INSTRUCTIONS

1. This question paper contains EIGHTEEN (18) questions and comprises EIGHT (8) printed pages, including this page.

2. An ANSWER SHEET is provided for you to write the answers. It comprises TWO (2) printed pages.

3. Answer ALL questions within the space provided on the Answer Sheet.

4. Maximum score is 20 marks.

5. This is an OPEN BOOK test.

6. Write legibly with a pen or pencil.

7. Calculators are allowed, but not electronic dictionaries, laptops, PDAs or other computing devices.

8. Submit only the Answer Sheet at the end of the test. You may keep the question paper.

9. Write your MATRICULATION NUMBER on the Answer Sheet using a PEN.

——— END OF INSTRUCTIONS ———
SECTION A (15 Multiple Choice Questions : 15 Marks)
Each question has one correct answer. Write your answer in the space provided on the
Answer Sheet. 1 mark for each correct answer and no penalty for wrong answer.

1. Which of the following are not legal identifiers?
   i. NUMBER_OF_MEMBERS_2008
   ii. #OfMembers2008
   iii. $NumberOfMembers2008
   iv. 2008MembersNumber

A. Only (iv).
B. Only (ii) and (iii).
C. Only (ii) and (iv).
D. Only (ii), (iii) and (iv).
E. All of (i), (ii), (iii) and (iv).

2. What is the value of variable \( i \) after execution of the following statement?
   \[
   \text{int } i = 7/2 \ast 4 \text{ } \% \text{ } 3 \ast 3;
   \]

A. 0
B. 3
C. 5
D. 6
E. 9

3. Which of the following assignment statements is not valid?
   A. int i = (int) 0.987;
   B. int j = 9.0;
   C. double d = 9;
   D. double e = (int) 9.87;
   E. char c = (char) 98.7;

4. Which of the following expressions is/are false?
   i. \((3 < 2) \mid \mid \text{"abc".charAt(1) == 'a'}\)
   ii. !(false) && (5/3 \text{ } \% \text{ } 4 - 1 != 1)
   iii. \("NUS SOC".length() >= 7 && (int)(5.0/1.7) == 2\)

A. None of (i), (ii) and (iii) is false.
B. Only (i) is false.
C. Only (i) and (ii) are false.
D. Only (ii) and (iii) are false.
E. All of (i), (ii) and (iii) are false.
5. Two int variables \(x\) and \(y\) are declared and initialized with a value between 0 and 99 inclusive. Which of the following statements will interchange the values of \(x\) and \(y\)?

   i. \(x = y;\) \(y = x;\)
   ii. \(x = y;\) \(y = x;\) \(x = y;\)
   iii. \(x = ((x*100)+y)\%100;\) \(y = ((x*100)+y)/100;\)

   A. None of (i), (ii) and (iii).
   B. Only (i).
   C. Only (i) and (ii).
   D. Only (ii) and (iii).
   E. All of (i), (ii) and (iii).

6. Given the following program:

   ```java
   import java.util.Scanner;
   
   public class Scan {
       public static void main(String[] args) {
           Scanner stdIn = new Scanner(System.in);
           System.out.println("Enter year of matriculation: ");
           String year = stdIn.next();
           System.out.println("Enter student's name: ");
           String name = stdIn.nextLine();
           System.out.println("Name - "+ name + " - "+ year);
       }
   }
   ```

   Assume that the user intends to input the following data:

   2008 <Enter>
   John Smith <Enter>

   What happens when the program is run?

   A. Program accepts both inputs, and it outputs:
      Name - John Smith - 2008
   B. Program accepts both inputs, and it outputs:
      Name - John - 2008
   C. Program accepts only first input, and it outputs:
      Name - - 2008
   D. Program accepts only second input, and it outputs:
      Name - John Smith -
   E. Program causes run-time error due to mismatch of input type.
7. The following program determines if the input integer is even or not.

```java
import java.util.Scanner;

public class IsEven
{
    public static void main(String[] args)
    {
        Scanner stdIn = new Scanner(System.in);
        int n = stdIn.nextInt();
        boolean isEven;

        // code to test whether n is even.
        System.out.println(n + " even? " + isEven);
    }
}
```

Which of the following codes can be used in place of the comment without causing any error?

i. if (n%2 == 0)
   {
       isEven = true;
   }
else
   {
       isEven = false;
   }

ii. if (n%2 == 0)
    {
       isEven = true;
    }
    if (n%2 == 1)
    {
       isEven = false;
    }

iii. switch (n%2)
    {
    case 0: isEven = true; break;
    case 1: isEven = false; break;
    }

A. None of (i), (ii) and (iii).
B. Only (i).
C. Only (i) and (ii).
D. Only (i) and (iii).
E. All of (i), (ii) and (iii).
8. What is the output of the following program fragment?

```java
int a = 2;
int b = 8;
while (a < 7)
{
    a += 1;
    System.out.print(a + b + " ");
    b -= 1;
}
System.out.println();
```

A. 38 47 56 65 74  
B. 28 37 46 55 64  
C. 11 11 11 11 11  
D. 11 12 13 14 15  
E. Program cannot be run due to compilation error.

