## AMIETE – CS/IT (Current & New Scheme)

**Time: 3 Hours** | **JUNE 2017** | **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:** (10×2)

a. What does the following statement mean:
   int (*fp)(char*)

   **(A)** Pointer to a pointer
   **(B)** Pointer to an array of chars
   **(C)** Pointer to function taking a char* argument and returns an int
   **(D)** function taking a char* argument and returning a pointer to int

b. cout is a
   **(A)** class                      **(B)** object
   **(C)** function                   **(D)** byte of char

c. Which statement is correct?
   **(A)** Only constructors can have parameters
   **(B)** Only destructors can have parameters
   **(C)** Both constructors and destructors can have parameters
   **(D)** Neither constructor nor destructor can have parameters

d. In C++,
   **(A)** both references and pointers can be NULL.
   **(B)** pointers can be NULL but not the references.
   **(C)** pointers can be NULL and references can be void
   **(D)** None of these is correct

e. Which of the following is/are added automatically to every class, if we do not write our own:
   **(A)** Copy constructor             **(B)** Assignment operator
   **(C)** A constructor without any parameter   **(D)** All of these

f. Choose the correct statement w.r.t. friend functions & classes:
   **(A)** Friendship is inheritable
   **(B)** Too much of use of friendliness lessens the value of encapsulation
   **(C)** Friendship is automatic i.e. if class A is friend of class B then B is also a friend of A

**(D)** None of these

g. A static data member of a class declared in private scope
   **(A)** cannot be accessed by the member functions of the class
   **(B)** cannot be accessed by a static member function of the class
   **(C)** is shared by all the objects of the class
   **(D)** is same as normal data members

h. We cannot use friend function to overload the following operator
   **(A)** +                               **(B)** =
   **(C)** *                               **(D)** None of these

i. The member functions of a derived class can directly access only the
   **(A)** protected and private data      **(B)** private and public data
   **(C)** protected and public data       **(D)** protected data

j. Run time polymorphism is achieved only when
   **(A)** an object name along with dot operator is used to access virtual function
   **(B)** a virtual function is accessed through a pointer to the base class
   **(C)** a virtual function is accessed through a pointer to the derived class
   **(D)** a pointer to the object is used with the virtual function

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

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**Q.2**  a. What drawbacks of procedure oriented language like C led to the development
         of object oriented programming language like C++?                    **(8)**

         b. What happens in an object oriented paradigm? What are its main features?   **(8)**

**Q.3**  a. Illustrate the difference between the *break* and *continue* statement with the help
         of C++ programs.                                                     **(8)**

         b. Write a program in C++ using a two-dimensional matrix where the rows
         represent the **districts** and the columns represent **sale** in Rs. in each of the
         months of a specific district, in a year. Output of the program may look like as
         shown below:                                                         **(8)**

|             | Months |        |     |     |     |     |     |     |     |     |     |         |
|-------------|--------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|---------|
|             | 1      | 2      | 3   | 4   | ... | ... | ... | ... | ... | ... | ... | 12      |
| District 1  | 4137.5 | 846.7  | ... | ... | ... | ... | ... | ... | ... | ... | ... | 4679.25 |
| District 2  | 9876.2 | 8275.9 | ... | ... | ... | ... | ... | ... | ... | ... | ... | 1239.75 |
| .           | .      | .      | .   | .   | .   | .   | .   | .   | .   | .   | .   | .       |
| .           | .      | .      | .   | .   | .   | .   | .   | .   | .   | .   | .   | .       |
| .           | .      | .      | .   | .   | .   | .   | .   | .   | .   | .   | .   | .       |
| District 10 | ...    | ...    | ... | ... | ... | ... | ... | ... | ... | ... | ... | ...     |

**Q.4**  a. What are inline functions? Explain their behaviour with the help of a C++
         program.                                                             **(8)**

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    b. With the help of complete C++ programs explain the mechanism of Return-by-value and Return-by-reference of functions. **(8)**

**Q.5** a. What are static data members/class variables? Discuss. **(4)**

    b. In an institution students get admitted in various streams, or branches like MCA, DCA, BCA, BE etc. Write a complete C++ program to keep track of total number of students admitted in a particular session, using static data member. **(6)**

    c. What are constructors? Enlist its properties and illustrate the different types of constructors with a complete C++ program. **(6)**

**Q.6** a. What is operator overloading in C++? Which rules govern the operator overloading, explain by overloading a '+' (binary) operator for adding two objects. **(8)**

    b. Write a complete C++ program to overload new and delete operators. **(8)**

**Q.7** a. Can destructors be virtual? What is the purpose of a virtual destructor? Can constructors be virtual? Explain. **(6)**

    b. Explain the mechanism of access to virtual functions with the help of a C++ program. **(5)**

    c. With the help of an example explain the Overriding and data hiding mechanism of C++. **(5)**

**Q.8** a. Explain the concept of Class Templates with examples. **(8)**

    b. Briefly explain the following: **(8)**
       (i) Ellipsis in a Catch Block
       (ii) Nested Try-Catch Blocks
       (iii) Rethrowing an Exception
       (iv) Conditional Expression in a Throw Expression

**Q.9** a. Describe the ios class declaration and give the iostream hierarchy. **(8)**

    b. Illustrate the use of get(), put(), getline() and write() with programs. To which class they all belong to? Discuss in brief. **(8)**