

Annual Examinations 2017

Year 10

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

1. For each **application**, tick (✓) where it is **mostly** used.

		Education	Industry	Travel	
a.	Robotics:				[1]
b.	CAD-CAM:				[1]
c.	GPS:				[1]
d.	CAL:				[1]
e.	Air traffic control:				[1]

2. The contents below are found in the **User**, **Technical** or **Program Documentation**. For each content, write the documentation it is found in.

a.	Valid types of data entry:		[1]
b.	Output screenshots:		[1]
c.	Flowcharts:		[1]
d.	Memory requirements:		[1]
e.	Source code:		[1]

3. Write **True** or **False** for each of the CPU statements below.


a.	Cycles per second refer to the speed of the CPU:		[1]
b.	With 7 bits one can represent 128 symbols:		[1]
c.	Numeric overflow usually occurs when subtracting numbers:		[1]
d.	Nano seconds are units of time measurement:		[1]
e.	MHz is greater than GHz:		[1]

4. a. Give one use of **logic gates** in computing.

_____ [1]

b. The symbol and Boolean expression of the OR gate are:

i. [4]

Gate: OR	
Symbol	Boolean expression
	$C = A + B$

- ii. In the space below give the **name**, **symbol** and **Boolean expression** of the two other gates:

Gate:	
Symbol	Boolean expression
Gate:	
Symbol	Boolean expression

5. a. What is a computer **register**? [2]

- b. i. Add the binary numbers: $101010 + 111111 + 110110$.
 ii. Convert your answer to decimal. [3]

- i. **Addition:** _____
 ii. **Conversion:** _____

Working space:

6. a. **10111110** and **01011111** are two 8-bit Two's complement (2C) binary numbers.
- Which one of the two numbers is negative, and why?
 - What happens if the addition of the two numbers is stored in an 8-bit register?

[3]

i. **Negative:**

Why?

ii. **Answer:**

b. Convert **-111₁₀** to an 8-bit 2C binary number

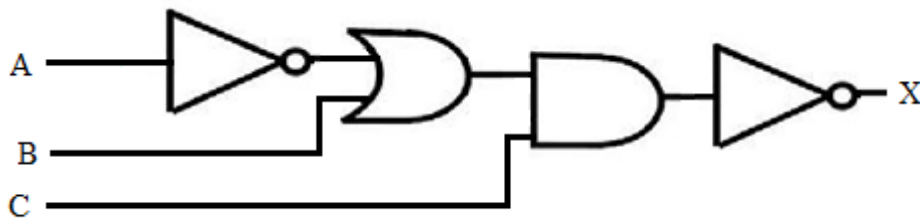
[2]

-111₁₀ =

Space for working:

7. Study the logic diagram below and then:

- Construct its **truth table**.
- Extract the **Boolean expression**.



[5]

i. **Truth table:**

ii. **Boolean Expression:**

8. a. What is **customisable software**? [2]
Customisable: _____

- b. Give an **advantage** and a **disadvantage** of **off-the-shelf** software. [2]
Advantage: _____
Disadvantage: _____
- c. When **installing** a program, one is usually asked to check some **system requirements**. Give one requirement which is usually asked for. [1]
Requirement: _____
9. **Run-time** error is one type of programming errors. [5]
 i. When do **run-time** errors usually occur?
 ii. Give and briefly explain the other **two** programming errors.
 iii. For each error justify your answer with an **example**.
- i. **Run-time errors:** _____

- ii. **1st Error & Explanation:** _____

2nd Error & Explanation: _____

- iii. **Example of 1st Error:** _____

Example of 2nd Error: _____

10. a. i. What is **test data**?
 ii. Using the Java instructions below, what suitable test data can be used to test the instructions. Justify your answer by giving a brief explanation. [3]
- ```

for (int i =1; i < 11; i++) {
 System.out.println("Count is: " + i);
}

```
- i. **Test data:** \_\_\_\_\_  
 \_\_\_\_\_
- ii. **Suitable test data:** \_\_\_\_\_  
 \_\_\_\_\_

**Explanation:**

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- b. **Name** and **explain** one method which can be used to check the output of a program manually. [2]

**Name:**

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**Explanation:**

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11. Fetch and execute cycle is the process by which a computer retrieves an instruction from memory, determines, and carries the necessary actions. Give the first five steps of the cycle (the last one is given). [5]

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6. Go back to step 1.

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**Section B**

12. The CPU is at the heart of a computer system.

a. Give the term for the following CPU components. [5]

|      | <b>Definition</b>                                                                                         | <b>Component Name</b> |
|------|-----------------------------------------------------------------------------------------------------------|-----------------------|
| i.   | A CPU component responsible for mathematical computations and logic operations.                           |                       |
| ii.  | A CPU component that directs all its operations.                                                          |                       |
| iii. | A small, temporary storage location inside the CPU that holds the instruction currently being executed.   |                       |
| iv.  | A CPU register that stores intermediate logic and mathematical results.                                   |                       |
| v.   | A small, temporary storage location inside the CPU that holds the memory address of the next instruction. |                       |

b. The CPU is central in determining a computer’s speed. Name and briefly describe **two** things that determine CPU speed. [4]

|     | <b>Name</b> | <b>Description</b> |
|-----|-------------|--------------------|
| i.  |             |                    |
| ii. |             |                    |

c. The address bus specifies which memory location is being accessed.

i. What is the address space of a computer with a 64-bit address bus? [1]

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ii. Explain how the width of the address bus is relevant to computer performance. [2]

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d. New CPUs on the market are subjected to various benchmark tests that rate how well they perform. Name **one** feature that may lead a CPU to perform better on a benchmark test. [1]

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- e. *Intel* is a tech company that names a range of its processors thus: *Core i3*, *Core i5*, *Core i7*. The *Core i7* is the higher end of the CPUs: they are more expensive but have a better performance rating. Suggest **two** situations when it would make sense to get a *Core i7*, despite the higher price. [2]

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

13. A frame-making business is computerising its ordering and billing system. The software will work out the cost of a frame: including the wooden frame round the picture and the glass covering the picture. The application has a class called *Frame*.

- a. Suggest 2 possible properties of class *Frame* and state their type. [2]

| Property name | Property type |
|---------------|---------------|
|               |               |
|               |               |

- b. The VAT rate is being declared as a constant at 18%. Write a line of code to declare the constant *VATRATE* and assign it this value. [2]

\_\_\_\_\_

- c. Class *Frame* includes the following method called *findCost()*. Fill in the blanks in the code below: [2]

```
public _____ findCost(){
 double totalCost = this.getFrameCost() + this.getGlassCost()
 return _____;
}
```

- d. Use the above code to deduce 2 methods in class *Frame*. [2]

\_\_\_\_\_

\_\_\_\_\_



- e. The method *findCostWithVAT()* will find and output the cost of a frame, [5]  
including the VAT. Write this method.  
(Your method should include a call to method *findCost()*, which includes the  
cost of the frame and glass)

- f. Distinguish between a class and an object. [2]

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