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**P.E.S. College of Engineering, Mandya - 571 401**  
 (An Autonomous Institution affiliated to VTU, Belgaum)  
**Third Semester, B.E. - Computer Science and Engineering**  
**Semester End Examination; Dec. - 2014**  
**Object Oriented Programming with C++**

*Time: 3 hrs*

*Max. Marks: 100*

*Note : i) Answer FIVE full questions, selecting ONE full question from each Unit.  
 ii) Assume suitable missing data if any.*

**Unit - I**

1. a. State and explain the basic concepts of OOP with an example. 10
- b. Write a program to define a class by name MATRIX with suitable data members and member functions to accept, display and to add and subtract two matrices. 10
2. a. Write a program to create a class called student with data members as stu-name, stu-Reg-No., Test1, Test 2 and Test 3 marks. Create an array of 'n' objects of this class and display all the information of students along with the Final test marks.(Final Test marks is calculated by tallying the average of the best two test marks). 10
- b. Write a program to illustrate function overloading to find area of a rectangle, triangle and circle. 10

**Unit - II**

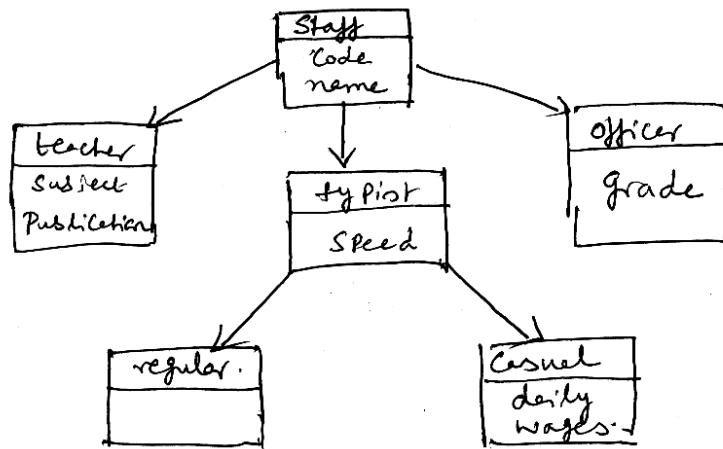
3. a. Define constructors and destructors with an example. 8
- b. Discuss with an illustration the overloading of new and delete operators. 8
- c. What are friend functions? Explain with an illustration. 4
4. a. Write a program to concatenate two strings using dynamic constructors. 10
- b. Write a C++ to illustrate the overloading of + and – operators. 10

**Unit - III**

5. a. Define function template. Write a function template for sorting the given numbers in a array. The array parameter must have generic data types. 10
- b. What is an exception? How is an exception handled in C++? Explain with an example. 10
6. a. Write a class template for STACK operations. 10
  - (i) Insert an element at front
  - (ii) Display the elements of Stack
  - (iii) Delete an element from stack
- b. Explain the purpose of function template with an example. How exceptions are handled in C++.

**Unit - IV**

- 7 a. Define inheritance. What are the different types of inheritance supported by C++? Explain them with an example. 12
- b. Explain with a suitable program, how base class member functions can be invoked in a derived class, if the derived class also has a member function with the same name. 8
- 8 a. An educational institution wishes to maintain a database of its employees. The data base is divided into a number of classes whose hierarchical relationships are shown below. The figure also shows the maximum information required for each class. Specify all the class and define functions to create the data base and retrieve individual information as and when required.



10

- b. Write short notes:
  - (i) Nested classes 10
  - (ii) This pointer.

**Unit - V**

- 9 a. Explain how do you achieve polymorphism? 6
- b. What are Virtual functions? Explain with an example. 7
- c. Discuss with an example the istream and ostream classes member functions, to handle I/O operations. 7
- 10 a. Explain the formatted console I/O operations with examples. 10
- b. Write notes on:
  - (i) C++ stream classes 10
  - (ii) Virtual functions.

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