9. A Breakpoint has been set at line 14 of the following program using the DrJava debugger. What are the values of the variables given below when the Breakpoint is reached for the first time?

```java
public class Parser
{
    public static void main(String[] args)
    {
        String sentence = "this is a test ";
        String token;
        int start = 0;
        int stop;

        do
        {
            stop = sentence.indexOf(' ');
            token = sentence.substring(start, stop) ;
            sentence = sentence.substring(stop + 1);
            System.out.println(token);
        } while (!sentence.equals(""));
    }
}
```

<table>
<thead>
<tr>
<th>stop</th>
<th>token</th>
<th>sentence</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. 3</td>
<td>&quot;this&quot;</td>
<td>&quot;this is a test &quot;</td>
</tr>
<tr>
<td>B. 4</td>
<td>&quot;this&quot;</td>
<td>&quot;is a test &quot;</td>
</tr>
<tr>
<td>C. 4</td>
<td>&quot;this&quot;</td>
<td>&quot;this is a test &quot;</td>
</tr>
<tr>
<td>D. 14</td>
<td>&quot;test&quot;</td>
<td>&quot;this is a &quot;</td>
</tr>
<tr>
<td>E. 13</td>
<td>&quot;test&quot;</td>
<td>&quot;this is a test &quot;</td>
</tr>
</tbody>
</table>
10. What is the output of the following program fragment?

```java
int p = 1;
for (int i = 0; i < 10; i+=2)
{
    p += i;
    System.out.print(p + " ");
}
```

A. 0 2 4 6 8  
B. 1 2 4 7 11 16 22 29 37 46  
C. 1 3 5 7 9  
D. 1 3 7 13 21  
E. 1 3 5 7 9 11

11. What is the value of variable `count` after execution of the `do..while` loop?

```java
String str = "Mississippi";
int count = 0, i = 0;
do
{  
    if ( str.charAt(i) == str.charAt(i+1) &&  
        str.charAt(i+1) != str.charAt(i+2) )  
    {  
        count++;
    }
    i++;
} while (i < str.length() - 2);
```

A. 0  
B. 1  
C. 2  
D. 3  
E. A StringIndexOutOfBoundsException occurs.

12. What is the output of the following program fragment?

```java
char c = 'd';
Character.toUpperCase(c);
System.out.println("Is " + c + " lower case? " +  
    Character.isLowerCase(c));
```

A. Is c lower case? true  
B. Is d lower case? true  
C. Is d lower case? false  
D. Is D lower case? true  
E. Is D lower case? false
13. What is the output of the following statement?

\[
\text{System.out.printf("%-2.2f\n", Math.pow(2,3));}
\]

A. 8
B. 8.
C. -8
D. 8.00
E. -8.00

14. What is the output of the following program fragment?

```
int[] array = {1,2,3,4,5};
int j = 0;
for (int i = 0; i < 10; i++)
{
    System.out.print(array[j]);
    j = (j+2) % array.length;
}
```

A. 12345
B. 1234512345
C. 1351351351
D. 13524
E. 1352413524

15. Study the following program fragment.

```
String s1 = "ABC";
String s2;
char[] c1 = {'a','b','c'};
char[] c2 = new char[c1.length];
s2 = s1;
c2 = c1;
s2 = s2.substring(0,1) + "Y" + s2.substring(2);
c2[1] = 'y';
```

What are the contents of the strings and arrays?

A. "ABC" "ABC" {'a','b','c'} {'a','b','c'}
B. "ABC" "AYC" {'a','b','c'} {'a','y','c'}
C. "ABC" "AYC" {'a','y','c'} {'a','y','c'}
D. "AYC" "AYC" {'a','b','c'} {'a','y','c'}
E. "AYC" "AYC" {'a','y','c'} {'a','y','c'}
Section B (3 Questions, 5 Marks)
Write your answer in the space provided on the Answer Sheet.

16. Complete the Java program Pattern given in the Answer Sheet so that given a positive integer input, a stylized pattern is printed accordingly as shown in the sample runs below. [2 Marks]

<table>
<thead>
<tr>
<th>Enter count: 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>#-#--#---#----</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Enter count: 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>#-#--#---#----#-----#------#-------</td>
</tr>
</tbody>
</table>

17. Write down the output of the following program fragment. [2 Marks]

```java
int[] array = {1,2,3,4,5};
for (int i = 0; i < array.length; i++) {
    for (int j = 0; j < i; j++) {
        array[i] += array[j];
    }
    System.out.print(array[i] + " ");
}
```

18. Given an int variable p containing an odd integer greater than one, complete the following Java expression to generate a random odd number oddNum between 1 and p inclusive. (Hint: every positive odd number s can be expressed as 2r + 1 where r ≥ 0) [1 Mark]

```
int oddNum = Write your answer in the Answer Sheet.
```

—— END OF PAPER ——

—— Page 8 of 8 ——