# JUNIOR LYCEUM ANNUAL EXAMINATIONS 2004
## Educational Assessment Unit – Education Division

**FORM 5 (Option)**          **COMPUTER STUDIES**          **TIME: 1 hr 30 min**

**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** (a) Draw and label a block diagram of **CPU** and **main memory unit**, showing clearly the following items:
- The functional units – ALU, control unit and memory unit.
- The registers – accumulator, shift register and program counter register.
- The buses – data, address and control.
- The system clock.

[4]

(b) How many **memory locations** can the CPU access with a **20**-bit address bus?

[1]

**2** Give a **brief description** of each of the following terms:

(a) **Machine code**:

[1]

(b) **High level language**:

[1]

(c) **Assembly Language**:

[1]

(d) **Compiler**:

[1]

(e) **Software  portability**:

[1]

**3** (a) Convert the following decimal numbers to **binary** and **hexadecimal**. *Use the space below to show your working.*

| Decimal | Binary | Hexadecimal | |
|---------|--------|-------------|---|
| 254 | | | [1] |
| 109 | | | [1] |

*Working space*

(b) Using **2's complement** 8-bit representation, work out the decimal subtraction **37 – 42**.
*Show all your working*.

**Answer:** [2]

(c) What is **numerical overflow**?

_____

_____ [1]

**4** A supermarket has installed an **EPOS** (electronic point-of-sale) system together with **EFT** (electronic funds transfer).

(a) Explain how the system would **help the management** in the running of the supermarket.

_____
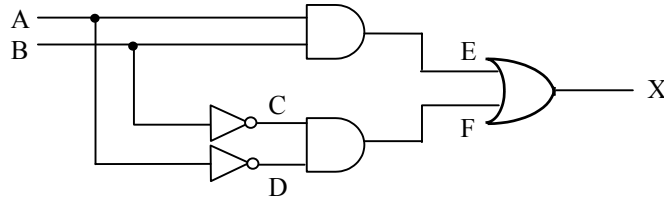
_____

_____ [2]

(b) Explain how the system would provide a **better service to customers**.

_____

_____

_____ [2]

(c) What do you understand by **EFT**?

_____

_____ [1]

**5** The diagram below shows a **logic circuit**.



(a) Complete the following **truth table** for the logic circuit above.

| A | B | C | D | E | F | X |
|---|---|---|---|---|---|---|
| 0 | 0 | | | | | |
| 0 | 1 | | | | | |
| 1 | 0 | | | | | |
| 1 | 1 | | | | | |

[2]

(b) Write down the **Boolean expression** (in terms of A, B and X) that represents the logic circuit above.

Answer: **X =**        [2]

(c) Complete the following statement to **describe the function** of the logic circuit above.

**Output X is true when** _____ [1]

**6** (a) Explain the difference between **off-the-shelf** and **custom-made** (or tailor-made) software packages.

_____

_____

_____

_____ [2]

(b) Give one **advantage** of each type of software when compared to the other type.

Advantage of off-the-shelf package: _____

_____ [1]

Advantage of custom-made package: _____

_____ [1]

(c) What do you understand by **software piracy**?

_____

_____ [1]

**7** (a) Which **type of network** connects together the computers and other devices in the school computer lab?

_____ [1]

(b) List **three advantages** of such a network.

_____

_____

_____

_____ [3]

(c) Name and draw one network **topology**.

[1]

**8** (a) What do you understand by the term **resolution**?

_____

_____ [1]

(b) What **unit of measurement** is used to measure the resolution of a printer?

_____ [1]

(c) Explain how a need for higher resolution will **effect storage space** and **printer specifications**.

_____

_____

_____ [2]

(d) How much **storage space** (in bytes) is needed to store a picture with a resolution of 1024 x 620 having a 16-bit colour representation?

_____ [1]

**9**   (a)   Write a **program** in Pascal to declare a one-dimensional array and store five names in the array. Use a loop to read in the names from the keyboard.

[3]

(b)   Draw the **flowchart** of a program that allows a user to input a variable set of numbers. When zero (0) is entered the inputting process terminates and the process outputs the sum of all the numbers.

[2]

**10**  The process of developing a solution to a problem passes through a number of stages, one of which is **testing the programs**.

(a)  Identify the three common **types of program errors** and for each describe the cause of the error.

_____

_____

_____

_____

_____

_____

_____                    [3]

(b)  What do you understand by the term **program tracing**?

_____

_____

_____                    [2]

**11**  (a)  What is the overall function of an **operating system** (OS)?

_____

_____                    [1]

(b)  Explain what you understand by each of the following **computer processing modes**.

**Real time processing**:  _____

_____                    [1]

**Batch processing**:  _____

_____                    [1]

**Multi-user processing system**:  _____

_____                    [1]

(c)  Explain briefly what a **dedicated operating system** is, stating where would you find such an OS.

_____

_____

_____                    [1]

**Section B – Answer any TWO questions**

12     The owner of a **CD/DVD lending club** has installed a computerised system to handle the rentals of CD/DVDs by club members. Each CD/DVD has a unique code and each member has a membership card with another unique code. The system uses three files, a **CD/DVD file**, a **Member file** and a **Transaction** file. The Transaction file stores all the loans/returns for the day.

   (a)   Name **four important fields** you expect to find in the CD/DVD file.    [2]
   (b)   Name **four important fields** you expect to find in the Members file.    [2]
   (c)   Which field in the CD/DVD file and in the Member file should be the **key field**?    [1]
   (d)   Name a device that will **facilitate the input** of the CD/DVD's code and the member's code. What **special feature** would you expect to find on each CD/DVD and on the membership card?    [2]
   (e)   Explain how the system will search for members having **overdue CD/DVDs** and prepares a **reminder** to be sent to these members.    [3]
   (f)   With the help of a diagram explain how the Transaction file is used to update the CD/DVD and Member files at the end of the day.    [5]

13     Write a **program** in Pascal to help your teacher **process the students' examination results**.
    The teacher is first prompted to enter the number of students in the class. He then inputs the students' names and marks for one examination. The range of acceptable marks is from 0 to 100 and the pass mark is 45. The program should output:

- The number of students whose mark is greater or equal to 45.
- The average mark for the whole class.
- A list of student names who passed the test.    [15]

14     Write short notes on any **FIVE** of the following:

   (a)   **Data security** and **data integrity**.
   (b)   The use of **CAD-CAM** software in an industrial environment.
   (c)   **Office automation software** has made office work easier and more efficient.
   (d)   **System analysis** is an essential stage in the development of new system.
   (e)   In an operating system what are the functions and features of the **disk filing system**?
   (f)   **Flight simulators** provide an effective platform for the training of pilots.
   (g)   What are the implications of **teleworking**?    [5x3]