FACULTY: INORMATION & COMMUNICATION TECHNOLOGY SUBJECTS: PRINCIPLES OF PROGRAMMING A & INTRODUCTION TO PROGRAMMING I PPA115D & TRO115D	**ST 1**

Tshwane University of Technology

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	1st Examiner V MEMANI	
SEMESTER TEST 1 Duration: 3 hrs Date: 14 March 2020 Total: 96 Pages: 10	**Moderator** M Liebenberg	

"Code and test one functionality at a time"
- **Vathiswa Booi**

Instructions

- Question **1**, **2**, **3** and **4** must be done on **EC**.
- Question **5** must be answered on the provided answer book.
- To provide answers on **EC**, please logon **EC** and go to **Student →
Tests → Web Test 4**. Enter the **subject code** as **PPA115D** or
TRO115D, intake is **20201** and **test number** is **G.**
- Provide your answers under the following sections:
  - ✓ Section 1 for question 1.
  - ✓ Section 2 for question 2.
  - ✓ Section 3 for question 3.
  - ✓ Section 4 for question 4.

Question 1: Theory //15//

Questions

*For each of the following statements (**1.1– 1.3**), state whether the given statement is **True** or **False**.*

1.1 A string value can be stored in an integer variable. [1]

1.2 Every Java statement must be terminated with a semicolon (**;**). [1]

1.3 Dividing an integer with an integer will give you an integer. [1]

*For each of the following statements (**1.4 – 1.8**), choose a letter (**A, B** or **C**) that corresponds to the correct answer.*

1.4 What is the best approach to problem solving? [1]

    A. Write code.

    B. Write code after analyzing the problem.

    C. Write code after analyzing and designing a solution to the problem.

1.5 Which tool is needed for solution design? [1]

    A. IPO chart.

    B. Flow chart.

    C. Java.

1.6 What is the purpose of a compiler? [1]

    A. Compile code.

    B. Edit code.

    C. Convert error-free source code into byte code.

1.7 Ayanda is used to buying bread for **R15** at the sphaza shop next to her home. Suddenly the sphaza shop owner decides to increase the prices of all the items by **20%**. What is the new price of bread? [2]

A. R18.00

B. R16.50

C. R16.00

1.8 Traore is doing module **ABC** in institution **XYZ**. In module ABC, they write **five** class tests and **two** semester tests. All the tests have a specific weight. Semester test 1 weighs **20%**, semester test 2 is at **30%** and each of the class tests weigh **10%.** Traore needs to know his final predicate mark. A predicate mark is the sum of all the weighted marks. Traore wrote all the tests and obtained the following percentage marks depicted in **table 1** below. [3]

Test	Mark obtained (%)
Class test 1	60
Class Test 2	70
Class Test 3	50
Class Test 4	100
Class Test 5	80
Semester Test 1	90
Semester Test 2	80

Table 1: Marks obtained by Traore

What is predicate mark of Traore?

A. 78%

B. 76%

C. 74%

*What does each of the following acronyms/terms stand for? Starting from **1.9 – 1.12**.*

1.9 JDK   [1]

1.10   JRE   [1]

1.11   JVM   [1]
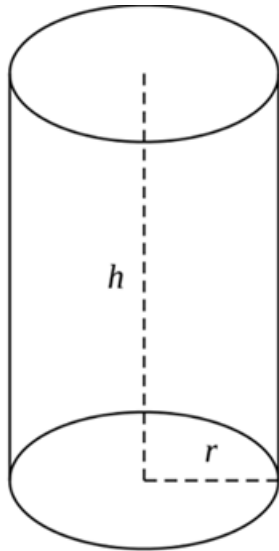
1.12   IDE   [1]

Question 2: Creating an IPO chart   //10//

Problem statement

A cylinder is one of the most basic geometric shapes. **Figure 1** below shows a typical cylinder.

Figure 1: A cylinder

A cylinder has a **height** and **radius**. From these two properties we can calculate the both the **surface area** and **volume** of the cylinder using the following formulae:

- volume = $\pi * r^2 * h$
- surfaceArea = $2 * \pi * r * h$

In this section, we want you to create an IPO chart that will determine and display both the surface area and volume of the cylinder. Given to you in the next page is an incomplete IPO chart that you must fill-in with answers from a provided table.

To do

Create an IPO chart that will determine and display both the **surface area** and **volume** of a cylinder. Given to you below is **Table 2.** The table has possible answers that you can use to complete the given IPO chart. Each possible answer is represented by a letter on its left, e.g **height** is represented by **F**.

A	I	E	O	I	Enter height	M	Determine volume
B	Display diameter	F	height	J	radius	N	Display area
C	P	G	Ask user to enter height	K	Ask user to enter radius	O	Display volume
D	volume	H	Enter radius	L	Determine area	P	Display radius

Table 2: Possible answers for completing IPO chart.

Use the table to complete the given IPO chart below. Fill-in the chart with letters corresponding to possible answers.

Incomplete IPO chart

1._____	4._____	13._____
2. height	5. Ask user to enter height	14. surfaceArea
3._____	6._____	15._____
	7._____	
	8._____	
	9. Determine surfaceArea	
	10._____	
	11. Display surfaceArea	
	12._____	

Question 3: Coding with random numbers   //24//

Problem statement

In this section we want you to create a random number generator game. In this game you must generate four random numbers in the range of **1** to **20**, both numbers inclusive. You must then determine the highest number generated among the four. After determining the highest number, you must display the following:

- All the randomly generated numbers.
- The highest number among the four.

Question 4: Coding a tile application   //32//

Problem statement

Ngugi wa Thiongo has a beautiful house which he wants to partially tile. The house has four rooms, but due to financial constraints he is only able to tile one room at the moment.

Ngugi wa Thiongo needs a program that will allow him to calculate the number of tiles he needs to buy and the cost thereof. The envisaged program must allow a user to enter the room dimensions (length and width), the size of the tile to be used and the cost of the tiles per square meter.

The room dimensions

The room dimensions consist of the **length** and **width** of the room in **meters (m)**. The room area can be calculated using the following formula:

area = length * width.

Tile dimensions

The dimensions of the tile also consist of the **length** and **width** of the tile. Both the length and width are measured in **millimeters (mm)**. The tiles are charged per square meter, e.g. **R130.99/m²**.

To do

Create an application called **TileApp** that will determine and display the number of tiles Thiongo needs, and the total cost thereof. The total cost must include 15% VAT (Value Added Tax). The application must Ngugi wa Thiongo to enter the necessary data and thereafter make the necessary calculations. The total cost must be displayed to two decimal places.

Question 5: Creating a flowchart //15//

Problem statement

Thato gets a monthly allowance from her parents. The allowance is never the same, it always depends on the family's financial situation at the time. Irrespective of the allowance Thato gets, she consistently divides it as follows:

- 50% goes to groceries.
- 20% is set aside for savings.

Thato needs a program that will determine the actual amounts she is setting aside for the above mentioned categories and ultimately the remaining amount after distribution. In this section, we want you to a flowchart for Thato that will determine the amounts stated above.

To do

Create a flowchart that will determine and display the amounts Thato is distributing per category, and the remaining amount. Use the given answer book to create the required flowchart.