

**Government College of Engineering, Amravati**  
(An Autonomous Institute of Government of Maharashtra)

**Fourth Semester B. Tech. (CS/IT)**

**Summer Term-2016**

**Course Code: CSU 403**

**Course Name: Object Oriented Technology**

**Time: 2 Hrs. 30 Min.\***

**Max. Marks: 60\***

**Instructions to Candidate**

- 1) All questions are compulsory.
- 2) Assume suitable data wherever necessary and clearly state the assumptions made.
- 3) Diagrams/sketches should be given wherever necessary.
- 4) Use of logarithmic table, drawing instruments and non-programmable calculators is permitted.
- 5) Figures to the right indicate full marks.

- 1. Solve: [8]**
- a) Differentiate between object model & function model.
  - b) How do structure of C and C++ differ ?
  - c) What is the difference between a constructor and a simple member function of a class? When is a constructor member function invoked in a class?
  - d) What is a friend? Do friends violate encapsulation?

2. **Solve any two**
- a) Create a class ,which keeps track of number of instances of this class. Using Static data members ,constructor and destructor to maintain updating information about active objects. [6]
  - b) Design a program to input two complex numbers and add them with + using operator overloading? [6]
  - c) A function clear is expected to set its argument to zero value. Write an overloaded function clear to clear objects of type point, complex number. [6]

3. **Solve:**
- a) What is Dangling pointer? Justify the answer with suitable example. [6]
  - b) What is visibility mode? What are the different inheritance visibility modes supported by C++. [6]
  - c) What are pure virtual functions? How do they differ from normal virtual function? [6]

4. **Solve any two:**
- a) With an example explain what are the different types of inheritance? [6]
  - b) What is container-ship or delegation? How does it differ from inheritance? [6]
  - c) What is function template? Write a function template for finding largest number in a given array. The array parameters must be of generic data type. [6]



5. Solve the following:

[10]

- i) ---- is a variable which holds the address of another variable.
- ii) A function with no return type is declared as -----
- iii) The operator & when placed before a variable returns -----
- iv) The ----- pointer stores the address of the object currently invoking a member function.
- v) A constructor that takes no argument is known as -----
- vi) A child class is said to be ---- from the base class.
- vii) Memory once allocated is released using ---- operator.
- viii) ---- gives a new meaning to the existing C++ operators.
- ix) The class that handles writing to a file is -----.
- x) Dynamic allocation of memory is done by ----- operator.

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- 1 Attempt any two of the following**
- a** Distinguish between the following terms: **6**
- (a) Objects and classes
  - (b) Data abstraction and data encapsulation
  - (c) Inheritance and polymorphism
  - (d) Dynamic binding and message passing
- b** What are the properties of a static data member and static function? Explain with example **6**
- c** Define a class to represent a bank account. **6**
- Include the following members:
- Data members:
1. Name of the depositor.
  2. Account number.
  3. Type of account.
  4. Balance amount in the account.

*Contd..*



Member functions:

1. To assign initial values.
2. To deposit an amount.
3. To withdraw an amount after checking the balance.
4. To display the name and balance.

Write a main program to test the program.

2

**Attempt any two of the following**

- a What is constructor? List some of the special characteristics and various types of constructor. 6
- b 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. 6
- c Discuss this pointer with the help of suitable example. 6

3

**Attempt any two of the following**

- a The class master derives information from both account and admin classes which in turn derives 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. Class person has data members name and code. Class account has data member pay. Class admin has data member experience. Class Master has data members name, code, pay, experience. 6
- b In what order class constructor called when derived class object is created? Give suitable example. 6
- c Write a program to read two distances in feet and inches through two objects of class distance. Add 6

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two distances using friend function and display the added distance.

