PECANWOOD
COLLEGE
Prepared for Life

INFORMATION TECHNOLOGY JULY EXAM THEORY – GRADE 11

NAME: Memo **GRADE:** _____

DATE: 17 JULY 2019 **MARKS: ~~120~~ 115**
MODERATOR: MR N NAINAR **TIME: 2 HOURS**
EXAMINER: MR SC EILERTSEN

INSTRUCTIONS:

1. This test is made up of 11 pages. Please ensure that your paper is complete.
2. There are no trick questions on this paper e.g. a comma that did not print clearly would not be the intention of any of the questions.
3. You can use a non-programmable calculator.

Section One — Principals of Java

1.1) Is Java case sensitive? Yes / No Yes (1)

1.2.1) Consider the code snippet below. There is a method called "sum"; it is a method that adds. To use a method we must conform to the structure of the method header.
Here is its method header – **public static int sum (int a, int b)**

```
9         int first = 4, second = 5, result = 6;
10        result = Integer.sum(first,second);
11        System.out.println(result);
12        System.out.println( (double) result);
```

1.2.2) For this method to work would we need to import 'java.lang.Integer'? No (1)

1.2.3) What would the output 'result' be in line 11? 9 (1)

1.2.4) What would the output 'result' be in line 12? 9.0 (1)

As we said before, the method header for 'sum' is as follows – **public static int sum (int a, int b)**.

1.2.5) What does 'public' mean in this context? Available to whole program (1)

1.2.6) What does 'static' mean in this context? Belongs to the class (1)

1.2.7) Explain the significance of 'int' in the three places where it appears in the method header

Return type is int. Method accepts two parameters – both must be int

(3)

1.3) Consider the code snippet below.

```
9       int first = 4, second = 5, third = 6, result = 0;
10      result = Integer.sum(first,second, third);
11      System.out.println(result);
```

What would be the output of line 11? Does not compile (sum does not accept 3 parameters) (1)

1.4) Consider the code snippet below

```
9       char mychar = 'a';
10      int first = 4, second = 5, result = 6;
11      result = Integer.sum(first,mychar);
12      System.out.println(result);
```

4 + ASCII value of 'a'

What would the output 'result' be in this case? 101 (2)

1.5) The code snippet below is intended to swop two values around if the second is bigger than the first, but it does not work correctly. Correct it in the space provided.

```
9       int first = 10, second = 20, temp = 0;
10
11       // First must always bigger than second
12       if (second > first)
13       {
14          temp = first;      // temp = first
15          second = first;    // first = second
16          second = temp;     // second = temp
17
18       }
19
20
```

(3)

1.6) This line of code does not compile. Correct in on the line below so that it compiles AND "Y" or "N" is stored in a relevant variable. Note mark allocation.

```
char storeroom = JOptionPane.showInputDialog ("Storeroom? Y/N");
```

String storeroom = JOptionPane.showInputDialog("Storeroom? Y/N");
storeroom = storeroom.toUpperCase() (3)

1.7) char answer = storeroom.charAt(0)

There are 6 code snippets below. Tick the one that prints "Yes" to the console.

```
String myCode = "ZS-3456-Q";
if ((myCode.substring(3,4)).equals ("34")) {
        System.out.println("Yes");
}
```

```
String myCode = "ZS-3456-Q";
if ((myCode.substring(3)).equals ("34")) {
        System.out.println("Yes");
}
```

```
String myCode = "ZS-3456-Q";
if ((myCode.substring(4)).equals ("34")) {
        System.out.println("Yes");
}
```

```
String myCode = "ZS-3456-Q";
if ((myCode.substring(3,5)).equals ("34")) {
        System.out.println("Yes");
}
```

Yes

```
String myCode = "ZS-3456-Q";
if ((myCode.substring(4,5)).equals ("34")) {
        System.out.println("Yes");
}
```

```
String myCode = "ZS-3456-Q";
if ((myCode.substring(4,6)).equals ("34")) {
        System.out.println("Yes");
}
```

