IT Number: | | Machine Number: | | Lab: | |

SLIIT
ACADEMY

Sri Lanka Institute of Information Technology

Higher Diploma
in
Information Technology

Mid Examination
Year 1, Semester 2 (2019)
January Intake
Version A

Object Oriented Programming (JAVA)
(IT1108)

Duration: 1 Hour

Instructions to Candidates:

- This is a closed book examination.
- This paper contains 2 questions on 3 pages without the cover page.
- Create a Directory on the **HOME** directory with your **IT Number** and save all your programs in the folder.
- Read all questions before answering.
- The total marks obtainable for this examination is **30**.
- Use only the **VI** as the text editor.

Question 1 (20 Marks)

a) Write a java method called `calculateMSpeed` which calculate the root-mean-square speed (v_p) of a gas molecule. The above method returns the calculated answer as a float value. The method takes two double values (M-the molar mass of the gas in kilograms per mole, T-temperature in Kelvin) as parameters.

The formula to calculate the root-mean-square speed (v_p) is as follows:

root-mean-square speed of a gas molecule (v_p) = $\sqrt{(\frac{3RT}{M})}\mathbf{x10^3}$

v_p = root-mean-square speed of a gas molecule.
M = the molar mass of the gas in kilograms per mole.
T = temperature in Kelvin.
R = molar gas constant (8.3144598 m^2 kg s^{-2} K^{-1} mol^{-1}))

b) Write a main method to take the molar mass of the gas in kilograms per mole and temperature in Kelvin as user inputs and calculate the root-mean-square speed of a gas molecule by calling `calculateMSpeed`.

c) Based on the calculated root-mean-square speed, determine the category of the speed as follows:

Root-Mean-Square of a gas molecule.	Category of the Speed
0-500	Slow
501-1000	Medium
greater than or equal to 1001	Fast

Hint: Use the scanner class to get the inputs from the user

Sample Input:

```
Enter molar mass of the gas in kilograms per mole: 32000
Enter the Temperature in kelvin: 298
```

Sample Output:

```
root-mean-square speed of a gas molecule:481.9597707
rounded answer: 481.96
Category of the Speed: Slow
```

Note: -round the root-mean-square speed to two decimal places.

Marking Criteria

Criteria	Marks	Marks Obtained
Proper class structure and main method	2	
Importing the Scanner class and their usage	2	
Reading user input	2	
Calling the method with correct parameters	2	
correct method header with correct parameters marks	2	
Rounding the answer	4	
Calculate the answer	2	
Deciding the answer based on the calculation using nested if else statements	2	
Final output with compiled ByteCode	2	
Total Marks	**20**	

Question 2 (10 Marks)

Write a java program to takes a greeting message and the number of repetitions, using command line arguments. Print your greeting message, according to the number of repetitions, in uppercase letters

Sample Input: `Greeting Message - "welcome"`

`Number of repetitions 3`

Sample Output:

```
WELCOME
WELCOME
WELCOME
```

Marking Criteria

Criteria	Marks	Marks Obtained
Proper class structure and main method	2	
Usage of the command line arguments	2	
Conversions of datatypes	2	
Printing the message with correct case.	3	
Final output with compiled ByteCode	1	
Total Marks	**10**	