THE ASSOCIATED EXAMINING BOARD
for the General Certificate of Education

June Examination, 1976 – Ordinary Level

COMPUTER STUDIES

Paper 1   095/1

Friday, 18 June, 2.00 p.m. to 4.30 p.m.

2 hours 30 minutes allowed

Answer five questions.

All questions carry equal marks.

1. (a)   Perform the following calculations, showing all working clearly.   Give the answers to parts (i) – (iv) in binary.

   (i) $101011_2 + 110111_2$ (1 mark)

   (ii) $10101011_2 \times 45_8$ (2 marks)

   (iii) $1001100101111_2 - 100100100101_2$ (2 marks)

   (iv) $1011111111_2 \div 101_2$ (2 marks)

   (v)   Convert 101001110_2 to binary coded decimal.   (3 marks)

   (b)   The mantissa of the binary floating point representation of the decimal number 3.1 is held in a 6-bit word.

   (i)   Show this representation by means of a diagram.   (4 marks)

   (ii)   Calculate the error when the binary representation is converted back to denary.   (6 marks)

2. (a) The diagram below shows the data-flowchart for the production of gas bills.
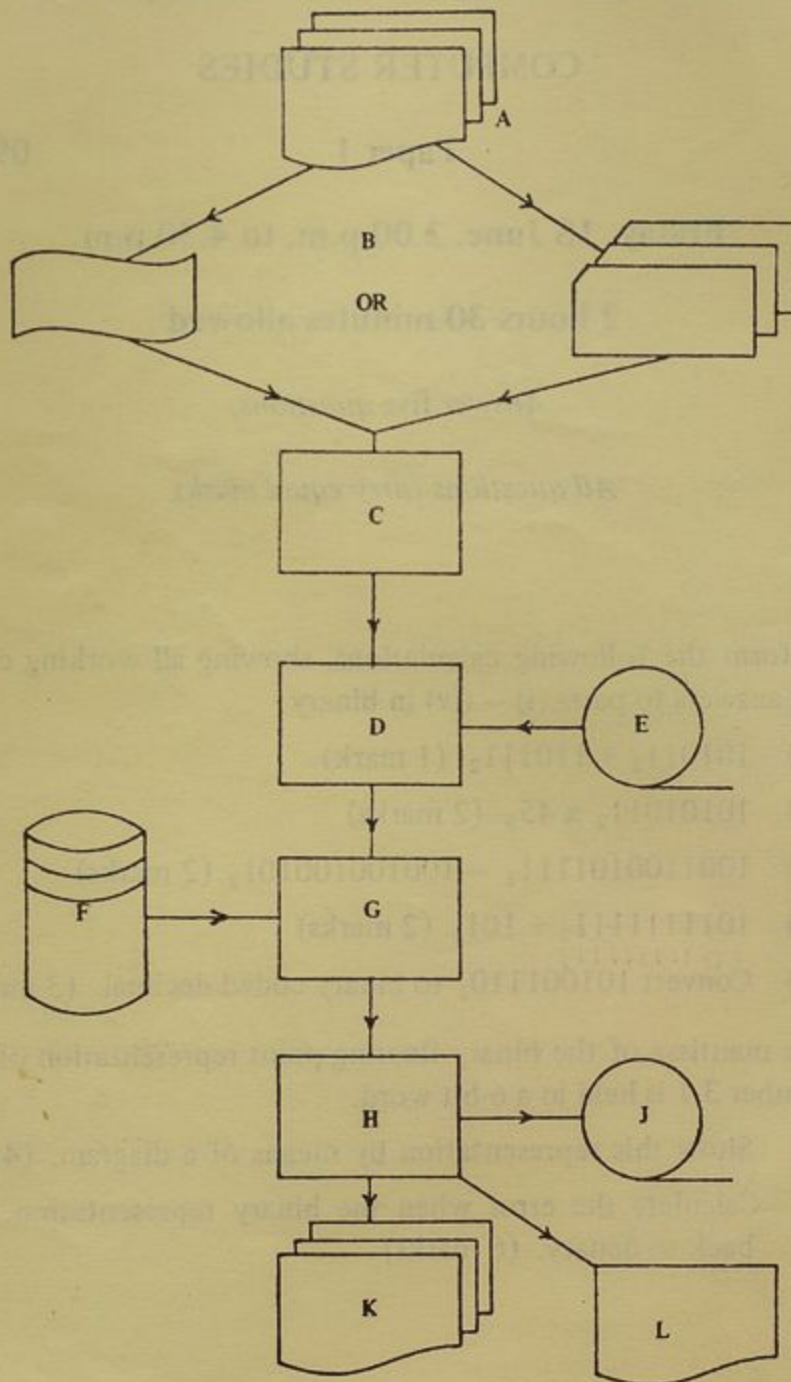
Using the letters shown as references, state what each stage/symbol of the flowchart represents. (5 marks)

(b) In the data processing application given in (a), state, briefly, what checks (manual and automatic) might be made to ensure accuracy of data and processing. (7 marks)

(c) Choose one of the automatic checking procedures mentioned in (b) and describe, more fully, its use and operation. (8 marks)

3. Describe, in detail, a computer application with which you are familiar. The system described should include details of data collection; input and output devices used; details of the central processor relevant to the application described; storage devices used and any important human elements of the system. (20 marks)

4. Explain each of the following terms:

Character; Byte; Zone; Parity; Diagnostics; Batch processing;
Full adder; Iteration; Round-off error; Address.
(2 marks for each term)

5. A residents' association intends to investigate a demand for a controlled pedestrian crossing over a busy road by collecting data at the site of the proposed crossing, relating to the number of pedestrians wishing to cross the road and the number of vehicles using the road. This data will be processed by a computer. Describe, fully, a system necessary to implement this job with particular reference to what data is needed; how it is to be obtained; any special forms necessary; how the data is to be input into the computer; the type of program needed in the computer to process the data; the form of the output for analysis. Sketches and flowcharts should be given where appropriate. (20 marks)

6. Explain, in detail, the most important features of 'First Generation'; 'Second Generation'; and 'Third Generation' computers and the distinguishable differences between these 'generations'.

