VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD
Accredited by NAAC with A++ Grade
B.E. (CSE & AIML) III-Semester Main & Backlog Examinations, Jan./Feb.-2024
Object Oriented Programming

Time: **3 hours**   Max. Marks: **60**

*Note: Answer all questions from **Part-A** and any **FIVE** from **Part-B***

Part-A (10× 2 = 20 Marks)

Q. No.	Stem of the question	M	L	CO	PO
1.	What is the need of object-oriented programming over procedural programing?	2	1	1	1,2
2.	Justify the statement "A redefinition of a superclass method in a subclass need not have the same signature as the superclass method. Such a redefinition is not method overriding but is simply an example of method overloading".	2	2	1	1,2
3.	Can we have multiple catch blocks for a single try block? Give an example.	2	2	2	1,2
4.	If the only constructor for a class is marked as private, is it ever possible to have an instance of that class or any subclass of it? Explain why or why not.	2	2	2	1,2
5.	Explain what is required to declare an immutable class in Java.	2	2	3	1,2
6.	Discuss the advantages and disadvantages of using byte streams over character streams.	2	1	3	1,2
7.	How does the collection framework differ from legacy classes in java?	2	2	4	1,2

8.	Predict the output for the given code
	
	import java.util.StringTokenizer;
	public class Main {
	  public static void main(String[] args) {
	    String str = "This is a sample string, with multiple delimiters! How cool is that?";
	    StringTokenizer st = new StringTokenizer(str);
	    while (st.hasMoreTokens()) {
	     System.out.println(st.nextToken());
	    }
	  }
	}
		2	1	4	1,2

9.	What is a lambda expression in Java? How does a lambda expression relate to a functional interface?	2	1	5	1,2
10.	What distinguishes Stream's intermediate and terminal operations?	2	2	5	1,2

		Part-B (5×8 = 40 Marks)				
11. a)		What are the key principles of object-oriented programming?	4	1	1	1,2
b)		For each of the following Java language features, Explain exactly what the feature achieves, why that is a benefit in the context you describe, and what risk or inconvenience might arise if the feature were not deployed.	4	3	1	1,2
		a) Methods that have been declared as protected.				
		b) Classes that are labeled as final.				
12. a)		Imagine that you are working in the insurance context. You can issue a Policy to insure a policy holder. There are two types of policies available: a life insurance policy and a car insurance policy. Both of these policies take into consideration the age of the policy holder. You need to calculate the premium (i.e. the cost) of each policy based on the following guideline: ^	4	3	2	1,2
		a) The life insurance takes 5 percent of the total sought coverage amount if the policy holder is under 35 of age or 10 percent otherwise.				
		b) For adults only, the car insurance takes 10 percent of the car value if the policy holder is over 30 of age or 20 percent otherwise .				
		Define four classes Policy Holder, Policy, Life Insurance Policy extends Policy, Car Insurance Policy extends Policy such that they encapsulate this system and raise custom exceptions wherever applicable.				
b)		Write a Java program to Explain how modifiers are used to control the visibility of identifiers.	4	3	2	1,2
13. a)		What is meant by a generic in the context of Java? Explain the main purpose of generics and the most important syntax associated with them.	4	2	3	1,2
b)		Write a Java method called toHex that takes an integer as its argument and returns the string form of the hexadecimal representation of that number. Explain clearly how your code works, commenting on how it avoids displaying unnecessary leading zeros and how negative numbers are handled.	4	2	3	1,2
14. a)		Discuss the proposition "String is a sub-class of Object, therefore Vector <Object> is a sub-class of Vector<String>".	4	2	4	1,2
b)		Develop a java application that needs to execute a task repeatedly at a fixed interval of time. The task should start after a delay of 2 seconds. How would you implement this functionality? Hint: Timer class	4	3	4	1,2
15. a)		Write a java program using lambda expression to calculate the factorial of a given number.	4	1	5	1,2
b)		Write a java program given a stream of data (in our case, a List of String) where each string is a combination of the country name and place of the country(Ex:Nepal, Kathmandu). Now, we can process this stream of data and retrieve only the places from Nepal. Hint: Stream API	4	2	5	1,2

			M	L	CO	PO
16.	a)	Write a Java program to describe the Circumstances in which you might choose to declare one of your classes final, and cases when you might declare a method in a class final or protected.	4	2	1	1,2
	b)	For the banking application, create an array of objects for the Account class, Raise the predefined Array Index Out of Bounds, Negative Array Size and Array Store Exceptions while creating an account based on details given. Create Insufficient Funds Exception while withdrawing amount if balance not available and if trying to deposit amount <=0, explicitly raise the Illegal Argument Exception. Wherever suitable make use of multi-catch, throws and finally blocks.	4	3	2	1,2
17.		Answer any *two* of the following:				
	a)	Which class would you choose among String, StringBuffer, and StringBuilder, and justify why you have chosen for developing an application that requires multiple string modifications, such as appending, replacing, and deleting characters.	4	3	3	1,2
	b)	Consider you have a list of cars with their models and prices. Write a comparator to sort the cars in ascending order of their prices. If two cars have the same price, sort them in descending order of the length of their models.	4	3	4	1,2
	c)	Write a Java program to move all lower case letters to the front of a given word. This will keep the relative position of all the letters both upper and lower case same. Input: Java, output: avaJ Hint: Regular Expression	4	3	5	1,2

M : Marks;　　L: Bloom's Taxonomy Level;　　CO; Course Outcome;　　PO: Programme Outcome

i)	Blooms Taxonomy Level – 1	20%
ii)	Blooms Taxonomy Level – 2	37.5%
iii)	Blooms Taxonomy Level – 3 & 4	42.5%

*****