and inheritance. | |
| **Duration for completion** | 1 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors.<br>3. To understand the concept of polymorphism and implement static (compile time) polymorphism in programs by overloading operators.<br>4. To understand and implement the concept of inheritance and overriding functions.<br>5. To understand concept of dynamic polymorphism using virtual functions, overriding functions and abstract class. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between virtual function and pure virtual function?<br>2. How one can access the current copy of base class by calling function using derive class object?<br>3. What changes should be made in the logic so that display_area() method can calculate area of circle?<br>4. Which error shall be raised if we don't provide virtual keyword to create pure virtual function? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Marks Secured** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester

## Practical Problem and Assessment Policy

## 060010203: Object Oriented Programming

| **Practical No**. 15 | **Enrollment No.** | **Group :** E |
|---|---|---|
| **Practical Problem** | Write a program which reads a text from keyboard and displays the following information on the screen in two columns:<br>Number of consonants, Number of vovels, Number of characters,<br>String should be left – justified and the numbers should be right – justified in a suitable field width, and also fill unused space with star (*) | |
| **Objective(s)** | Learn how to format output using i/o functions. | |
| **Pre-requisite** | Usage of class, object and member function, function overriding, access modifiers, inheritance and formatting function . | |
| **Duration for completion** | 1 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors.<br>3. To understand the concept of polymorphism and implement static (compile time) polymorphism in programs by overloading operators.<br>4. To understand and implement the concept of inheritance and overriding functions.<br>5. To understand concept of dynamic polymorphism using virtual functions, overriding functions and abstract class.<br>6. To understand I/O operations and hierarchy of File Stream classes and able to develop programs to perform File and I/O operations. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between get() and put() function of istream and ostream.<br>2. How do the I/O facilities in C++ differ from that in C?<br>3. What changes should be made in the logic so that we can calculate how many words are there in input?<br>4. Which error shall be raised if we don't provide iomanip header file in this program? | |

**Assessment**

| | **Solution achieves the desired bjective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Marks Secured** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester

## Practical Problem and Assessment Policy

## 060010203: Object Oriented Programming

| | | |
|---|---|---|
| **Practical No**. 16 | **Enrollment No.** | **Group :** E |
| **Practical Problem** | Write a program that reads the character from the file and calculates the average number of characters per line in a file. Display the average number of character on screen. | |
| **Objective(s)** | Clear the concepts of handling file in C++ | |
| **Pre-requisite** | Usage of class, object and member function, function overriding, access modifiers, inheritance and formatting function and header files, file classes for I/O in file. | |
| **Duration for completion** | 1 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors.<br>3. To understand the concept of polymorphism and implement static (compile time) polymorphism in programs by overloading operators.<br>4. To understand and implement the concept of inheritance and overriding functions.<br>5. To understand concept of dynamic polymorphism using virtual functions, overriding functions and abstract class.<br>6. To understand I/O operations and hierarchy of File Stream classes and able to develop programs to perform File and I/O operations. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between ostraem and ofstream?<br>2. How one can create a new file using program?<br>3. What changes should be made in the logic so that if file already exists, it should delete all content of that file at the time of file creation?<br>4. Which header file we need to include for file handling? | |

**Assessment**

| | **Solution achieves the desired bjective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Marks Secured** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester

## Practical Problem and Assessment Policy

## 060010203: Object Oriented Programming

| **Practical No.** 1 | **Enrollment No.** | **Group :** F |
|---|---|---|
| **Practical Problem** | WAP to input two numbers and find their LCM and HCF. | |
| **Objective(s)** | Want to make students familiar with C++ environment and with cin and cout statements. | |
| **Pre-requisite** | Usage of cout and cin objects. | |
| **Duration for completion** | 1 Hour | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between cout and printf statements.<br>2. How one can take input from user in C++?<br>3. What changes should be made in the logic so that the same program generates LCM and HCF in a single function?<br>4. Which error shall be raised if we use printf statements instead of cin? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester
## Practical Problem and Assessment Policy
## 060010203: Object Oriented Programming

