

**FINAL EXAMINATION****DIPLOMA IN COMPUTER SCIENCE****COURSE : FUNDAMENTAL OF PROGRAMMING****COURSE CODE : SWC1653****DURATION : 2 HOURS AND 30 MINUTES****INSTRUCTIONS TO CANDIDATES:**

1. This question paper consists of **TWO (2)** parts : PART A (20 questions)
PART B (4 questions)
2. Answer ALL questions from PART A and PART B.
 - i. Answer PART A in the Objective Answer Sheet.
 - ii. Answer PART B in the Answer Booklet provided.
3. Please check to make sure that this examination pack consists of:
 - i. The Question Paper
 - ii. An Answer Booklet
 - iii. An Objective Answer Sheet
4. Do not bring any material into the examination hall. The use of a calculator is allowed.
5. Please write your answer using permanent ink.

MYKAD/ PASSPORT NO : _____
ID. NO. : _____
LECTURER : _____
SECTION : _____

DO NOT OPEN THIS QUESTION PAPER UNTIL YOU ARE TOLD TO DO SO*This question paper consists of 11 printed pages including the front page.*

PART A: MULTIPLE CHOICE QUESTIONS

1. Which statement **BEST** explains the important of programming?
 - A. It enables computers to solve problems by following instruction.
 - B. It improves computer hardware performance
 - C. It allows users to browse the internet
 - D. It replaces operating systems

2. Why is **procedural programming** suitable for small programs?
 - A. It focuses on objects
 - B. It supports inheritance
 - C. It requires less memory
 - D. It is easier to read and debug

3. Which situation **BEST** represents **procedural programming**?
 - A. Modeling a Student as an object
 - B. Using inheritance between classes
 - C. Grouping data and methods together
 - D. Writing a program using a sequence of functions

4. What is the relationship between a class and an object in Java?
 - A. An object is an instance of a class
 - B. A class is created from an object
 - C. A class and object are the same
 - D. An object is a type of variable

5. Why is the **compilation step** necessary in Java program development?
 - A. To convert source code into bytecode
 - B. To load the program into memory
 - C. To execute the program directly
 - D. To verify program logic

6. What is the main **DIFFERENCE** between *primitive* and *reference* data types in Java?
 - A. Primitive types store simple values, reference types refer to objects.
 - B. Primitive types store objects, reference types store values.
 - C. Reference types cannot be used in calculations.
 - D. Primitive types are slower than reference types.

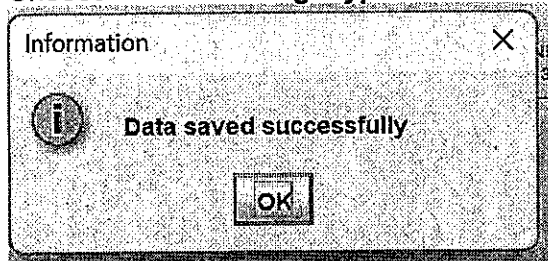
7. Which situation **BEST** explains the use of a boolean data type?
- A. Storing total marks.
 - B. Storing a person's height.
 - C. Storing a student's name.
 - D. Storing whether a user is logged in or not.
8. In the statement `float salary = 2500.50f`, why is the letter `f` used?
- A. To specify the value is a float type.
 - B. To convert float to double.
 - C. To indicate a boolean value.
 - D. To end the statement.
9. Why is the `"=="` operator used instead of `"="` in a condition?
- A. The `"=="` assigns values, the `"="` symbol compares values.
 - B. The `"=="` compares values, `"="` assigns values.
 - C. The `"="` is used for output.
 - D. There is no difference.
10. What is the output of `(5 > 3 && 2 < 1)`?
- A. 2
 - B. 5
 - C. False
 - D. True
11. What is the output from segment of coding below:
- ```
double price = 19.99;
int newPrice = (int) price;
System.out.println(newPrice);
```
- A. Error display
  - B. 19.99
  - C. 19.9
  - D. 19
12. Why is `Scanner` commonly used for console input in Java?
- A. It can only read integers.
  - B. It is used only for output.
  - C. It works without importing any package.
  - D. It allows easy reading of different data types from the keyboard.

13. What is the important of the following syntax?

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

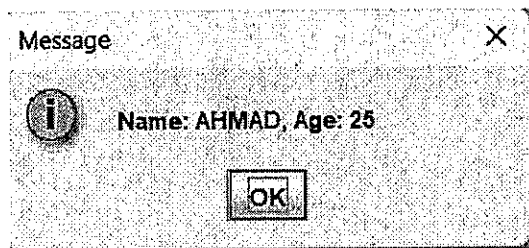
- A. It is used to compile Scanner.
- B. It is one of the Dialog Box class package.
- C. If this statement is missing, will produce a compile-time error.
- D. It allow user interact with the java compiler by using dialog box interface.

