

JUNIOR CYCLE EXAMINATION, 1987

COMPUTER STUDIES

Five questions to be attempted.
 Attempt Question 1 and ONE question from each of four sections.
 All questions carry equal marks.
 You are allowed 2.5 hours for this paper.

1. (i) Which one of the following best describes what is meant by an algorithm ?
- (a) a recipe
 - (b) a knitting pattern
 - (c) a sequence of precise instructions for solving a problem
 - (d) a computer program in COMAL.
- (ii) If the value of A is 20, what output will the instruction PRINT "THE VALUE OF A IS, A" produce ?
- (a) 20
 - (b) THE VALUE OF A IS, A
 - (c) THE VALUE OF A is 20
 - (d) THE VALUE OF 20 IS 20.
- (iii) If you wanted to enter information about your class into a computer, which one of the following would you be most likely to use ?
- (a) a word processor
 - (b) a programming language such as COMAL or LOGO
 - (c) spreadsheet software
 - (d) database software.
- (iv) Which of the following devices was least relevant in the development of computers ?
- (a) abacus
 - (b) electric telegraph
 - (c) electric light bulb
 - (d) Pascal's calculator.
- (v) As an answer to the following question which is the odd one out ?
 In order to make effective use of information on a computer it must be
- (a) numeric (b) accurate (c) complete (d) relevant.
- (vi) If a micro computer has 64K of RAM memory it can hold
- (a) 2^{16} characters of user information
 - (b) 64 000 ASCII symbols
 - (c) 64 COMAL programs
 - (d) 2^{16} words of text.
- (vii) Which of the following tasks is not done by an OS in a computer ?
- (a) dealing with errors
 - (b) managing the memory
 - (c) communicating with disc drives
 - (d) adding numbers.
- (viii) A compiler is
- (a) a micro chip
 - (b) a program to translate a high level language into a low level language.
 - (c) a program to translate a high level language into another high level language
 - (d) a program to correct the bugs in another program.
- (ix) What value is computed for A by the following section of a program ?
- ```

10 C: = 10
20 REPEAT
30 A: A + C
40 C: C - 1
50 UNTIL C=0
60 PRINT A

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- (a) 0 (b) 10 (c) 55 (d) cannot be determined.
- (x) A floppy disc has 48 tracks and each track is divided into 10 sectors. How many bytes must each sector contain so that the whole disc can hold 245 760 characters ?

## SECTION 1

2. (i) What was the special significance of the punched card in the development of computers ?  
(ii) Give a brief account of its history.  
(iii) Why has its importance decreased in recent years ?  
(iv) What role does a 'mouse' play in communicating with a computer ?
3. (i) The computer is often seen as a serious threat to human employment. Why is this so ?  
(ii) Is it a correct view ?  
(iii) Give some examples of computers having a good effect on employment opportunities.  
(iv) Discuss briefly the long term effects which you think are likely.
4. (i) Describe the sensor board and explain clearly how you would use it to work out the functions of the AND and OR gates.  
(ii) Write down the truth tables for these gates.  
(iii) A computer may be connected to other pieces of equipment by means of input/output ports. Explain how those ports may serve the roles of Data Direction Register, I/O Register and Control Register respectively.  
(iv) Write a short program in COMAL to initialise the ports and explain what your program does.

## SECTION 2

5. Dear Mr. Brown,

Thank you very much for the information yours  
sincerely.

You sent me recently,  
Joseph White

Describe clearly how you would use a word processor to correct the above letter.

6. A database file contains geographical information laid out as follows:

| County  | Town   | Population | Foundation Date | River  |
|---------|--------|------------|-----------------|--------|
| Dublin  | Dublin | 800 000    | 860             | Liffey |
| Wicklow | Bray   | 50 000     | 1450            | Dargle |
| Wexford | Gorey  | 10 000     | 1600            |        |

Compose questions to retrieve the following information from the file:

- (a) All towns in County Dublin.  
(b) All towns in County Wicklow with a population under 10 000.  
(c) All towns in County Wicklow founded before 1600 but not before 1200.  
(d) All towns in County Wicklow or Wexford with populations between 5000 and 15 000.

The following problem is to be solved by a computer program:

A list of numbers representing peoples ages is to be read and the average age calculated. The end of the input is to be indicated by a negative number. The output should include:

- (a) A count of the number of ages entered
- (b) The sum of the ages
- (c) The average (mean) age.

Express the solution to this problem by means of a flow chart or a structure diagram. Then write a program to carry out the solution in a structured programming language.

8. John is married to Joan and they have three children Anne, Mary and Tom. John's brother Jim is married to Sheila and they have two children Betty and Deirdre. Betty is married to Billy and they have one child Alan.

Using the relations father-of;, mother-of; is (e.g. John is male) write down the above information as micro-PROLOG facts. Then pose the following questions in micro-PROLOG:

- (a) Who is Anne's mother ?
- (b) What are the names of Joan's children ?
- (c) What males are present in the database ?
- (d) Is Jim married to Sheila ?

Construct rules in micro-PROLOG to describe the relations grandfather-of, grandmother-of, grandparent-of, sister-of using the above relations and any suitable built-in-micro-PROLOG relations.

#### SECTION 4

9. (i) Draw an outline sketch of a complete computer system and label the various components clearly.
- (ii) What is meant by CPU ?
  - (iii) Describe the functions it performs.
  - (iv) What are peripherals ?
  - (v) Explain the difference between main memory and secondary memory.
  - (vi) How would you take proper care of a floppy disc ?

10.

| Name       | Maths | History | Geography | Irish |
|------------|-------|---------|-----------|-------|
| Student 1  | 47    | 49      | 50        | 80    |
| Student 2  | 83    | 80      | 85        | 60    |
| Student 3  | 69    | 68      | 72        | 65    |
| "          | "     | "       | "         | "     |
| "          | "     | "       | "         | "     |
| Student 30 | 71    | 65      | 65        | 50    |

- (i) Describe how you would set up a spreadsheet and enter the above information into it.
- (ii) How would you add a column to display the average mark for each student ?
- (iii) What would you do to obtain the average mark in each subject ?

11. Write LOGO procedures to:

- (i) Find the sum of the first 500 terms of the arithmetic series  
 $1 + 4 + 7 + 10 + \dots$
- (ii) Print a word backwards.
- (iii) Add the numbers in a given list of numbers.