PAPER A

Subject codes	PPAF05D/ TROF05D
Assessment description	SUMMATIVE ASSESSMENT
Date	8 NOVEMBER 2022
Duration	3 hours
Total Marks	100
Assessors	KS TSHEHLA
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MEMORANDUM

SECTION A (THEORY) [45]

All questions in this section must be answered on EC.

QUESTION 1 (True or False) (10)

State whether the following statements are True or False.

	Questions	Answers	
1.1	This is a valid Java statement. **int 7 = x + 1;**		**False**
1.2	The height of a person in meters, can be accurately stored as an **int** data type.		**False**
1.3	Data type of a lower rank is automatically converted to a data type of a higher rank when a program is compiled.	**True**	
1.4	Boolean variable can only hold one of two values – true, or false.	**True**	
1.5	The loop terminates (stops / ends) when the loop-continuation condition is false.	**True**	
1.6	This processing statement calculates the fastest time between **rTime1** and **rTime2**. **rFastest = Math.max(rTime1, rTime2);**		**False**
1.7	A loop that will not terminate because the loop continuation condition never becomes false is called Infinity loop.	**True**	
1.8	This loop can be used to display all the alphabets. for(int count = 'a'; count <= 'z'; count++)	**True**	
1.9	The equal sign operator is used to assign a new value to a variable.	**True**	
1.10	The following fragment of codes are equivalent : **if(a==3 || a ==5 || a==11)** **result="Good";** **else** **result="Bad";** **AND** **If (a!=3 || a!=5 || a!=11)** **result="Bad";** **else** **result="Good";**		**False**

QUESTION 2 (MC) (20)

Select the correct answer for the following questions.

2.1 What is the value of variable **a** after the following block of code has executed?

```
double a = 36.3;
int b = 93;
b = (int)a;
a = b/3;
```

12
12.0 /2/
12.1
2.56

2.2 Given the following block of code. Which line contains an error?

```
int m = 5 ;
double n = 99;
double o = m ;
int p = n ;
```

int m = 5 ;
double n = 99;
double o = m ;
int p = n ; /2/

2.3 What is the value of variable **count** after the following block of code has executed?

```
char c = ' a ' ;
int count = 0 ;
while ( c < ' g ' )
{
   ++c ;
   ++count ;
}
```

f
g
6 /2/
7

2.4 What is the value of variable **b** after the following block of code has executed?

```
int a = 33;
int b = 0 ;
while ( a > 0)
{
   a /= 2 ;
   b += a ;
}
```

16
17
31 /2/
32

2.5 The correct statement (processing) to calculate the total length in meters (iMeters) when the program takes the length in kilometers (iKm) as input is:

iMeters = 1000 * iKm /2/
iMeters = iKm * iMeters
iKm = iMeters * 1000
iMeters = iKm % iMeters

2.6 Which one of the following Java Boolean expressions is suitable to determine whether the first mark entered (**rMark1**) is 75% or more, the second (**rMark2**) is exactly 75% and the third (**rMark3**) is strictly not 75%?

(rMark1 > 75 || rMark2 == 75 || rMark3 > 75)
(rMark1 >= 75 && rMark2 == 75 && rMark3 != 75) /2/
(rMark1 > 75 && rMark2 == 75 && rMark3 > 75 || rMark3 < 75)
(rMark1 >= 75 || rMark2 >= 75 || rMark3 != 75)

2.7 The CEO of PostBank has requested you to write a program that apply a 25% bonus to every employee's Christmas salary (**rSalary**). Which processing statement is correct?

rSalary = rSalary + 25
rSalary = rSalary * 25/100
rSalary = rSalary + rSalary *25/100 /2/
rSalary = rSalary * 125/100

2.8 When does the body of the following loop execute?

```
while (cAnswer != 'Y' && cAnswer != 'N') ;
{
    System.out.println("You should enter Y or N: ");
    cAnswer = keyboard.next().charAt(0);
}
```

When cAnswer is Y and N
When cAnswer is Y or N
When cAnswer is not Y or N /2/
It will never execute the body of the loop

2.9 The Mathematics Department has asked you to write a program that displays the respective sum and product of three (3) numbers. Which of the following statements is correct?

The program will have 1 input variable and 1 output variable
The program will have 2 input variables and 1 output variable
The program will have 3 input variables and 2 output variables /2/
The program will have 3 input variables and 3 output variables

2.10 Study the following block of code:

```
if (a){
    System.out.println("A");
}
else if (a && b){
    System.out.println("A && B");
}
else{
   if (!b){
        System.out.println("!B");
   }else {
     System.out.println("None");
   }
}
```

Which of the following statements is correct?

