



**Annual Examinations for Secondary Schools 2014**

**FORM 4**

**COMPUTING**

**TIME: 1h 30min**

Name: \_\_\_\_\_

Class: \_\_\_\_\_

***Directions to Candidates:***

*Answer ALL questions in Section A and Section B on this paper;  
 The use of flow chart template is permitted;  
 Calculators are NOT allowed;*

**Good English and orderly presentation are important.**

*For office use only:*

| Question | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | Paper Total | Course Work | Final Mark |
|----------|---|---|---|---|---|---|---|---|---|----|----|----|----|-------------|-------------|------------|
| Max      | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5  | 5  | 15 | 15 | 85%         | 15%         | 100%       |
| Mark     |   |   |   |   |   |   |   |   |   |    |    |    |    |             |             |            |

## Section A – Answer all Questions

1. The CPU can carry out arithmetic on binary values in its registers.

a. Given an **8-bit register**, how would you represent:

i. Unsigned 56

[1]

Answer \_\_\_\_\_

ii. -56 in Two's Complement

[2]

Answer \_\_\_\_\_

b. Use **8-bit two's complementation** to subtract 56 from 88.

[2]

Answer \_\_\_\_\_

2. Logic circuits are designed to carry out specific functions.

Use **AND**, **NOT** and **OR** gates to represent the logic circuit for the following

a. truth table:

[3]

(X is the output of the circuit)

| A | B | X |
|---|---|---|
| 0 | 0 | 0 |
| 0 | 1 | 1 |
| 1 | 0 | 1 |
| 1 | 1 | 0 |

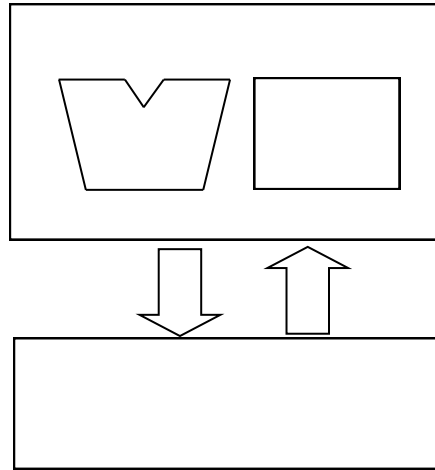
*Space for Logic Circuit*

b. Give the **Boolean expression** for the above circuit.

[2]

3. The diagram below shows various system components. [3]
- a. **Label** the following system components:

**ALU, CU, Main Memory**



- b. What is a CPU register? [1]
- 
- c. Explain the role of the **accumulator** register. [1]
- 

4. There are various steps in the system lifecycle. [2]
- a. State **two** things that are normally done during the system design stage of the system lifecycle. [2]
- i. \_\_\_\_\_
- ii. \_\_\_\_\_
- b. What is **system changeover**? [1]
- 
- c. Give **one** advantage of the following changeover methods: [2]
- i. Parallel changeover
- 
- ii. Direct changeover
-

5. System testing is an important step in the system lifecycle.
- a. What is a syntax error? [1]
- 
- b. Give the term for: [2]
- i. Checking a program by working through a section of it manually.
- 
- ii. An error in a program.
- 
- c. Look carefully at the following section of code: [2]
- ```
average = num1 + num2/total;
System.out.println ('The average is ' + average);
```
- i. Identify a logic error in this code.
- 
- ii. In what circumstances can the above code give a runtime error?
- 
6. There are various character coding systems.
- a. How many different characters can be represented by a **7-bit** character coding system? [1]
- 
- b. If in a character coding system 'A' is represented by **binary** 65, give the **binary** equivalent of 'F'. [2]
- 
- c. An 8-bit register holds the binary pattern 01000001.
- i. What will be the value stored in the register after an **Arithmetic Shift Left**? [1]
- 
- ii. Therefore what does an Arithmetic Shift Left do to a number? [1]
- 
7. a. Identify the difference between system and application software. [2]
- |                      |  |
|----------------------|--|
| System Software      |  |
| Application Software |  |
- b. Give **two** differences between tailor-made and off-the-shelf packages. [2]
- | Tailor made packages | Off-the-shelf packages |
|----------------------|------------------------|
|                      |                        |
|                      |                        |
- c. What application software would you use to keep track of business sales? [1]

8. Java is an Object Oriented Language.

a. Answer **True** or **False**.