(2)

1.8)

```
String myName = "Henry";
int a = myName.length( );
char b =myName.charAt(0);
boolean c = myName.equalsIgnoreCase("HENRY");
int d = myName.compareTo("Henry");
int e = myName.compareTo("HENRY");
System.out.println( a + " " + b + " " + c + " " + d + " " + e );
```

any integer value or relevant comment for e

What will the system print to the console? 5 H true 0 (6)

Spaces

1.9) Precedence, Casting and BODMAS

How would Java evaluate the following expressions?

1.9.1) (3 * 8) % 12 0 1.9.2) 3 + 8 % 12 11

1.9.3) 2 * 3 + 20 % 7 12 1.9.4) (7 * (4 / 2)) % 10 4

1.9.5) All values in this expression are integers. (7 * (15 / 6) / 3) 4

1.9.6)

```
double a = 9.5;
double b = 4.5;
double e = (int) a + (int) b * 2
```

17

1.9.7)

```
String a = "Bob";
int b = 248;
String c = a + b;
System.out.println(c)
```

Bob248

1.9.8)

```
double a = 8;
double b = 5;
double e = a + b /10;
System.out.println(e);
```

5.0 / 10 = 0.5

8.5

1.9.9)

```
int a = 8;
int b = 5;
double e = a + b /10;
System.out.println(e);
```

5 / 10 = 0

8.0

(9)

Section Two **Object Orientated Programming**

Classes and objects, with particular reference to the String and Character class; also the class Gogga where a bug-like object can be created on a grid.

```
Gogga parky = new Gogga( );      // creating a new Gogga object called parky.
```

The Gogga bug can be made to move, point in a new direction, turn left/right or be placed at a certain position on the grid.

In the questions below state the type of method for each question. Choose from . . .

- Static typed
- Static void
- Non-static typed
- Non-static void

2.1)

Method	Type of Method	Class or Object
parky.move	Non Static void	Belongs to the object class/object
mySentence.length( )	Non Static typed	Belongs to the object class/object
Character.toLowerCase('A')	Static typed	Belongs to the class class/object
answer.equalsIgnoreCase ("yes")	Non Static typed	Belongs to the object class/object
parky.turnRight( )	Non Static void	Belongs to the object class/object
Integer.parseInt( )	Static Typed	Belongs to the class class/object

(6)

2.2) Match the method calls on the left with their corresponding method headers on the right. Do this by filling in the **Ans** column with the correct number from the **Num** column.

Num	Method is called	Ans	Method header
1	greeting.printHello( )	4	public void printHello(String s)
2	String s = greeting.printHello( )	2	public String printHello( )
3	String s = greeting.printHello("Hello")	1	public void printHello ( )
4	greeting.printHello("Hello")	3	public String printHello(String st)

(4)

2.3) Complete the methods analysis table for the method charAt( ) below

Method Name	charAt ( )
This method belongs to which class?	String ✓
Is the method static or non-static?	Non static ✓
Data in: The method accepts what type of data?	int ✓
Data out: The method returns what type of data?	char ✓
Describe what the charAt( ) method does.	Returns the character found at the specified position ✓ eg charAt(7) ✓
Give an example of how you would call this method. Provide your own variable names and data types.	char a = myString.CharAt(4) ✓ ✓

(8)

Section Three **System Software**

3.1) Explain 7 functions of the operating system. Note mark allocation. Some functions are worth two marks.