A. If a and b are both true, then the output is "A && B".
B. If a is true and b is false, then the output is "!B".
C. If a is false and b is true, then the output is "None". /2/
D. If a and b are both false, then the output is "None".

QUESTION 3 (Short Answers) (15)

Provide only the Java statements needed. Do not write or submit full programs. Use the variable names (in bold) provided. You may use intermediate variables.

	Questions	Answers	Marks

3.1	Consider the following error from the command prompt. Write a Java statement that will fix this error:
	
	`error: variable iCount might not have been initialized`
	`iCount++;`
	`^`
		iCount = 0;//any number	/1/

3.2	Write the Java statements to calculate the cube root of the product of **rNumOne** and **rNumTwo** , store your answer in **rResult** .	**rResult = Math.pow(rNumOne * rNumTwo, 1/3.0);**	/3/
3.3	Re-write only the if statement line to give the correct result: **int iDay = 1;** **String sMonth = "april";** **if(iDay==1 && sMonth=="april")** **System.out.println("It's April Fool's Day");**	**if(iDay==1 && sMonth.equal("april"))**	/2/
3.4	Write two Java statements that print **Yes** if both **iNum1** and **iNum2** are positive numbers.	**if(iNum1 > 0 && iNum2 >0)** **System.out.println("Yes");**	/3/
3.5	Translate the following Math formula to its corresponding Java code: $x = t^4 + \frac{s}{at}$	$x = Math.pow(t,4) + s/(a * t)$	/2/
3.6	Using a for loop, write the code which prints the following numbers all in one line: 51 48 45 42 39 36 33 30 27 24 21 18 15 12 9 6 3 0	**for(int count = 51; count >= 0; count-=3)** **System.out.print(count + " ");**	/2/
3.7	Write a Java code that will print Java is Fun! over and over. Write only the infinite loop and printing statement.	**while(true)** **{** **System.out.print("Java is Fun");** **}** **OR** **count = 1** **while(count < 5)** **{** **System.out.print("Java is Fun");** **}**	/2/

SECTION B (Java programs) [55]

All questions in this section must be answered on EC in the provided spaces.

QUESTION 4 (18)

4.1 Code conversion. /4/

Convert the following do-while loop into a while loop. The loop must run at least once.

```
int p = 1;
int a;

do
{
        System.out.println("Loop " + p) ;
        p++;
        System.out.print("<0> Continue - <99> Stop? ");
        a = keyboard.nextInt();
}while(a == 0);
```

Answer

```
int p = 1;
int a = 0;   ✓
while(a == 0) ✓
{
        System.out.println("Loop " + p) ; ½
        p++;½
        System.out.print("<0> Continue - <99> Stop? ");½
        a = keyboard.nextInt();½
}
```

4.2 Code completion /5/

Study the following code carefully and complete the missing with **if statements** that would make the logic true. The code implements a rating system according to the table below.

Provide only the Java statements missing. Do not submit a full program.

Ratings	**Result**
0 - 3	POOR
4 - 6	BAD
7 - 9	GOOD
10	EXCELLENT

```
import java.util.Scanner;

public class Ratings {
   public static void main(String[] args) {
      Scanner keyboard = new Scanner(System.in);
      String sRating;

      System.out.println("Please rate our service!");
      System.out.print("Enter your rating [0 - 10]: ");
      int iRating = keyboard.nextInt();

      if statement 1
      {
         sRating = "Invalid entry!";
      }
      else
      {
          if statement 2
          {
             if statement 3
                sRating = "POOR!";
             else
                sRating = "BAD!";
          }
          else
          {
             if statement 4
                sRating = "GOOD!";
             else
                sRating = "EXCELLENT!";
          }
      }
      System.out.println("\n" + sRating + "\n\t\tWe strive for customer "
                + "satisfaction\n\t\tCall again for even better experience.");
   }
}
```

if(iRating < 0 || iRating > 10) ✓✓
if(iRating <= 6) ✓ OR if(iRating < 7)
if(iRating <= 3) ✓ OR if(iRating < 4)
if(iRating <= 9) ✓ OR if(iRating < 10)

4.3 Code completion /9/

Study the following code carefully and complete the missing section by **using switch statements**. The program reads an alphabet and displays whether it is a vowel or a consonant. The program must give correct output for both lowercase and uppercase alphabets.

