Course Code: CST256

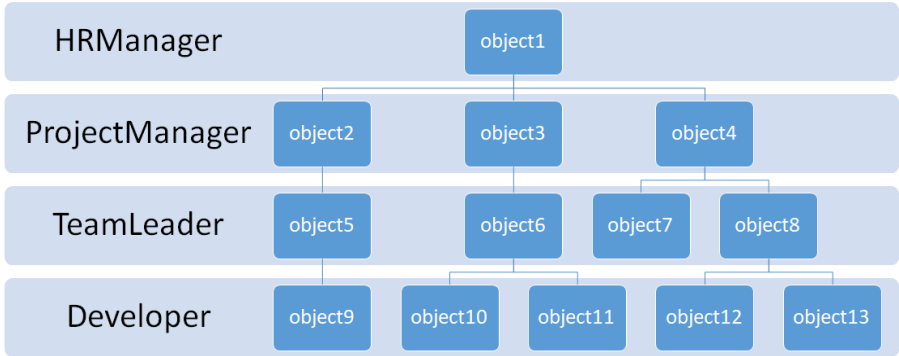**Fourth Semester BE (Computer Science and Engineering) Examination**
OBJECT ORIENTED PROGRAMMING

Time: 2 Hours]   [Max. Marks: 40

Instructions to Candidates:
   1. Make suitable assumptions wherever necessary and clearly state the assumption made.
   2. Copying the contents of square brackets in the question paper is not required.

Question	Description of Question	Marks	CO
1 (a)	Design a class Employee, having String companyname, String dept, String position and Employee reportingManager. Create another class Office having an array of employees where each must have a manager except one. Write a method displayAllManagersOf(Employee e) which will display all the managers of employee e and a method displayAll(String position) to display all employee working on that position. [For example: Given a object hierarchy as follows:	7	CO1

	Output of displayAllManagersOf(object13), must display details of below employee objects in the given order:-> object8, object4, object1 Output of displayAll("ProjectManager") must display the details of object2, object3 and object4]		
2 (a)	What is an interface? Why is it used in Java? Can we create an anonymous class using an interface? Demonstrate with an example.	7	CO1
	Explain the concept of functional interfaces and how they are used for writing Lambda Expressions. Illustrate with sample code how lambda expressions significantly reduce the lines of code in a Java program.		

3 (a) Explain the following terms related to exception handling in Java: 7   CO2
    A. try
    B. catch
    C. throw
    D. throws
    E. finally
Can a try catch block replace a conditional statement like if-else or switch case? If yes, then how? If no, then why?

--OR--

(b) Describe how we can create a serializable object and write it to a   7   CO2
file? Also demonstrate with the help of a program how will serialization work if the object contains references to other user defined datatypes?
Will serialization work if the object to be written contains an Arrayist? Why?

4 (a) Design a class Laptop having features String model_name, double   6   CO2
screen size, int RAM, int disk_size, boolean hasSSD and double cost.
Write a class MarketPlace having a collection of Laptops, where users can view all Laptops according to sorted order (descending or ascending) of cost, disk size, RAM, and screen_size.

5 (a) Write a brief note on thread synchronization techniques in Java.   3   CO3

(b) Write a program to query the below table, print the Name and   4   CO3
quantity of the items and compute the total cost of all available items.

Item_Code	Description	Cost	Qty_Available
101	Pen	10	350
102	Eraser	5	200
103	Pencil	3	500

6 (a) What are Design Patterns and its need? On what basis are they   6   CO4
classified? Name three patterns of each category.