14. Choose which **message type** has been used for the message dialog box below.



- A. JOptionPane.INFORMATION\_MESSAGE
- B. JOptionPane.WARNING\_MESSAGE
- C. JOptionPane.ERROR\_MESSAGE
- D. JOptionPane.PLAIN\_MESSAGE

15. Based on the message dialog box below, what is the **CORRECT** syntax to display a message box. Assume the input variables are name and age.



- A. JOptionPane.showInputDialog("Name: " + " , Age: ");
- B. JOptionPane.showMessageDialog(null, "Name: " + " , Age: " );
- C. JOptionPane.showInputDialog("Name: " + name + " , Age:"+age );
- D. JOptionPane.showMessageDialog(null, "Name: " + name + " ,Age: " + age);

Based on the code segment below, answer questions 16 – 18.

```
int num = 5;
while (num >= 0) {
 System.out.print(num + " ");
 num--;
}
```

16. What is the meaning of `num--` in the segment of coding above?

- A. `num = 5`
- B. The value of `num` is -1
- C. The value of `num` increase 1
- D. The value of `num` decrease 1

17. Give the **CORRECT** answer for the condition of `num >= 0` in the while loop above.

- A. The while loop will repeat as long the value of `num` is larger than zero
- B. The looping will continue if the `num` value is larger or equal to zero.
- C. The while loop will repeat as long as the value is not zero.
- D. The looping stop if `num = 6`

18. What is the output of the following coding?

- A. Infinite loop
- B. 5 4 3 2 1 0
- C. 5 4 3 2 1
- D. 1 2 3 4 5

Based on segment of coding below, answer questions 19 – 20.

Assume that num is declared as an int and sc is a Scanner object:

```
do {
 System.out.print("Enter a number (0 to exit): ");
 num = sc.nextInt();
 System.out.println("You entered: " + num);
} while (num != 0);
```

19. What is the output if the user enters 0 on the first input?

- A. Error
- B. You entered: 0  
Enter a number (0 to exit) :
- C. The looping stop the output
- D. Enter a number (0 to exit): You entered: 0

20. What is the difference between do-while and while loop?

- A. while loop executes the loop body at least once, whereas a do-while loop may not execute at all.
- B. A do-while loop checks the condition before executing the loop body, whereas a while loop checks the condition after execution.
- C. A do-while loop executes the loop body at least once because the condition is checked after execution, whereas a while loop executes only if the condition is true before execution.
- D. There is no difference between do-while and while loop, both work exactly the same way.

(TOTAL: 20 MARKS)

## PART B: STRUCTURED

## QUESTION 1

- a. There are **FIVE (5)** steps involved in developing and executing a Java program. Explain the process for each step below:
- i. Edit: \_\_\_\_\_ (1 mark)
  - ii. Compile: \_\_\_\_\_ (1 mark)
  - iii. Load: \_\_\_\_\_ (1 mark)
  - iv. Verify: \_\_\_\_\_ (1 mark)
  - v. Execute: \_\_\_\_\_ (1 mark)
- b. Design an algorithm to read **THREE (3)** numbers then and calculates and displays sum and average.
- i. Write a **pseudocode** for the following program. (5 marks)
  - ii. Draw a **flowchart** to represent the pseudocode from **QUESTION 1 (b) (i)**. (10 marks)
- (Total: 20 marks)

## QUESTION 2

- a. For each of the following scenario, identify a suitable Java data type and provide an example of a variable declaration in Java.
- i. A person's age. (1 mark)
  - ii. A price that includes decimal values. (1 mark)
  - iii. Pass or fail status. (1 mark)
  - iv. A grade of student's result. (1 mark)
- b. The following Java code segment contains logical and relational expressions:

```
int x = 5;
int y = 10;
System.out.println(x > 3 && y < 15);
System.out.println(x == 5 || y == 20);
System.out.println(!(x < y));
```

Explain the output produced by each `System.out.println()` statement. Your explanation should show how the expressions are evaluated.