[3]

|      |                                                                          |  |
|------|--------------------------------------------------------------------------|--|
| i.   | An object is an instance of a class.                                     |  |
| ii.  | A class is a blueprint for an object.                                    |  |
| iii. | A programmer should not declare more than one instance of a given class. |  |

b. Write a line in Java to declare and create an instance called 'personA' of a class called 'Person'.

[2]

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9. This question is about Software Documentation.

a. Name **two** things you expect to find in program documentation.

[2]

- i. \_\_\_\_\_
- ii. \_\_\_\_\_

b. Give **two** reasons why such program documentation is important.

[2]

- i. \_\_\_\_\_
- ii. \_\_\_\_\_

c. What is a user manual?

[1]

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10. CPU evolution has been a long struggle to improve its efficiency.

a. **Name** and **briefly describe** the relevance of 3 factors that determine CPU speed.

[3]

| Factor | Description |
|--------|-------------|
|        |             |
|        |             |
|        |             |

b. What is address space?

[1]

---

c. What is the address space of a 16-bit address bus?

[1]

---

11. Registers are limited to storing a certain range of values.
- a. What is the **range** of two's complement numbers that can be stored in an **8-bit register**? [2]
- Answer \_\_\_\_\_
- b. Use **8-bit binary** to add 34 and 244. [2]
- Answer \_\_\_\_\_
- c. If the result of your calculation in (b) was to be stored in an 8-bit register, what type of error would it generate? [1]
- 

## Section B

12. Computers have various applications in society.
- a. What do the following abbreviations stand for? [2]
- i. CAD \_\_\_\_\_
- ii. CAM \_\_\_\_\_
- b. Give an example of where a **CAD CAM** system can be used and briefly explain your answer. [2]

|                           |  |
|---------------------------|--|
| Where CAD CAM can be used |  |
| Explanation               |  |

- A Virtual Learning Environment (VLE) (like *Frontier*) can be a useful CAL tool. A VLE offers online facilities that allow teachers to share resources with students. They also allow students to submit their work online and receive teacher feedback, results and school reports. The system can be accessed by students, parents, teachers and members of the administration who have a login name and password. [2]
- c. Suggest **two** ways in which a VLE can be key in helping students improve their performance.
- i. \_\_\_\_\_
- ii. \_\_\_\_\_

d. Name **one** use of computers in the following fields: [6]

|      |                       |  |
|------|-----------------------|--|
| i.   | Medical diagnosis     |  |
| ii.  | Office Automation     |  |
| iii. | Business              |  |
| iv.  | Aviation              |  |
| v.   | Ecology               |  |
| vi.  | School Administration |  |

e. What is **EFTPOS**? [1]

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f. Explain one way **EFTPOS** is advantageous: [2]

|     |                 |  |
|-----|-----------------|--|
| i.  | To the shop     |  |
| ii. | To the customer |  |

13. Below is an incomplete Java class called Student:

```
public class Student {
    String name;
    String surname;
    int totalExamMark;
    _____; //array to hold 10 marks

    public void findHighest(){
        int h = _____;
        int i; //counter

        for ( _____ ){
            if ( _____ ){
                h = markList[i];
            }
        }
        System.out.println("The highest mark is: " + h);
    }
}
```

a. Write a line to declare the array called *markList* to hold a total of 10 whole marks. [2]

---

- b. Complete the method *findHighest* such that it outputs the highest mark in the array `markList`. [3]

```
public void findHighest(){
    int h = _____;
    int i;

    for (_____){
        if (_____){
            h = markList[i];
        }
    }
    System.out.println("The highest mark is: " + h);
}
```

- c. Write a method called *findAverage()* that finds and outputs the average of the marks in `markList`. [5]

- d. Answer **True** or **False**. [3]

|      |                                             |  |
|------|---------------------------------------------|--|
| i.   | The for loop is a predetermined loop        |  |
| ii.  | The while loop is executed at least once    |  |
| iii. | The do...while loop is a predetermined loop |  |

- e. The following variable types are all used for whole numbers: [2]

**int, short, byte, long**

|     |                                                                                             |  |
|-----|---------------------------------------------------------------------------------------------|--|
| i.  | Which of these variable types has the smallest range?                                       |  |
| ii. | Why is it important not to use larger variable types than necessary when writing a program? |  |