Provide only the Java statements missing. Do not submit full program.

```
import java.util.Scanner;

public class VowelCons
{
	public static void main(String[] args)
	{
		Scanner keyboard = new Scanner(System.in);
		char alpha; //alphabet
		String alphaType;

		//Input
		System.out.print("Enter an alphabet (a-z): ");
		alpha = keyboard.next().charAt(0);

		//Determine whether alphabet is vowel/consonant
		 //Complete the missing switch section


		// Output
		System.out.println(alpha + " is a " + alphaType);
	}
}
```

```
switch(Character.toLowerCase(alpha)) ✓ ✓
        {
            case 'a': ✓
            case 'e': ✓
            case 'i': ✓
            case 'o': ✓
            case 'u': alphaType = "vowel"; break; ✓ ✓
            default:  alphaType = "consonant"; ✓
        }
```

QUESTION 5 (37)

All questions in this section must be answered on EC in the provided spaces.

- Open Notepad++
- Create a java program in Notepad++ based on the statement below.

When you are done, copy your code from Notepad++ and paste into EC in the provided space.

5.1 Basic-Kota logbook program. /22/

Lesedi, the owner of Basic-Kota uses a tally system in a book to record the number of Kota(s) sold and total amount received. Write a Java program for Lesedi that will keep track of number of Kota(s) sold, as well as total revenue.

The program must work as follows:

a. First the program must display the menu option of Kota(s) offered. The menu must be displayed only once, that is not to be repeated.

```
                Kota Menu

<1> Kota + Polony               R15.00
<2> Kota + Polony + Egg         R17.00
<3> Kota + Polony + Vienna      R17.50
<4> Kota + Polony + Russina     R20.00
```

b. The program should ask Lesedi to enter the number of Kota(s) each customer wants to buy.

```
                Kota Menu

<1> Kota + Polony               R15.00
<2> Kota + Polony + Egg         R17.00
<3> Kota + Polony + Vienna      R17.50
<4> Kota + Polony + Russina     R20.00

How many Kota's does the customer want? _
```

c. For each Kota, Lesedi should enter the type of filling according to the menu. If the menu option entered is incorrect, the program should not continue but an error message must be displayed, and Lesedi must be asked to re-enter continuously until a valid value is entered.

```
How many Kota's does the customer want? 2
Select Kota 1 option: 1
Select Kota 2 option: 2
```

```
How many Kota's does the customer want? 2
Select Kota 1 option: 5
Invalid option! Enter option 1 - 4: 6
Invalid option! Enter option 1 - 4: 1
Select Kota 2 option:
```

d. After a valid menu option is provided, the program must add the price of each Kota to the total amount. Display the total amount.

```
How many Kota's does the customer want? 2
Select Kota 1 option: 1
Select Kota 2 option: 2

>>> 2 x Kota(s) = R32.00
```

e. Add (Accumulate) the total amounts into total income, and also add the number of Kota(s) to the total number of Kota(s).

f. The program should prompt Lesedi to enter Q to end program, or N to repeat from step b.

```
How many Kota's does the customer want? 2
Select Kota 1 option: 1
Select Kota 2 option: 2

>>> 2 x Kota(s) = R32.00

Press <Q> to end session or <N> for next customer:
```

g. Once Q has been entered, display the total number of Kota(s) sold and the total income amount.

```
               Kota Menu

<1> Kota + Polony              R15.00
<2> Kota + Polony + Egg        R17.00
<3> Kota + Polony + Vienna     R17.50
<4> Kota + Polony + Russina    R20.00

How many Kota's does the customer want? 2
Select Kota 1 option: 1
Select Kota 2 option: 2

>>> 2 x Kota(s) = R32.00

Press <Q> to end session or <N> for next customer: q

>>> 2 x Kota(s) sold this session. Total revenue: R32.00
```

Valid input data.

```
               Kota Menu

<1> Kota + Polony              R15.00
<2> Kota + Polony + Egg        R17.00
<3> Kota + Polony + Vienna     R17.50
<4> Kota + Polony + Russina    R20.00

How many Kota's does the customer want? 2
Select Kota 1 option: 1
Select Kota 2 option: 2

>>> 2 x Kota(s) = R32.00

Press <Q> to end session or <N> for next customer: n

How many Kota's does the customer want? 3
Select Kota 1 option: 1
Select Kota 2 option: 1
Select Kota 3 option: 1

>>> 3 x Kota(s) = R45.00

Press <Q> to end session or <N> for next customer: N

How many Kota's does the customer want? 1
Select Kota 1 option: 4

>>> 1 x Kota(s) = R20.00

Press <Q> to end session or <N> for next customer: q

>>> 6 x Kota(s) sold this session. Total revenue: R97.00
```