(6 marks)

- c. Based on the code segment below:

```
int num = 50;
double y = 2.5;
int z = x / y;
```

- i. Describe the error(s) in the above code. (3 marks)
- ii. Fix the error(s) and state the corrected code. (2 marks)

- d. The following Java code uses an arithmetic operation and a compound assignment operator:

```
int num1 = 5;
num1 += 10 * 2;
System.out.println("The final result is:" + num1);
```

- i. Explain how the value of num1 is determined. Your answer should include a step by step explanation of the order in which the expression is evaluated. (4 marks)
- ii. State the final output produced by the program. (1 mark)

(Total: 20 marks)

### QUESTION 3

- a. Refer to the output statement given below:

```
System.out.printf("Name: %s, Age: %d, Salary: %.2f", name,
age, salary);
```

Describe each **format specifier** and give an example of its use.

| Format Specifier | Description | Example Output |
|------------------|-------------|----------------|
| %s               |             |                |
| %d               |             |                |
| %f               |             |                |
| %.2f             |             |                |

(4 marks)

- b. Based on the following code segment, answer the questions below:

```
Scanner myObj = new Scanner(System.in);
System.out.println("Enter username");
String userName = myObj.nextLine();
System.out.println("Username is: " + userName);
```

- i. Explain the purpose of `new Scanner(System.in)` in Java. (2 marks)
  - ii. What does `myObj` represent in the program? (1 mark)
  - iii. Explain the function of the `nextLine()` method. (2 marks)
  - iv. If the user enters **"Asiah"**, what output is produced by the program? (1 mark)
- c. If the user enter input  $x=4$  and  $y=3$ , state the output and show the sequence in which operators are evaluated. (2 marks)

```
Scanner input = new Scanner(System.in);
int x = input.nextInt();
int y = input.nextInt();
int result = x + y * 2;
System.out.println("Result = " + result);
```

- d. The following Java code uses dialog boxes for user input and output:

```
String name = JOptionPane.showInputDialog("Enter name:");
String age = JOptionPane.showInputDialog("Enter age:");
int age2 = Integer.parseInt(age);
JOptionPane.showMessageDialog(null, "Name: " + name + "\nAge: " + age);
```

Answer the following questions based on the code above:

- i. What is the purpose of the `Integer.parseInt()` method in this program. (2 marks)
- ii. What will happen if the user enters a non-numeric value for age? (1 mark)
- iii. Explain the role of the `null` parameter used in `showMessageDialog()`. (1 mark)
- iv. If the user enters **"Ahmad"** as the name and **17** as the age, draw the dialog box produced by the program. (4 marks)

(Total: 20 marks)

## QUESTION 4

- a. Complete the following Java program using the `Scanner` class to accept the user's age and display the age category based on the rules. Use if-else statements to complete the program according to the following rules:

|                                                                                                                        |
|------------------------------------------------------------------------------------------------------------------------|
| Age 46 – 61 : Generation X<br>Age 30 – 45 : Generation Y<br>Age 14 – 29 : Generation Z<br>Otherwise : Generation Alpha |
|------------------------------------------------------------------------------------------------------------------------|

Start with the following code skeleton:

(10 marks)

```
import java.util.Scanner;
public class GradeCheck {
 public static void main(String[] args) {
 Scanner input = new Scanner(System.in);
 System.out.print("Enter age: ");
 int age = input.nextInt();

 //continue your answer using if-else statements below.
 if ()..
 else if ()...
```

- b. Recall and complete the following Java program that uses `Scanner` input, `for` loop and basic calculations to perform the following tasks:

1. The program prompts the user to enter the number of students.  
(Already stated in the program)
2. Use a `for` loop to repeatedly read the score for each student and calculate total score. The value of total score will be put in variable `int total`.  
(5 marks)
3. Calculate the Average based on the input values.  
(Using formula;  $\text{Average} = \text{total} / \text{students}$ )  
(2 marks)
4. Display the output of Total Score and Average Scores clearly as output.  
(3 marks)

Sample of input (using scanner and for loop) as below:

```
Enter number of students: 3
Enter score for student 1: 70
Enter score for student 2: 80
Enter score for student 3: 90
```

Sample of Output:

```
Total Score = 240
Average Score = 80.0
```

Start with the following code skeleton:

```
public class StudentScores {
 public static void main(String[] args) {
 Scanner input = new Scanner(System.in);
 int Total = 0;
 int Score;
 double Average;
 System.out.print("Enter number of students: ");
 int students = input.nextInt();

 // 2. Continue your answer using for loop to input score for each student
 // and total score for all students.

 for() {
 }

 // 3. Calculate average score

 Average =

 // 4. Display the output of Total Score and Average Score.
```

(Total: 20 marks)

(TOTAL: 80 MARKS)

(TOTAL: 100 MARKS)

END OF QUESTION PAPER

