

AMIETE – CS/IT (Current & New Scheme)

Time: 3 Hours

December 2016

Max. Marks: 100

PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.

NOTE: There are 9 Questions in all.

- Question 1 is compulsory and carries 20 marks. Answer to Q.1 must be written in the space provided for it in the answer book supplied and nowhere else.
- The answer sheet for the Q.1 will be collected by the invigilator after 45 minutes of the commencement of the examination.
- Out of the remaining EIGHT Questions answer any FIVE Questions. Each question carries 16 marks.
- Any required data not explicitly given, may be suitably assumed and stated.

Q.1 Choose the correct or the best alternative in the following: (2×10)

- a. Bundling data and functions together is called _____.
(A) Inheritance (B) Encapsulation
(C) Polymorphism (D) Robustness
- b. Assuming var1 starts with the value 20, what will the following code fragment print out?
cout << var1--;
cout << ++var1;
(A) 20 20 (B) 19 20
(C) 20 21 (D) 19 21
- c. The library function exit() causes an exit from
(A) the loop in which it occurs. (B) the block in which it occurs.
(C) the function in which it occurs. (D) the program in which it occurs.
- d. The goto statement causes control to go to:
(A) an operator (B) a variable
(C) a label (D) a function
- e. In a class definition, data or functions designated private are accessible
(A) to any function in the program.
(B) only if you know the password.
(C) only to public members of the class.
(D) to member functions of that class.

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- f. If objA is in class A, and objB is in class B, and you want to say objA = objB;, and you want the conversion routine to go in class A, what type of conversion routine might you use?
- (A) Destructor (B) Member function
(C) Constructor (D) Inline function
- g. Assume a class C with objects obj1, obj2, and obj3. For the statement obj3 = obj1 - obj2 to work correctly, the overloaded - operator must:
- (A) take two arguments
(B) return a value
(C) create a named temporary object
(D) take only one argument
- h. Assume a class Derv that is privately derived from class Base. An object of class Derv located in main() can access:
- (A) public members of Derv (B) protected members of Derv
(C) protected members of Base (D) private members of Base
- i. A class hierarchy
- (A) shows the same relationships as an organization chart
(B) describes “has a” relationships
(C) describes “is a kind of” relationships
(D) shows the same relationships as a family tree
- j. Actual code for a template function is generated when
- (A) the function declaration appears in the source code
(B) the function definition appears in the source code
(C) a call to the function appears in the source code
(D) the function is executed at runtime

**Answer any FIVE Questions out of EIGHT Questions.
Each question carries 16 marks.**

- Q.2** a. Discuss the following concepts of Object Oriented programming: (2×4)
- (i) Objects
(ii) Data Encapsulation and abstraction
(iii) Dynamic Binding
(iv) Message Passing
- b. Differentiate between the procedure oriented programming and object oriented programming paradigm. Describe the main benefits provided by OOP. (4)

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- c. Illustrate the following: **(2+2)**
(i) Construct an expression that is equal to the absolute value of a variable i.e. if a variable A is positive, the value of the expression is just a, but if A is negative, the value of the expression is $-A$, which would be positive. Do it in the two ways, first by using a mathematical function, and second by using a conditional operator without using a mathematical function.
(ii) Write a C++ program that inputs experience and age of employee. The salary of the employee is 59000 if the employee is experienced and his age is more than 35, otherwise if the employee is experienced and his age is more than 28 but less than 35 than the salary should be 47000 otherwise for experienced employee the salary should be 29000 and for inexperienced employee the salary should be 19000.
- Q.3** a. Define the following statements in object oriented programming with suitable example to illustrate. **(4+4)**
(i) Loop Structures (For, while and do-while)
(ii) Jump Statements
- b. Describe the two dimensional arrays with an example. Discuss the memory representation of two dimensional arrays by a C++ program. **(8)**
- Q.4** a. What is Inline function? Explain the working of inline function in detail with a suitable C++ program. **(2+4)**
- b. Explain Function overloading in brief. Illustrate function overloading through volume function which computes the volume of a cube, a cylinder and a rectangular box. **(6)**
- c. Explain the concept of Default arguments in detail by a suitable C++ program. **(4)**
- Q.5** a. Differentiate between constructors and destructors. Describe the copy constructor by a C++ program and explain its use. **(8)**
- b. Explain the following with their suitable C++ program codes: **(4+4)**
(i) Static class Members and their characteristics
(ii) New and Delete operators
- Q.6** a. Write a C++ program to perform addition arithmetic operation on two complex numbers with + operator overloading that illustrates the concept of overloading of Binary operators. **(6)**
- b. Explain the rules for overloading operators in detail. Illustrate the operators that cannot be overloaded and also show the operators where friend functions cannot be used. **(4)**

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- c. What is the difference between Overloaded pre-increment operator and overloaded post increment operator? Give a C++ program code that illustrates the concept of overloading of subscript operator represent as []. (6)
- Q.7** a. Briefly describe the term Multilevel Inheritance in object oriented programming. Write a C++ program to illustrate the concept of Multilevel Inheritance. (8)
- b. Describe Polymorphism with its types. Discuss the concept of Compile time and Run time Polymorphism by using two different C++ programs. (8)
- Q.8** a. Discuss the concept of templates in C++. Explain the class template and function template with the help of two different programs in C++. (8)
- b. Explain the term Exception Handling and its mechanism. Discuss the concept of rethrowing an Exception by using a C++ program that demonstrates how an exception is rethrown and caught. (8)
- Q.9** a. Write short notes on the following: (1+1+2+2+2+2)
- (i) Text Streams
 - (ii) Binary Streams
 - (iii) Ifstream
 - (iv) Ofstream
 - (v) Fstream
 - (vi) Seek and Tell functions for manipulation of file pointers
- b. Explain the components of Standard Template Library in detail. (6)