BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION MO/2024)

CLASS: BTECH **SEMESTER : III/ADD**
BRANCH: CSE/AIML **SESSION : MO/2024**

SUBJECT: CS233 OBJECT ORIENTED PROGRAMMING & DESIGN PATTERN

TIME: 02 Hours **FULL MARKS: 25**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 5 marks and total 25 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates**

			CO	BL
Q.1(a)	How did java become a platform-independent language?	[2]	1	2
Q.1(b)	Consider the following scenarios and justify whether each of the scenarios is an example of abstraction or encapsulation properties of object-oriented programming. Scenario 1: You have a class *BankAccount* that provides methods like *deposit*() and *withdraw*() but hides the internal details of how the balance is stored or calculated. The user interacts only with the public methods and does not know how the calculations are performed. Scenario 2: A class *Car* has private variables like speed and *engineTemperature* and provides public methods *accelerate*() and *coolEngine*(). The internal state of the car's components is hidden and modified only through these methods. Scenario 3: An *Animal* class provides a method *makeSound*() implemented differently by subclasses like *Dog* and *Cat*. The concept of making a sound is defined at a high level, but the specific details are left to the subclasses.	[3]	1	2

Q.2(a)	Correct the errors (if any) and predict the output of the following code segment:
	class Test
	{ public static void main(String args[])
	{ byte b;
	int i = 257;
	double d = 323.142;
	System.out.println("Conversion of int to byte.");
	b = (byte) i;
	System.out.println("i = " + i + " b = " + b);
	System.out.println("\nConversion of double to byte.");
	b = (byte) d;
	System.out.println("d = " + d + " b= " + b);
	} }
		[2]	2	4

Q.2(b)	(i) Differentiate between local variable and instance variable. (ii) Differentiate between static and non-static method. (iii) Differentiate between 'Integer' and 'int' in context of java?	[3]	2	4
Q.3(a)	Can we overload Java main method? Justify your answer with an example.	[2]	2	2
Q.3(b)	What do you understand about constructors? Describe the types of constructors with an example? What is the behavior of constructors with keyword static?	[3]	2	1, 4

PTO

Q.4(a) What is the output of the following program? Explain your answer. Assume both class A and Main are in same packages. [2] 2 3

```
class A{
        public int val;


        public A(int v){

                this.val = v;

        }
}
```

```
public class Main{
 public static A modifyVal(A a){
          a.val = 30;
   return a;
 }
  public static void main(String
args[]){
   A a1 = new A(10);
          A a2 = a1;
          a2.val = 20;
   A a3 = modifyVal(a2);
   System.out.println(a1.val);
   System.out.println(a2.val);
   System.out.println(a3.val);
  }  }
```

Q.4(b) Explain three usages of 'this' keyword with example? Can we use 'this' with a static method? If yes then provide a suitable example, if no then justify your answer. [2+1] 2 1, 4

Q.5(a) Illustrate the difference between standard and enhanced for statement (for-each loop) with ArrayList. [2] 2 3

Q.5(b) Write a Java program to return true if an array can be split into two halves in such a way that the sum of left side of the splitting is equal to the sum of the right side. [3] 2 3

Sample input 1: The given array is : 1 3 3 8 4 3 2 3 3
Sample output 1: True!! The array can be split in a position where the sum of both side are equal.
Note: Here, splitting position is in between 8 and 4. Sum of left side is 1+3+3+8 =15 Sum of right side is 4+3+2+3+3 = 15
Sample input 2: The given array is : 1 4 1 8 4 3 5 3 3
Sample output 2: False!! The array cannot be split at any position where the sum of both side are equal.

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