JUNIOR LYCEUM ANNUAL EXAMINATIONS 2005
Educational Assessment Unit – Education Division

FORM 4 (Option)   **COMPUTER STUDIES**   **TIME: 1h 30min**

Name: _____   **Class:** _____

Directions to Candidates:

> *Answer **ALL** questions in **Section A** on this paper.*
> *Answer any **TWO** questions from **Section B** on separate foolscaps.*
> *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	14	Paper Total	Course Work	Final Mark
Max	5	5	5	5	5	5	5	5	5	5	5	15	15	15	85%	15%	100%
Mark																	

Section A - Answer all Questions

1   Three of the most important units in computers are: **Central Memory Unit**, **Arithmetic Logic Unit (ALU)** and **Control Unit**. Briefly describe the function of the following components found in these units: **Accumulator**, **Shift Register**, **Program Counter**, **Instruction Register** and **Random Access Memory (RAM)**.

Accumulator: _____

_____

Shift Register: _____

_____

Program Counter: _____

_____

Instruction Register: _____

_____

RAM: _____

_____

[5]

2   (a)   Application Software may either be found **off-the-shelf** or **tailor-made**. Distinguish between the two.

Off-the-shelf: _____

_____

Tailor-made: _____

_____

[2]

    (b)   Give **two** benefits and **one** disadvantage of buying an off-the-shelf application rather than tailor-made.

1st Benefit: _____

_____

2nd Benefit: _____

_____

Disadvantage: _____

_____

[3]

3   (a)   Some programmers still find the need of writing programs using Low Level Languages. Briefly explain **three** differences between writing programs in a Low Level Language and in a High Level Language.

1st Difference: _____

_____

2nd Difference:

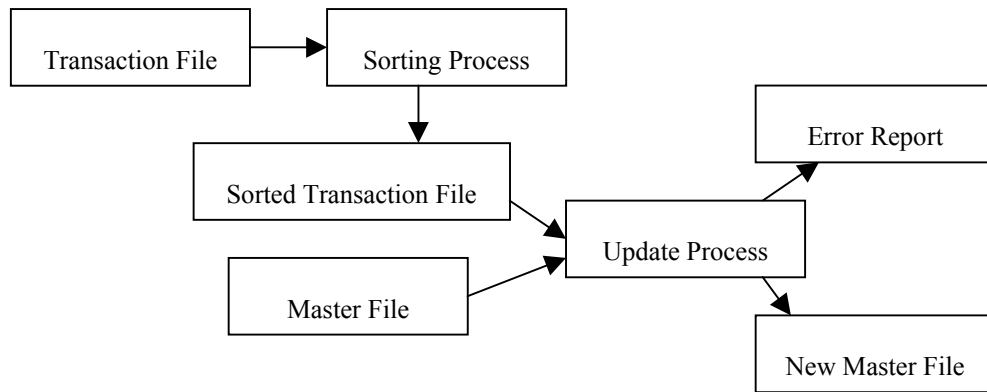**3rd Difference:**

[3]

(b)   Explain why a program written in a certain Low Level Language still needs to be translated to machine code.

[2]

4   The diagram below illustrates how a master file is updated using a transaction file. With reference to the terms used in the boxes in the diagram explain how updating is done to produce the New Master File.

```
┌─────────────────┐      ┌─────────────────┐
│ Transaction File│ ───► │ Sorting Process │
└─────────────────┘      └─────────────────┘
                                  │
                                  ▼
              ┌─────────────────────────┐         ┌─────────────────┐
              │ Sorted Transaction File │         │  Error Report   │
              └─────────────────────────┘         └─────────────────┘
                           │                              ▲
       ┌─────────────┐     │      ┌────────────────┐     │
       │ Master File │ ───►└────► │ Update Process │ ────┘
       └─────────────┘            └────────────────┘
                                          │
                                          ▼
                                 ┌──────────────────┐
                                 │  New Master File │
                                 └──────────────────┘
```

[5]

5   (a)   GIGO (Garbage In Garbage Out) is a common term used in computer science. To avoid the processing of incorrect data, **Verification** and **Validation Checks** are performed. Distinguish between the two terms.