| | | |
|---|---|---|
| **Practical No.** 2 | **Enrollment No.** | **Group :** F |
| **Practical Problem** | Write a program to generate a series of Armstrong numbers. A number is an Armstrong number if the sum of the cube of its digit is equal to the number. | |
| **Objective(s)** | Want to make students familiar with C++ environment and with cin and cout statements. | |
| **Pre-requisite** | Usage of cout and cin objects. | |
| **Duration for completion** | 1 Hour | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between cin and scanf statements.<br>2. How one can take input from user in C++?<br>3. What changes should be made in the logic so that the same program takes the input of number for user and checks whether the given number is palindrome or not?<br>4. Which error shall be raised if we use scanf statements instead of cin? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester
## Practical Problem and Assessment Policy
## 060010203: Object Oriented Programming

| | | |
|---|---|---|
| **Practical No**. 3 | **Enrollment No.** | **Group :** F |
| **Practical Problem** | WAP to input elements in two matrices and then find the sum of these matrices. | |
| **Objective(s)** | Clear the concept of conditional statements and loops. | |
| **Pre-requisite** | Usage of cout,cin, different looping constructs and conditional statements. | |
| **Duration for completion** | 1 Hour | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Apart from If condition statements, which statements can we use to solve this problem?<br>2. How one can take compare two integers in C++?<br>3. What changes should be made in the logic so that the same program generates the multiplication of diagonal of two matrix?<br>4. Which error shall be raised if we write condition as follow? if(int x=10 && int y=20) | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester
## Practical Problem and Assessment Policy
## 060010203: Object Oriented Programming

| | | |
|---|---|---|
| **Practical No**. 4 | **Enrollment No.** | **Group :** F |
| **Practical Problem** | Write a program to generate n lines of the following pattern on the computer screen:<br>4321<br>432<br>43<br>4 | |
| **Objective(s)** | Clear the concept of conditional statements and loops. | |
| **Pre-requisite** | Usage of cout,cin, different looping constructs and conditional statements. | |
| **Duration for completion** | 1 Hour | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between for and do..while() loop constructs.<br>2. How one can develop the same program without using for construct?<br>3. What changes should be made in the logic so that the same program prints the same pattern but in descending order as follow?<br>4<br>43<br>432<br>4321<br>4. Which error shall be raised if provide only three ; in for loop? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester
## Practical Problem and Assessment Policy
## 060010203: Object Oriented Programming

| **Practical No.** 5 | **Enrollment No.** | **Group :** F |
|---|---|---|
| **Practical Problem** | Write a program that define class student, in which put field like student id,name,class name and marks of minimum 5 subjects, and do the following:<br>1. Insert values for five students through constructor.<br>2. Calculate percentage and grade, if student is fail in any subject then grade is F and if he/she is pass then criteria for grade is as follows:<br>a. if per >=70 grade is A<br>b. if per >=60 and <70 then grade is B<br>c. if per >=50 and <60 then grade is C<br>d. otherwise D.<br><br>Display student information according to grade wise, whenever you display student information | |
| **Objective(s)** | Clear the concept of Class and Objects. | |
| **Pre-requisite** | Usage of cout,cin, different looping constructs and conditional statements along with struct, class and object. | |
| **Duration for completion** | 2 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between structure and class<br>2. How one can execute the same program without creating object?<br>3. What changes should be made in the logic so that program will print student detail who are fail, when program will get terminate?<br>4. Which error shall be raised if we don't provide semicolon (;) at the end of class? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester
## Practical Problem and Assessment Policy
## 060010203: Object Oriented Programming

| | | |
|---|---|---|
| **Practical No.** 6 | **Enrollment No.** | **Group :** F |
| **Practical Problem** | Write a program that defines a class called calculation_area which calculate different areas of shapes like triangle, circle, square, rectangle etc; using the concept of method overloading. Create the object of calculation_area and using the concept of menu driven call different method of calculation_area | |
| **Objective(s)** | Clear the concept of Class and Objects. | |
| **Pre-requisite** | Usage of cout,cin, different looping constructs and conditional statements along with struct, class and object. | |
| **Duration for completion** | 2 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between constructor and destructor.<br>2. How one can print area of shape that has been selected by user when program execution gets terminate?<br>3. What changes should be made in the logic so data should not be accessible outside the class?<br>4. Which error shall be raised if we don't provide any access modifier to any data member and we try to call that member from main function using object? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester
## Practical Problem and Assessment Policy
## 060010203: Object Oriented Programming

