Unique paper Code      : 42347901
Name of the Course    : B.Sc. (Programme): DSE 1A
Name of the Paper      : Programming in JAVA
Semester                   : V
Year of Admission      : 2015, 2016, 2017 & 2018
Maximum Marks          : 75
Duration                    : Three hours

**Instructions for candidates:**
Attempt any four questions. All questions carry equal marks.

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| Q1. | Is JVM a compiler or interpreter? Give justification. How does polymorphism promote extensibility? Explain with an example.<br><br>What will be the output of the following Java program?<br><br>```java
1.      class Test {
2.      public static void main(String[] args)
3.      {
4.          int i = 0, j = 9;
5.          do {
6.              i++;
7.              if (j-- < i++) {
8.                  break;
9.              }
10.         } while (i < 5);
11.         System.out.println(i + "" + j);
12.     }
13.     }
```<br>What are the two control structures used in Java for making decisions? Explain with suitable example.<br><br>How many elements will be allocated in the array twoD after the execution of following statements?<br>```java
    int twoD[][] = new int [2][];
    twoD[0] = new int [2];
    twoD[1] = new int [4];
``` |
| Q2. | Write a Java program to create a user defined exception MyException and use this to signal an error condition if the number is negative. Write a method MySqrt(int num) to compute the square root of a number which raises an exception of type MyException if the input (i.e. num) is a negative number. Explain the terms try, catch, throw and finally with respect to exception handling in your program.<br>Write a program in Java to replace a substring in a string by another one. Make use of indexOf() and substring() methods. |
| Q3. | What do you mean by applets? Explain its types. How do applets differ from application program? Write a program in Java using AWT to display a string message "Stay Safe Stay Healthy" in an applet window with pink as background colour and blue as text colour.<br>Write a program in Java to read a file named A.txt and copy the contents in another file named B.txt after removing the vowels.<br>Name the two types of I/O streams available in Java. What is the difference between the two types of streams? |

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| Q4. | Write a program in Java to create a class `CountAndPrintArgs` to print the number of arguments passed on the command line as well as the first character of each argument passed. For example, if the command line arguments are "Mango Cucumber Apple" then the output will be:<br><br>    No. of Arguments – 3    MCA<br><br>What are the properties of a constructor? Why are the overloaded constructors needed? Explain the use of overloaded constructors with the help of an example.<br><br>Referring to the following Java code snippet, what data type could be returned by the method `check()` and why?<br><br>    `if (check(storeNum) != Null) {}` |
| Q5. | What is the significance of the CLASSPATH environment variable in creating/using a package? Write a program in Java to create an interface `Shape` that contains a method `Perimeter` to calculate the perimeter of an object. Define two classes-`Circle` and `Rectangle` with suitable fields and methods. Implement the interface `Shape` in these classes. Write the appropriate `main()` method to create object of each of the above mentioned classes and test all the methods.<br>How an interface is different from a class? Show how we can create an instance of an interface. What type of variables can be declared inside an interface definition? Give examples. |
| Q6. | Write a program in Java to create a class `BankAccount` that represents a bank account including appropriate data members. Construct the methods to:<br>        Assign initial values to data members<br>        Deposit an amount<br>        Withdraw amount after checking balance<br>        Display the name, balance and interest earned.<br>Do you need to use `static` keyword for the above bank account program? Explain.<br>What is the purpose of `final` keyword in context of variable, method and class? Explain with the help of suitable examples. |