Verification:

Validation:

[2]

(b)   A date in a program is input as **15 JUN 2005** (day made of 2 digits, month of 3 letters and year of 4 digits). Describe the validation checks which could be carried out on such dates.

_____

_____

_____

_____

[3]

6   (a)   Draw the logic circuit for the following Boolean Expression:

X = NOT((A AND B) OR B)

Space for Logic Diagram

[3]

(b)   For the logic circuit of part (a) above, draw the Truth Table.

Space available for Truth Table.

[2]

7   (a)   Convert the decimal numbers **84** and **30** to binary.

Space for Working:

84 in Binary = _____

30 in Binary = _____

[2]

(b)   Using **two's complement** subtract 30 from 84.

Space for working:

Answer:

[2]

(c)   What is the minimum number of bits required to represent the 26 small letters of the English alphabet?

Answer:

[1]

8   (a)   Systems Analysis is the process of analysing a system to decide whether a computerised system is more useful. Briefly explain what is the **system life cycle**.

[1]

(b)   The **system analyst** plays a big role in the system life cycle. Give **two** main duties of the system analyst.

1st duty:

2nd duty:

[2]

(c)   Two stages in systems analysis are **Feasibility Study** and **Maintenance of the New System**. Briefly describe both stages.

Feasibility Study:

Maintenance:

[2]

9   The **Fetch-Execute Cycle** is the repetitive procedure of executing a program. With reference to **Program Counter**, **Instruction Register** and **Main Memory**, list the steps carried out in the fetch-execute cycle.

_____

_____

_____

_____

_____

_____

[5]

10 (a) New computer applications are frequently developed to reach the demands of various people in industry, education, the home-user etc. **CAM**, **CAD** and **CAL** are three such applications. What do the acronyms stand for?

CAM: _____

CAL: _____

CAD: _____

[3]

(b) Although the use of CAL software has many advantages, some disadvantages do exist. List any **two** disadvantages.

1ˢᵗ Disadvantage: _____

_____

2ⁿᵈ Disadvantage: _____

_____

[2]

11 Write one or more statements in Pascal for each of the following tasks:

(a) To calculate the volume using the formula $\mathbf{V} = \dfrac{22}{7}\mathbf{r}^2\mathbf{h}$

_____

[1]

(b) Declare an array named **Height** which would store 20 numbers.

_____

[1]

(c) Read 20 numbers from the keyboard and after finding their total, output their average.

_____

_____

_____

_____

_____

_____

[3]

Section B – Answer any TWO questions

12 (a) **Sorting** and **Searching** are two important functions that are used in databases. Explain what each function does.
Use examples to explain the two types of sorting of the records in a database.
Explain how particular records can be searched in a database. [4]

(b) You have been asked to design a database to keep the details on students in a particular school. Copy and complete the file specifications below by inserting **four** other **important** fields and their data type. (*Besides 'text' you should include at least 2 other different data types*)

Name of Field	Data Type
surname	text
name	text

[8]

(c) What is a key-field? [1]

(d) Which field, from your students' database of part (b) above, would you use as the key-field? [1]

(e) The data entered in the database created may have personal details which should not be available for unauthorized users. Explain **one** way how data stored could be protected from unauthorized users. [1]

13 One of your teachers has asked you to process some exam marks.
Write a program in Pascal to input and store **ten** student names and their corresponding exam mark. The program should then output the following information:

- A list of student names and marks

- The average mark

- The highest mark

- The lowest mark.

Use in-line documentation (comments) where you think it is necessary to explain your source code. [15]

14 (a) When testing a program errors may cause the program not to work at all or to produce incorrect output.

i. Write down the names of the **three** types of errors that may be found in a program. [3]

ii. Distinguish between each type of error by giving an example of each and stating how the error could be corrected. [3]

(b) Documentation helps both the users of the program and the programmers in some way or another.

i. Mention any **three** reasons to show the importance of documentation. [3]

ii. Distinguish between:

- Program Documentation

- Technical Documentation

- User's Manual [3]

iii. List **three** important features (or sections) you expect to find in the User's Manual. [3]