Possible answer:

```
import java.util.Scanner;
import java.text.DecimalFormat; ½

public class KotaMenu{
	public static void main(String[] args){
		Scanner keyboard = new Scanner(System.in);
		DecimalFormat fm = new DecimalFormat("R#,##0.00");½
		final double KOTA1 = 15, KOTA2 = 17, KOTA3 = 17.5, KOTA4 = 20; ½
		double rTotal = 0, rTotSales = 0; ½
		int iChoice, numKota, countTot=0; ½
		char loop; ½
		System.out.println("\n\t\tKota Menu\n");½
		System.out.println("<1> Kota + Polony\t\tR15.00\n" +
				"<2> Kota + Polony + Egg\t\tR17.00\n" +	✓✓
				"<3> Kota + Polony + Vienna\tR17.50\n" +
				"<4> Kota + Polony + Russina\tR20.00");
		do
		{
			System.out.print("\nHow many Kota's does the customer want? ");½
			numKota = keyboard.nextInt();½

			for(int i = 1; i <= numKota; i++)	✓✓
			{
				System.out.print("Select Kota " + i + " option: ");½
				iChoice = keyboard.nextInt();½

				while(iChoice < 1 || iChoice > 4) ✓
				{
					System.out.print("Invalid option! Enter option 1 - 4: ");½
					iChoice = keyboard.nextInt();½
				}

				switch(iChoice) ½
				{
					case 1:rTotal += KOTA1; break; ½
					case 2:rTotal += KOTA2; break; ½
					case 3:rTotal += KOTA3; break; ½
					case 4:rTotal += KOTA4; break; ½
				}
			}
			System.out.println("\n>>> " + numKota + " x Kota(s) = " +
					½ fm.format(rTotal)); ✓
			countTot += numKota; ✓
			rTotSales += rTotal; ✓
			rTotal = 0; ✓

			System.out.print("\nEnter <Q> to end session or <N> for next
					customer: ");½
			loop = keyboard.next().charAt(0); ½
		}while(Character.toUpperCase(loop) != 'Q'); ✓

		System.out.println("\n>>> " + countTot + " x Kota(s) sold this session.
				Total revenue: " +½ fm.format(rTotSales)); ✓
	}
}
```

5.2 Practice multiplication program. /15/

Your younger sibling who is doing grade 2 requests that you help them with Maths, especially understanding multiplication. You then have this cool idea to write a code that will randomly generate questions for them to do. Write a code with a loop that will be doing the following:

- Randomly generating 2 numbers in the range 1 to 15.
- Prompt to the user the "num1 × num2 = ." so that the user can enter the answer.
- If the answer is correct, display '**Correct**-' then request if they wish to do another calculation or not.
- If the answer is not correct, display '**Wrong**-' then request if they wish to do another calculation or not.
- As the user provide the answers to the calculations, your code should be counting the correct answers and the wrong answers.
- When the user decides to stop, display the number of questions the user got correct and the number of questions they got wrong.

Your output should look like this:

Output example

```
CALCULATIONS START....
--------------------
15 x 3 = 45
Correct - Continue: <Y>, Stop: <N>: y
--------------------
8 x 12 = 96
Correct - Continue: <Y>, Stop: <N>: Y
--------------------
5 x 2 = 7
Wrong - Continue: <Y>, Stop: <N>: y
--------------------
2 x 1 = 2
Correct - Continue: <Y>, Stop: <N>: Y
--------------------
10 x 12 = 102
Wrong - Continue: <Y>, Stop: <N>: y
--------------------
15 x 4 = 45
Wrong - Continue: <Y>, Stop: <N>: n
------------------------------------------------------
You got 3 question(s) Correct and 3 question(s) Wrong!
```

Possible answer

```
import java.util.Scanner;
import java.util.Random;

public class PracMult
{
	public static void main(String[] args)
	{
		Scanner keyboard = new Scanner(System.in); ✓
		Random gen = new Random();✓

		int num1,num2,userAns;
		int right=0,wrong=0;
		char sentinel;
		System.out.println("\nCALCULATIONS START....");
		do
		{
			num1 = gen.nextInt(15) + 1; ✓
			num2 = gen.nextInt(15) + 1; ✓

			System.out.println("--------------------");
			System.out.print(num1 + " x " + num2 + " = "); ✓
			userAns = keyboard.nextInt(); ✓

			if(userAns == num1*num2) ✓
			{
				right++;✓
			}
			else
			{
				wrong++;✓
			}

			System.out.print("Correct - Continue: <Y>, Stop: <N>: ");✓
			sentinel = keyboard.next().charAt(0); ✓

		}while(Character.toUpperCase(sentinel) == 'Y'); ✓✓

		System.out.println("-----------------------------------------------------");
		System.out.println("You got " + right ✓+ " question(s) Correct and " +
					wrong✓ + " question(s) Wrong!");
	}
}
```