| | | |
|---|---|---|
| **Practical No.** 7 | **Enrollment No.** | **Group :** F |
| **Practical Problem** | Create a class **Counter** that contains an int count variable. There should be default constructor in class Counter which will ask user to give the initial value for count variable. It should print its count value which is provided by user and message like "It is being created", when an object is being created using **new** operator. It should also print its count value and message like "It is being destroyed", when object is being destroyed using **delete** operator. | |
| **Objective(s)** | Clear the concept of new and delete operators. | |
| **Pre-requisite** | Usage of cout,cin, different looping constructs and conditional statements along with class & object. | |
| **Duration for completion** | 1 Hour | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between new and constructor.<br>2. How one can free the resources which have been allocated during the program execution?<br>3. What changes should be made in the logic so we can allocate memory without using new operator?<br>4. Which will happen if we don't free the resources that have been allocated during the program execution? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester
## Practical Problem and Assessment Policy
## 060010203: Object Oriented Programming

| | | |
|---|---|---|
| **Practical No.** 8 | **Enrollment No.** | **Group :** F |
| **Practical Problem** | Write a program to create Student class with the following attributes.<br>Register Number, Name of the student, Mark in Subject 1, Mark in subject 2, Mark in subject 3, Total Marks<br>The total of the three marks must be calculated only when the student passes in all three subjects. The passing marks for each subject is 50. If a candidate fails in any one of the subjects, his total marks must be declared as 0. Using this conditions, write a constructor for this class. Write a method displayStudent() to display the details of the student object. In main method create an array of three Student objects and display the object details. | |
| **Objective(s)** | Clear the concept of member functions and how to handle functions with object. | |
| **Pre-requisite** | Usage of class, object and member function. | |
| **Duration for completion** | 2 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between constructor and member method.<br>2. How one can set the initial value of all data members of class?<br>3. What changes should be made in the logic so that initial values will get printed at the time of object creation?<br>4. Which error shall be raised if we don't provide constructor name same as class name? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester

## Practical Problem and Assessment Policy

## 060010203: Object Oriented Programming

| | | |
|---|---|---|
| **Practical No.** 9 | **Enrollment No.** | **Group :** F |
| **Practical Problem** | Considered the Student class defined in the previous program(11), write a method bestStudent() which returns the student with the highest total marks and print the detail of that student. | |
| **Objective(s)** | Clear the concept of member functions and how to handle functions with object. | |
| **Pre-requisite** | Usage of class, object and member function. | |
| **Duration for completion** | 2 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between object and constructor.<br>2. How one can access the private data of class?<br>3. What changes should be made in the logic so that initial values of one object will get assign to another object?<br>4. Which error shall be raised if we don't provide destructor name same as class name? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester
## Practical Problem and Assessment Policy
## 060010203: Object Oriented Programming

| | | |
|---|---|---|
| **Practical No**. 10 | **Enrollment No.** | **Group :** F |
| **Practical Problem** | Create two classes Feet and Centimeter which store the value of height. Feet stores height in feet and Centimeter in centimeter. Write a program that can read values for the class objects and add one object of Feet with another object of Centimeter. Use a friend function to carry out the addition operation. The object that stores the results may be a Feet object or Centimeter Object, depending on the units in which the result is required.<br>The display should be in the format of Feet or Centimeter depending on the object on display. | |
| **Objective(s)** | Clear the concept of friend function | |
| **Pre-requisite** | Usage of class, object and member function. | |
| **Duration for completion** | 2 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between virtual function and friend function?<br>2. How one can one set the default value to the function parameter?<br>3. What changes should be made in the logic so that we can carry out multiplication operation?<br>4. Which error shall be raised if we don't provide forward declaration of class when we are implementing concept of Friend function? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester

