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**Question Paper Code : 27170**

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2015.

Fourth Semester

Electrical and Electronic Engineering

CS 6456 — OBJECT ORIENTED PROGRAMMING

(Common to Electronics and Instrumentation Engineering, Instrumentation and Control Engineering)

(Regulations 2013)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Differentiate a Constant Pointer and a Pointer to a Constant with an example.
2. Illustrate the usage of this pointer in C++.
3. When do you call an Object destructor?
4. What is a pure virtual function?
5. What is an Iterator? List out the characteristics of an Iterator.
6. What do you mean by the term 'Generic Programming'?
7. Define the keyword 'static' in java.
8. Write the output produced by the following Code Fragments.  

```
System.out.println ("Result : "+ 40 + 30);  
System.out.println ("Result : "+(40 + 30));
```
9. Differentiate Checked and Unchecked exceptions.
10. How do you compare two strings by ignoring the case? Give an example.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Write a C++ program to implement a Binary Search Procedure to find whether the given element is present in the array or not using Objects and Classes. (6)
- (ii) Write short notes on casting primitive data types to Object type and vice versa with an example for each. (6)
- (iii) What is a namespace? How do you resolve the name conflicts using namespaces? Explain with an example. (4)

Or

- (b) (i) Write a C++ program to find maximum of two numbers using inline functions. (4)
- (ii) Write a C++ program to find the area of the square, rectangle, circle using function overloading. (8)
- (iii) Briefly describe on the objected oriented features supported by C++. (4)
12. (a) Develop a class Polynomial whose internal representation is a term consisting of a coefficient and an exponent. Develop a complete class containing proper constructor and destructor functions as well as set and get functions. Overload the addition and subtraction operator to add and subtract two polynomials and display the results. Overload the assignment operator to assign one polynomial to another using friend function. (16)

Or

- (b) (i) Develop an abstract Class Polygon from which **Triangle** and **Rectangle** are derived. Each Polygon should contain the function `Area( )` to calculate the area of them. Invoke appropriate `Area( )` function to calculate the area using pointer to base class and pointers to derived classes. (12)
- (ii) Create a 'Vector' named Student to add the names of the students in a class. Also display the contents of the vector after adding necessary elements. (4)
13. (a) (i) Implement a Dictionary named "Index" which consists of *Key Terms* and its *Descriptions* using MAP STL. Try to display all the terms and descriptions present in the dictionary and if a key term has been provided as an input, the corresponding description should get displayed as an output to the user by searching the entire dictionary. (8)
- (ii) Implement a Circular Queue with proper insertion and deletion operations using Class Templates. (8)

Or

- (b) (i) Write a C++ program to accept integer or string values from the user within a specified range. (Range has to be specified with minimum and maximum by the user). If the input violates the range, appropriate exception needs to be raised. (6)
  - (ii) Write a C++ program to sort a list of integers, floating point numbers and Characters by Quick Sort mechanism using function templates. (6)
  - (iii) Write short notes on the storage structures available with Standard Template Libraries. (4)
14. (a) (i) What are Packages? How are they created and used? Illustrate it with an example. (8)
- (ii) How do you implement multiple inheritance in Java? Explain. (4)
  - (iii) Why java has been called as "Write Once and Run Anywhere"? Explain. (4)

Or

- (b) Write a Java application to implement Mark Processing system for a University consisting of various disciplines such as Engineering, Science and Arts. Grade calculation for the students differs across the disciplines.
    - (i) Grade calculation for Undergraduate Engineering students requires the involvement of technical events apart from the marks obtained in their subjects and Post graduate Engineering students require research project as an additional component.
    - (ii) For Post graduate Science students, involvement of paper presentation is required whereas assignment weightage is mandatory for Post graduate Arts students.
    - (iii) Grades for Research scholars would be computed based on the number of research articles published and number of research projects done. Try to implement the above system polymorphically. (16)
15. (a) (i) Create an application that executes two threads. First thread displays the alphabets A to Z at every one second. The second thread will display the alphabets Z to A at every two seconds. Both the threads need to synchronize with each other for printing alphabets. The Second thread has to wait until the first thread finishes its execution. The application waits for all the threads to finish the execution. (10)
- (ii) What is an interface? How do you achieve multiple inheritance through interfaces? Explain with an example. (6)

Or

- (b) (i) Write a Java program to accept a string from user and check whether it is a file or directory. If it is a directory, count the number of files in that directory. If it is a file, count the number of consonants and display the contents of the file in a reverse order. (6)
- (ii) Write a Java program that enters an 8-digit string for a birthdate. The first two digits in the string are the month of birth, the next two are the day and the remaining four are the year. The Java program should squeeze out these substrings and calculate the current age (Hint: Approximately print the difference in years). Raise a **NegativeAgeException** if the calculated age is negative. (10)
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