Controls all hardware. Loads programs & allocates them memory so that they can run. Provides a GUI for users. Manages the process of saving files to secondary storage. Provides the means to manage files and folders (creating, renaming, moving, deleting). Manages the process being run by the CPU. Facilitates multitasking, multithreading, hyperthreading and multiprocessing. Manages device drivers. Manages Plug and Play. Installation & uninstall of applications (10)

3.2) Explain the concept of multitasking More than one program is loaded into RAM at one time. User can swap from one to another without loosing work or having to save. (2)

3.3) Explain the concept of multithreading One program can have several different threads running at the same time. Must be supported by the OS and must have been coded in this manner (3)

3.4) Explain the concept of hyperthreading The simulation of more cores than are present. Different threads can share the same cores via time-slicing. Additional registers in the CPU make this possible (3)

3.5) Explain the concept of multiprocessing. With a CPU with more than one core, programs can execute at the same time if supported by the BIOS and OS. (3)

Section Four **Computer hardware**

Rashid wants to study Information Technology in grade 10 and needs a personal computer to run Java and NetBeans. He will be staying in the boarding house with 74 other boys. He asks his father to buy him a computer he sees on special. Here are the specs ...

- Intel Core i7 Quadcore processor. Base Frequency 3.3Ghz. 15Mb Cache. 4 cores/8 threads
- Desktop case
- NVIDIA GeForce 8Gb GTX 1070 Accelerator Graphics Card (GPU)
- 16Gb DDR4 RAM
- 500GB SSD
- 17.3" FHD Display
- Windows 10 Pro
- 2 USB ports
- 2 SD card ports
- 1 LAN cable port
- 1 earphone / speaker jack
- Cost R34 999-00 less 15%

This is clearly not a suitable choice for a number of reasons.

4.1)
Describe in detail a computer that would better suit his needs, his environment and his father's budget. Be specific – don't use words like less, more, better, easier, safer, and cheaper. Use numbers and the correct terminology to motivate your answer. Discuss each sub-system making up a computer.

He does not need an i7 with four cores. An i5 is suitable with two cores. 4 to 8 Gb of RAM is enough. Graphics accelerator card is not needed. Being in hostel a laptop that is portable and can be locked away is useful. Superfast SSD is not needed. A normal 500Gb HDD is adequate. 15" display is big enough. Windows 10 Home is the better OS for his use. Ports and jacks are needed as per the ad. USB ports should be USB 3.0. The keyboard should be easy to use. A mouse and a laptop bag are also needed.

(12)

4.2)
What is the difference between primary memory and secondary memory? Give examples to illustrate the difference. Use the following keywords in your answer HDD, SSD, DVD, RAM, volatile, non-volatile, Cache memory and NVMe.

Primary memory - volatile - RAM, Cache
Secondary memory - non volatile - HDD, SSD, DVD + NVMe
Non volatile - permanent Volatile - ceases to exist if the power is turned off

(7)

4.3)
Name 6 input devices. Keyboard, mouse, scanner, camera, bar code scanner, sensors eg temperature, (3)

4.4)
What is cache memory? Where do you find it in modern computers? What purpose does it fulfill?
Fast memory close to the CPU where it is needed. (not at the end of a data bus in RAM) Cache is now often in the CPU. Cache often stores code that the OS predicts may be used next by the CPU
(3)

Section Five **Evolution of the Internet**

5.1) The Internet has undergone a number of evolutions. These changes have been described as Web 1.0, Web 2.0 and Web 3.0.

5.2) Describe the characteristics of Web 1.0
Static content. Professionally developed websites owned and operated by companies. Information is controlled, audited and reliable.
(3)

5.3) Describe the characteristics of Web 2.0 and how if differs from 1.0 Also give examples.
Dynamic content and interaction eg user can fill in a form. Everybody can publish, everybody can generate and share content Social media is Web 2.0 and onwards. Self publishing means content is opinion. Fake news becomes possible. E Commerce started here (4)