## Practical Problem and Assessment Policy

## 060010203: Object Oriented Programming

| **Practical No**. 11 | **Enrollment No.** | **Group :** F |
|---|---|---|
| **Practical Problem** | Overload + and – for a SinglyLinkedList class such that + provides insert node and – provides delete node operation. | |
| **Objective(s)** | Clear the concept of operator overloading. | |
| **Pre-requisite** | Usage of class, object and member function. | |
| **Duration for completion** | 1 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors.<br>3. To understand the concept of polymorphism and implement static (compile time) polymorphism in programs by overloading operators. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between function overloading and operator function?<br>2. How one can overload (: :) operator?<br>3. What changes should be made in the logic so that we can print the SinglyLinkedList object by overloading cout<< ?<br>4. Which error shall be raised if we don't overload operator function to insert the value in SinglyLinkedList? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester

## Practical Problem and Assessment Policy

## 060010203: Object Oriented Programming

| **Practical No**. 12 | **Enrollment No.** | **Group :** F |
|---|---|---|
| **Practical Problem** | Write a program to create a class called Integer. Display the addition and division of two Integer objects. | |
| **Objective(s)** | Clear the concept of operator overloading. | |
| **Pre-requisite** | Usage of class, object and member function. | |
| **Duration for completion** | 1 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors.<br>3. To understand the concept of polymorphism and implement static (compile time) polymorphism in programs by overloading operators. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between operator function and cast operator function?<br>2. How one can overload (->) operator?<br>3. What changes should be made in the logic so that we can increment Integer objects by 3 value?<br>4. Which error shall be raised if we don't provide return type in operator function? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester

## Practical Problem and Assessment Policy

## 060010203: Object Oriented Programming

| **Practical No**. 13 | **Enrollment No.** | **Group :** F |
|---|---|---|
| **Practical Problem** | Create three class **Publisher**, **Book** and **Stock**, **Publisher** class has data member like publisher name and subject and email-id, and **Book** class inherit the properties of Publisher class and it has data member like book name, rate and **Stock** class inherit the properties of Book class and it has data member like total quantity and total rate and do the following operation.<br>Create three constructors for base and derived class.<br>Create array of object for Stock.<br>Insert data through derived class parameterized constructor.<br>Illustrate the use of this reference and Super keyword.<br>Display all the information according to publisher wise and in proper format through parent class reference variable. | |
| **Objective(s)** | Clear the concept of Inheritance. | |
| **Pre-requisite** | Usage of class, object and member function, function overriding, access modifiers. | |
| **Duration for completion** | 2 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors.<br>3. To understand the concept of polymorphism and implement static (compile time) polymorphism in programs by overloading operators.<br>4. To understand and implement the concept of inheritance and overriding functions. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between hybrid inheritance and hierarchical inheritance?<br>2. How one can inherit friend class by private accessibility?<br>3. What changes should be made in the logic so that stock class cannot use attributes and methods of book class?<br>4. Which error shall be raised if we don't provide access modifiers for inheritance? | |

**Assessment**

| | **achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Secured by the student** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester

## Practical Problem and Assessment Policy

## 060010203: Object Oriented Programming

| **Practical No**. 14 | **Enrollment No.** | **Group :** F |
|---|---|---|
| **Practical Problem** | Create a base class called shape. Use this class to store two double type values that could be use to compute the area of figures. Derive two specific classes called triangle and rectangle from the base shape. Add get_data() member function to the base class to compute and display the area of figure. Make display_area() as a virtual function and redefine this function in the derived classes to suit their requirements.<br>Using these classes design a program that will accept dimensions of the triangle or a rectangle interactivly and display the area. | |
| **Objective(s)** | Clear the concept of Virtual Function. | |
| **Pre-requisite** | Usage of class, object and member function, function overriding, access modifiers and inheritance. | |
| **Duration for completion** | 1 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors.<br>3. To understand the concept of polymorphism and implement static (compile time) polymorphism in programs by overloading operators.<br>4. To understand and implement the concept of inheritance and overriding functions.<br>5. To understand concept of dynamic polymorphism using virtual functions, overriding functions and abstract class. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between virtual function and pure virtual function?<br>2. How one can access the current copy of base class by calling function using derive class object?<br>3. What changes should be made in the logic so that display_area() method can calculate area of circle?<br>4. Which error shall be raised if we don't provide virtual keyword to create pure virtual function? | |