- 4    **a**    What virtual and pure virtual functions. Write the various rules for the virtual functions    6
  - b**    What is polymorphism? How polymorphism is achieved at run time? Explain with suitable example    6
- 5    **a**    Write a program to handle two files using one stream.    6
- b**    Write a program declares a swap () function template that will swap two values of a given type of data.    6



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**Time: 2:30 Hr**

**Max. Marks: 60**

**Instructions to Candidate**

- 1) All questions are compulsory.
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- 3) Diagrams/sketches should be given wherever necessary.
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**1 Attempt any two of the following**

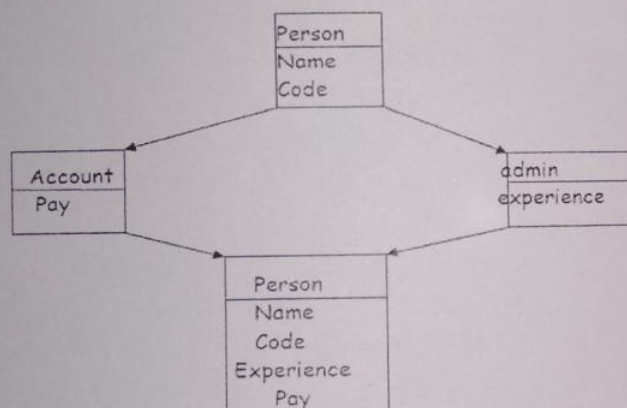
- a Describe with example the mechanism of accessing data members and member functions in the following cases **6**
  - b What is friend function? Explain with Example **6**
  - c Write a program to read two distances in feet and inches through two objects of class distance. Add two distances using function and display the added distance. **6**
- 
- 2 a How many arguments are required in the definition of an overloaded Binary Operators illustrate with program **6**
  - b Write C++ Program to display address of elements of an array using both array and pointers **6**

*Contd..*

3 **Attempt any two of the following**

a When it is mandatory for the derived class to have constructor? Write general form of defining derived class constructor and order of execution of base class constructor

b Consider a class network of the following figure. The class master derives information from both account and admin classes which in turn derives 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.



c How ambiguity can be resolve in multiple inheritance, when function with same name appear in more than one base class? Explain with example

4 **Attempt any two of the following**

a How is polymorphism achieved at run time? Explain with example

b What does this pointer point to? Explain with Example

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- c Create a base class called shape. Use this class to store two double type values that could be used to compute the area of figures. Derive two specific classes called triangle and rectangle from the base shape. Add to the base class, a member function `get_data()` to initialize base class data members and another member function `display_area()` to compute and display the area of figures. Make `display_area()` as a virtual function and redefine this function in the derived classes to suit their requirements 6
- 5 a What is the difference between opening a file with a constructor function and opening a file with `open()` function? When is one method preferred over the other? 6
- b Distinguish between the terms class template and template class. Explain with example 6

6

6

6

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**Course Code: CSU 403**

**Course Name: Object Oriented Technology**

**Time: 2 hr. 30 min.**

**Max. Marks: 60**

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**1.**

**Solve:**

**[8]**

- a) What are the various characteristics of Object oriented programming techniques ?
- b) What is a pointer? Explain with an example.
- c) What is constructor and destructor, explain with an example.
- d) What are file modes? Describe the various file mode options available.



2. **Solve any two**

- a) Write a program to read five real numbers and print average using a static member class .Use parameterized constructor for entering the numbers. [6]
- b) Design a program to input two complex numbers and add them with + using operator overloading? [6]
- c) Illustrate with an example how can a common friend function to two different classes be declared? [6]

3. **Solve:**

- a) What is Dangling pointer? Justify the answer with suitable example. [6]
- b) What is visibility mode? What are the different inheritance visibility modes supported by C++. [6]
- c) What are pure virtual functions? How do they differ from normal virtual function? [6]

4. **Solve any two:**

- a) With an example explain what are the different types of inheritance? [6]
- b) What is container-ship or delegation? How does it differ from inheritance? [6]
- c) Write a program to create an employ file, write the details of employees and display the details of the employ drawing the highest salary. The employ details are identification number, name, salary and designation. [6]

5. **Solve the following:**

[10]

- i) ---- is a variable which holds the address of another variable.
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- iv) The ----- pointer stores the address of the object currently invoking a member function.
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**1. Solve the following. (Two marks each) 12**

- (a) What is member-dereferencing operator?
- (b) Write some situations where inline expansion may not work.
- (c) What is virtual destructor?
- (d) How do the properties of following two derived

classes differ?