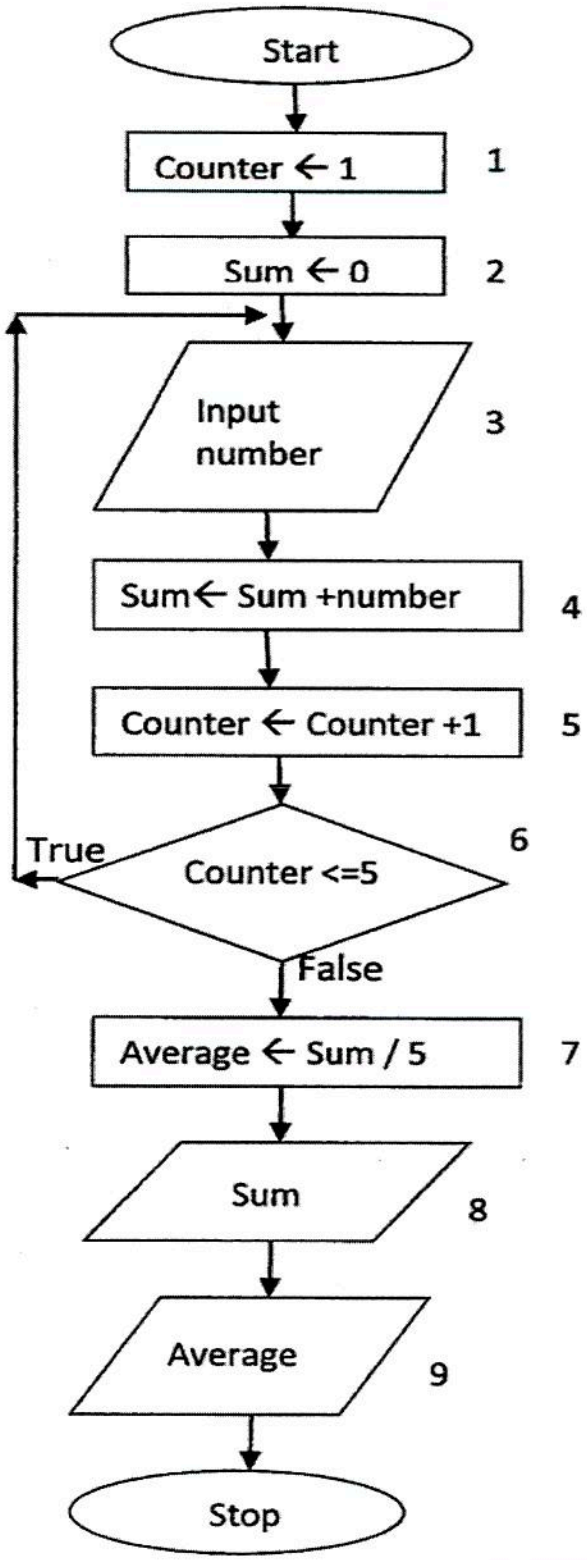
5.4) Describe the characteristics of Web 3.0 and how it differs from 2.0. Also illustrate your answer with examples.

Customisation. Using intelligent code the web begins to build a profile of who you are and customises content exactly for your preferences. eg eCommerce can offer your related products and services that it thinks you will like. (4)

Section Six **Algorithms, program flow and trace tables.**

6.1)

Here is a flowchart, which is a graphical way of representing algorithm design and logic. Lines 1, 2, 4 and 5 are assignment statements. Alongside, is a trace table where we can record the **changing values** of the 4 variables as the program runs from step 1 through to step 9. Fill in the trace table if the flowchart were to accept the following 5 numbers (see **** column) as input i.e. **3, 7, 5, 4, 2** A few values have already been entered into the trace table for you.



Step	Counter	Sum	Number ****	Counter <=5 . The changing variable in the loop.	Average	Output. Lines 8 and 9
1	1					
2		0				
3			3			
4		3				
5	2					
6				True		
3			7			
4		10				
5	3					
6				True		
3			5			
4		15				
5	4					
6				True		
3			4			
4		19				
5	5					
6				True		
3			2			
4		21				
5	6					
6				False		
					4.2	

✓ ✓ ✓ ✓ 5

(~~10~~) marks

TOTAL ~~120~~ Marks

115