**Assessment**

| | **Solution achieves the desired objective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Marks Secured** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester

## Practical Problem and Assessment Policy

## 060010203: Object Oriented Programming

| **Practical No**. 15 | **Enrollment No.** | **Group :** F |
|---|---|---|
| **Practical Problem** | Write a program which reads a text from keyboard and displays the following information on the screen in two columns:<br>Number of capital letters.<br>Number of Vowels.<br>Number of Consonant.<br>String should be right – justified and the numbers should be left – justified in a suitable field width | |
| **Objective(s)** | Learn how to format output using i/o functions. | |
| **Pre-requisite** | Usage of class, object and member function, function overriding, access modifiers, inheritance and formatting function . | |
| **Duration for completion** | 1 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors.<br>3. To understand the concept of polymorphism and implement static (compile time) polymorphism in programs by overloading operators.<br>4. To understand and implement the concept of inheritance and overriding functions.<br>5. To understand concept of dynamic polymorphism using virtual functions, overriding functions and abstract class.<br>6. To understand I/O operations and hierarchy of File Stream classes and able to develop programs to perform File and I/O operations. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between get() and put() function of istream and ostream.<br>2. How do the I/O facilities in C++ differ from that in C?<br>3. What changes should be made in the logic so that we can calculate how many words are there in input?<br>4. Which error shall be raised if we don't provide iomanip header file in this program? | |

**Assessment**

| | **Solution achieves the desired bjective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Marks Secured** | | |
| **Signature** | | |
| **Date** | | |

# 5 years Integrated M.Sc (IT): 2nd Semester

## Practical Problem and Assessment Policy

## 060010203: Object Oriented Programming

| **Practical No**. 16 | **Enrollment No.** | **Group :** F |
|---|---|---|
| **Practical Problem** | Write a text analyzer program that will read any text file. The program is to print a menu that gives the user the option of counting lines, words, characters, sentences (one or more words ending in a period), or all of the above from the given file. Provide a separate function for each option. At the end of the analysis, generate appropriate report and write it in report.txt file. | |
| **Objective(s)** | Clear the concepts of handling file in C++ | |
| **Pre-requisite** | Usage of class, object and member function, function overriding, access modifiers, inheritance and formatting function and header files, file classes for I/O in file. | |
| **Duration for completion** | 1 Hours | |
| **PEO(s) to be achieved** | PEO2: To provide quality practical skill of tools and technologies to solve industry problems. | |
| **PO(s) to be achieved** | PO6: Ability to use the techniques, skills and modern tools as necessary for software development. | |
| **CO(s) to be achieved** | 1. To understand the basic terminology of object oriented programming.<br>2. To understand memory management using constructors and destructors.<br>3. To understand the concept of polymorphism and implement static (compile time) polymorphism in programs by overloading operators.<br>4. To understand and implement the concept of inheritance and overriding functions.<br>5. To understand concept of dynamic polymorphism using virtual functions, overriding functions and abstract class.<br>6. To understand I/O operations and hierarchy of File Stream classes and able to develop programs to perform File and I/O operations. | |
| **Solution must contain** | Program and Output | |
| **Nature of submission** | Handwritten | |
| **References for solving the problem** | Thinking in C++ by Bruce eckel – Volume 1, Mastering C++ by Venugopal, Object Oriented Programming with C++ by Balaguruswami. | |
| **Post Laboratory questions** | 1. Give two points of differences between ostraem and ofstream?<br>2. How one can create a new file using program?<br>3. What changes should be made in the logic so that if file already exists, it should delete all content of that file at the time of file creation?<br>4. Which header file we need to include for file handling? | |

**Assessment**

| | **Solution achieves the desired bjective(s)** | **Viva** |
|---|---|---|
| **Out of Marks** | **10** | **5** |
| **Marks Secured** | | |
| **Signature** | | |
| **Date** | | |