- i) class D1: private B(//....)
- ii) class D2: public B(//....)

4.

- (e) What is abstract base class? (a)
- (f) What is static data member? (b)

2. Solve any two of the following.

- (a) Write a program to overload ( $\leq$ ) operator to (6) compare two distances. The program should use member functions to read two distances and display the largest distance. (a)
- (b) What is exception handling? Write a program to (6) handle multiple exceptions. (b)
- (c) Explain how prefix and postfix form of ( $++$ ) (6) operator is overloaded.

5.

3. Solve any two of the following.

- (a) Explain copy constructor in details. (6)
- (b) What is virtual function? How can you access this function with pointer? Explain with suitable example. (6)
- (c) What do you mean by friend function? Write a (6) simple C++ program that shows how this function can act as bridge between two classes.



**4. Solve the following.**

- (a) What is iterator? Explain it's characteristics. (6)
- (b) Write a program that reads a text file and creates another file that is identical except that every sequence of consecutive blank spaces is replaced by a single space. (6)

**5. Solve the following.**

- (a) How class objects are passed as function arguments? Explain with the help of suitable example. (6)
- (b) Write a function template to perform linear search in an array. (6)

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**1 Attempt any two of the following**

**a** Describe with example the mechanism of accessing data members and member functions in the ~~following~~ *cases - various cases.* **6**

**b** What is friend function? Explain with Example **6**

**c** Write a program to read two distances in feet and inches through two objects of class distance. Add two distances using function and display the added distance. **6**

**2 a** How many arguments are required in the definition of an overloaded Binary Operators illustrate with program **6**

**b** Write C++ Program to display address of elements of an array using both array and pointers **6**

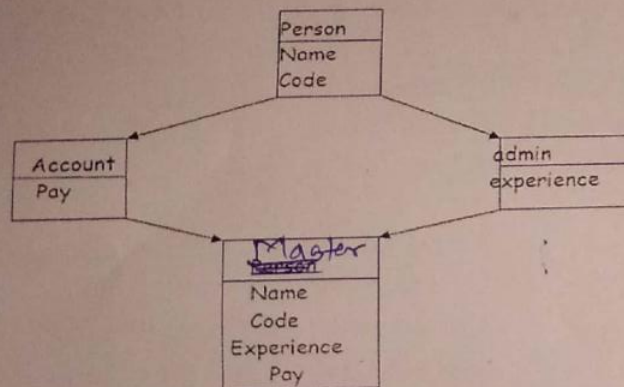
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3 **Attempt any two of the following**

a When it is mandatory for the derived class to have constructor? Write general form of defining derived class constructor and order of execution of base class constructor

b Consider a class network of the following figure. The class master derives information from both account and admin classes which in turn derives 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.



c How ambiguity can be resolve in multiple inheritance, when function with same name appear in more than one base class? Explain with example

4 **Attempt any two of the following**

a How is polymorphism achieved at run time? Explain with example

b What does this pointer point to? Explain with Example

c Create a base class called shape. Use this class to store two double type values that could be used to compute the area of figures. Derive two specific classes called triangle and rectangle from the base shape. Add to the base class, a member function get\_data() to initialize base class data members and another member function display\_area() to compute and display the area of figures. Make display\_area() as a virtual function and redefine this function in the derived classes to suit their requirements

5 a What is the difference between opening a file with a constructor function and opening a file with open() function? When is one method preferred over the other?

b Distinguish between the terms class template and template class. Explain with example