BE IT 2ND YEAR, 2ND SEMESTER, 2024
OBJECT ORIENTED SYSTEMS

Time: 1 hour **SET-A** **Full Marks: 30**

1. Justify the truth or falsity of the following statements with proper reasons. Provide code snippet where necessary.
i) Arrays and strings are reference data types in Java whereas int, float, char are primitive datatypes.
ii) A static block of a class can initialize both static and non-static variables of that class.
iii) All the member methods of a class except the main() method can be overloaded.
iv) An abstract class can not have a constructor because it cannot be instantiated.
v) Java does not support multiple inheritance.

[3x5=15]

2. a) Distinguish between String and StringBuffer class. How many constructors are available for each of them? Consider a StringBuffer object ***s*** created as follows. Now discuss the content of ***s*** after each statement is executed.

```
StringBuffer s=new StringBuffer("BE IT OOS");
s.ensureCapacity(30);
System.out.println("Capacity="+s.capacity()+"Length="+s.length());
s.append("2nd year") ;
s.insert(2, "2nd sem");
s.replace(5, 8,"Java");
```

b) Consider two packages p1 and p2; each having a class ***Sample***. What problem will arise on importing the two packages in a source file? State how the problem can be resolved. Use supporting code snippets to depict.

[(2+3+6)+(2+2)=15]

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Time: 1 hour **SET-B** **Full Marks: 30**

1. Justify the truth or falsity of the following statements with proper reasons. Provide code snippet where necessary.
i) Arrays are passed to a method by reference. However, strings are passed by value.
ii) We cannot access ***this*** operator within the ***main()*** method of a class.
iii) For cascading method call, all the methods can return any value other than **void**.
iv) Run-time polymorphism can be achieved for both member methods and member variables of a class.
v) Any member method of a Base class can be overridden in the Child class by keeping the signatures identical.

[3x5=15]

2. a) What will be the content of ***s*** after each statement of the following code snippet. Illustrate with proper logic.

```
StringBuffer s=new StringBuffer("Institute");
s.insert(3, "ABC");
s.insert(5, 1);
s.insert(7, 56.67d);
s.delete(3,6);
s.replace(3, 7, "PQRS");
s.setCharAt(2, 'X');
s.append(8);
s.ensureCapacity(30);
System.out.println("Capacity="+s.capacity()+"Length="+s.length());
```

b) What do you mean by static import of packages? Show its utility with suitable examples.
How can you restrict a class of a package from being imported?

[10+(3+2)=15]

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CT2 : SET-A

Time: 1 hour **Full Marks: 30**

1. a) What is the drawback of creating a thread extending the ***Thread*** class? State how this drawback can be overcome. Show how the execution of a thread can be started.
   b) Discuss when synchronized block is better to use than a synchronized method. Provide suitable code snippets.
   c) Distinguish between ***sleep()*** and ***wait()*** methods. Provide all the overloaded versions for each of them, if any.
   d) Distinguish the functionalities between ***throw*** and ***throws*** keyword with suitable code. Show how they can be combined.

   [(2+2+2)+3+3+3=15]

2. a) Explain the drawbacks of ***Scanner*** class. How those can be eliminated?
   b) State the functionalities of ***getAbsolutePath()***, ***isDirectory()*** and ***read()*** methods.
   c) Use suitable code snippet to show how to access/invoke the forbidden methods of a class using reflection. Also show (with snippet) how a final field of a class can be modified.

   [(3+3)+3+(3+3)=15]

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OBJECT ORIENTED SYSTEMS
CT2 : SET-B

Time: 1 hour **Full Marks: 30**

1. a) Explain the various ways of creating threads in java with suitable examples of code snippets. Which one is more efficient to use and why?
   b) What is the purpose of declaring a block as ***synchronized***?
   c) State the functionalities of ***join()*** and ***notify()*** methods.
   d) Show with a suitable code snippet how an exception can be rethrown.

   [(4+2)+3+3+3=15]

2. a) Consider the following code snippet. Find out the problem/s and state how to fix them. Rewrite the appropriate code. Is there any other way to solve the problem without Scanner class?

```
Scanner sc=new Scanner(System.in);
int a=sc.nextInt();
System.out.println("a="+a);
String s=sc.nextLine();
System.out.println("s="+s);
char ch=sc.nextChar();
System.out.println("ch="+ch);
```

   b) Discuss the functionalities of ***DataInputStream***, ***FileInputStream***, and ***InputStreamReader*** classes.
   c) Write suitable code snippet to invoke the ***length()***, ***capacity()*** and ***setCharAt()*** methods of **StringBuffer** class using reflection. Illustrate their functionalities with suitable examples.

   [(5+2)+3+(3+2)=15]