JUNIOR LYCEUM ANNUAL EXAMINATIONS 2010
Directorate for Quality and Standards in Education
Educational Assessment Unit

FORM 5 (Option)   **COMPUTER STUDIES**   **TIME: 1h 45min**

Name: _____   **Class:** _____

Directions to Candidates:

Answer **ALL** questions in **Section A** on this paper;
Answer **BOTH** questions in **Section B** on separate foolscaps;
The use of a 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 (a) Differentiate between **syntax** and **logical** errors as used in programming.

Difference:

[1]

(b) The program below allows the **input** of the radius of a circle and then **finds** and **displays** the area of the circle to two decimal places. However the program has **two** errors. Write down:
  i.   The instructions that contain the **errors**, and
  ii.   The **corrected** instructions.

```
Program Circle;

Const
 pi = 22/7;

Var
 A, r : Real;

Begin
 Write('Enter the radius: ');
 Readln(r);
 A := pi*sqr(l);
 Writeln('The area of the circle is: ',);
 Readln;
End.
```

1st Error:

Corrected:

2nd Error:

Corrected:

[4]

2 (a) i.   What is **Process Control**?
      ii.   Give an **example** where process control is used.

Process Control:

Example:

[2]

(b) Computers can be categorized either as **dedicated** or **general-purpose**.
  i.   What is a **dedicated** computer?
  ii.   Give two **examples** of dedicated computers.

Dedicated:

Example 1:

Example 2:

[3]

3   i.   Define the terms **network** and **bandwidth**.

           ii.   Mention one typical **application** of a WAN network.

           iii.   What is the purpose of a **modem** in networking?

           iv.   **Satellite links** and **twisted pair cable** are two communication media used in networking. Give another **example** of a communication medium.

Network:

Bandwidth:

WAN application:

Modem:

Example:

[5]

4   (a)   Software publishers employ hardware and/or software techniques to protect their software against piracy.

           i.   What is **software piracy**?

           ii.   Give an example of a **hardware** and of a **software protection** technique.

Piracy:

Hardware:

Software:

[3]

    (b)   i.   What is the **reason** behind the Data Protection Act?

           ii.   What is the role of the **Data Controller** in relation to the Data Protection Act?

Reason:

Data Controller:

[2]

5   (a)   System Analysts spend time investigating the problem/s in the present system. Mention three **methods** they may use to investigate a system.

1st Method:

2nd Method:

3rd Method:

[3]

(b) The analyst/programmer has to design the solution to a problem before the
     source code is written. Mention two **design** tools that the analyst/programmer
     uses to solve a problem.

1st Tool:

2nd Tool:

[2]

6 (a) Differentiate between data **verification** and data **validation**.

Verification:

Validation:

[2]

(b)   i.   What is a **check digit** and why is it used?
      ii.   Mention one **example** where check digits are found.
      iii. Briefly explain how a **range check** may be applied when inputting an
            examination mark.

Check digit:

Example:

Range check:

[3]

7 A DBMS package is a powerful tool to store and manipulate data.
   (a)   i.   Differentiate between a **relational database** and a **flat database**.
         ii.   Give a typical **commercial application** of a relational database.

Difference:

Application:

[2]

(b) The table below shows part of the students' file in a particular school. **Use the
     table** to explain your answers to the following questions.
         i.   What is **sorting**?
         ii.   Give an example of a **Simple Query**.
         iii. Give an example of a **Compound Query**.

Name	Surname	Form	Town
John	Abela	3	Siggiewi
Patrick	Farrugia	4	Naxxar
Tania	Curmi	5	Munxar
Marija	Farrugia	4	Siggiewi
Tonio	Zammit	3	Qrendi
Vanessa	Portelli	5	Msida

Sorting:

Simple Query:

Compound Query:

[3]

8   (a)   Mention two **registers** found in the **Control Unit** of the CPU and explain their use.

1ˢᵗ Register:

Use:

2ⁿᵈ Register:

Use:

[4]

     (b)   What is the purpose of the **accumulator** in the ALU?

Accumulator:

[1]

9   **Format**, **Defragmentation** and **Antivirus** are three important utilities in computers.
   - i.   What is meant by **formatting** a hard disk?
   - ii.   Mention one **precaution** that should be taken when formatting a hard disk that was already in use? Why the **need** for this precaution?
   - iii.   What is **defragmentation**?
   - iv.   Give one **function** of the **antivirus** software.

Formatting:

Precaution:

Need:

Defrag:

Function:

[5]

10   The **Fetch Execute Cycle** is the method used by the CPU to obey an instruc
Explain the **sequence of steps** involved in the fetch execute cycle.

1: _____

_____

2: _____

_____

3: _____

_____

4: _____

_____

5: _____

_____

6: _____

[5]

11   (a)   Mention one typical **item/section** found in the:
- User Documentation;
- Technical Documentation and
- Program Documentation.

User: _____

Technical: _____

Program: _____

[3]

(b)   Programmers dedicate a lot of time in **testing** their programs. Mention two
methods that a programmer may use to check that his/her program is working
correctly.

1st Method: _____

2nd Method: _____

[2]

Section B – Answer BOTH Questions

12 (a) Consider the following Boolean Expression:

$$X = ((\overline{A + B}).C) + \overline{C}$$

For the given Boolean Expression draw:
  i.   The **Logic Circuit** and   [5]
  ii. The **Truth Table**.   [4]

(b) Using **Twos Complement** represent the following two decimal numbers in **8 bits**:
  i.   110 and   [1]
  ii. -75   [2]

(c) The character set of a particular computer consists of:
  - The English alphabet (26 letters);
  - The digits 0 to 9, and
  - The four punctuation symbols: . (period), ; (semi-colon),
        ! (exclamation mark) and ? (question mark).

What is the **minimum number of bits** required to store this character set?   [2]

(d) What happens if the **result** of the addition of the two unsigned numbers 250 and 50 is being stored in an 8-bit register?   [1]

13 Study the following **assembly language program** and then answer the questions set on it. *A semicolon (;) introduces a comment which explains the function of that instruction.*

```
        LDA   #0        ; load 0 into accumulator
        STA   P         ; store contents of accumulator into location P
        LDA   #4        ; load 4 into accumulator
        STA   K         ; store contents of accumulator into location K
here:   LDA   P         ; load contents of location P into accumulator
        ADD   K         ; add contents of location K into accumulator
        STA   P         ; store contents of accumulator into location P
        LDA   K         ; load contents of location K into accumulator
        DEC             ; decrement contents of accumulator by 1
        STA   K         ; store contents of accumulator into location K
        JNZ   here      ; jump to 'here' if accumulator is not zero
        HLT             ; stop
```

  i.   A typical assembly language **instruction** consists of two parts. What is each **part** called?   [2]
  ii. Part of the program above forms a loop. How many **instructions** form the loop?   [1]
  iii. What are the values of **P**, **K** and the **Accumulator** immediately after the loop is executed for the first time?   [3]
  iv. What are the values of **P** and **K** when the program finishes execution (that is, the last HLT instruction is executed)?   [4]
  v.   Write a **program in Pascal** which does the same task as the assembly language program above.   [5]