Your answer should include dates, names or types of computers, hardware and software features and reference to the type of processing carried out, where applicable. (20 marks)

[Turn over

7. A school has a teletype terminal linked to a large computer system via an acoustic coupler.

   (a) Suggest two applications in each of the following categories:

      (i)   School administration.

      (ii) Teaching in disciplines other than computer studies.

      (iii) Testing.

      (iv) Teaching slow learners.   (2 marks each)

   (b) Choose *one* of the applications mentioned in (a) and describe, with the aid of diagrams, implementation of the system used. (12 marks)

8. FIZZ-BUZZ is a game for any number of players in which each player counts in turn. A player says the next number in the sequence unless that number contains a 5, or is a multiple of 5, in which case the player says "FIZZ", or the number contains a 7, or is a multiple of 7, in which case the player says "BUZZ".

The game may be played on the flowchart shown opposite from which some information has been removed.

   (a) (i)   Complete the list of numbers missing from box A. (3 marks)

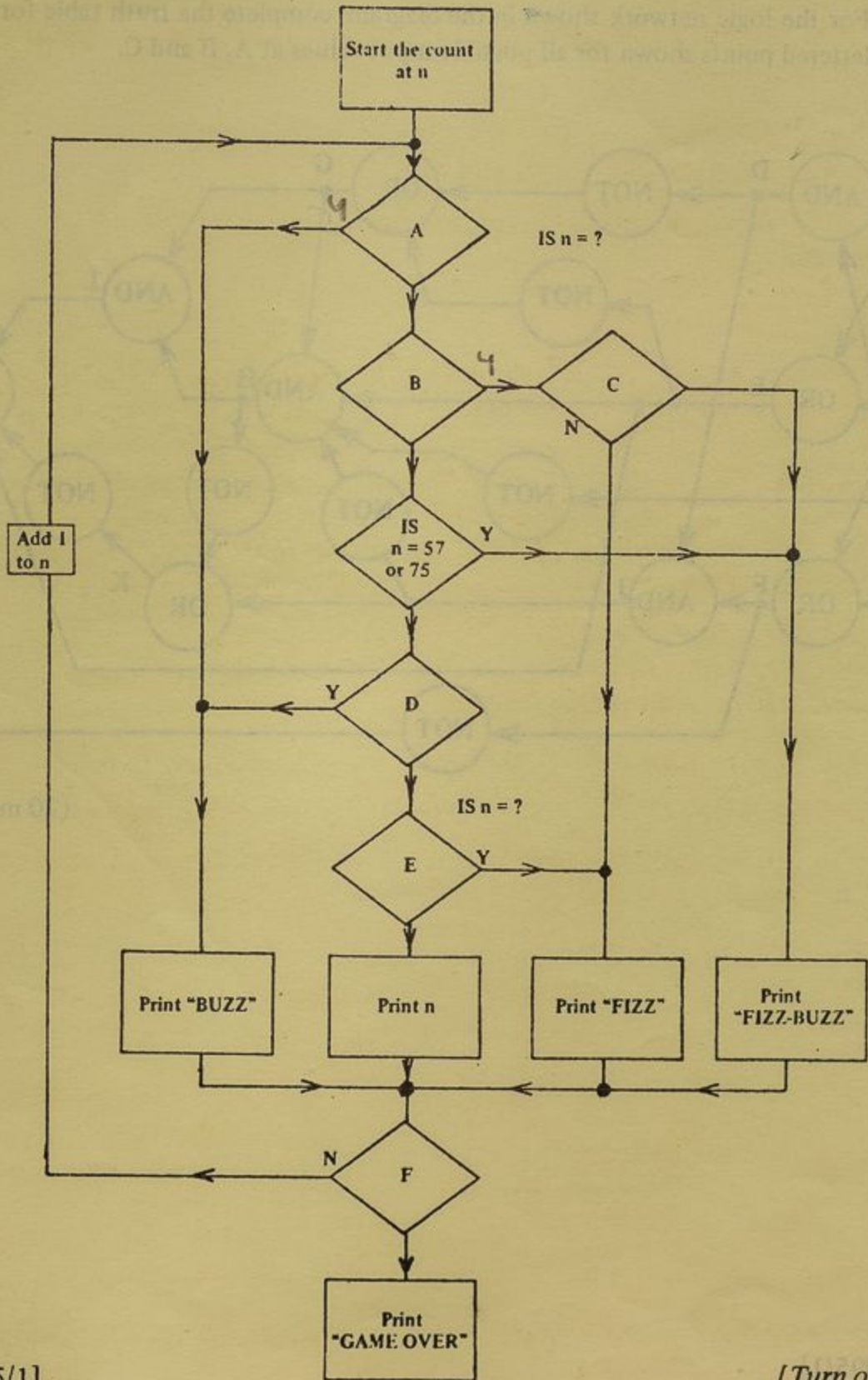   (ii) Complete the list of numbers missing from box E. (3 marks)

      (iii) Complete the question missing from each of boxes B, C and D.
                                              (8 marks)

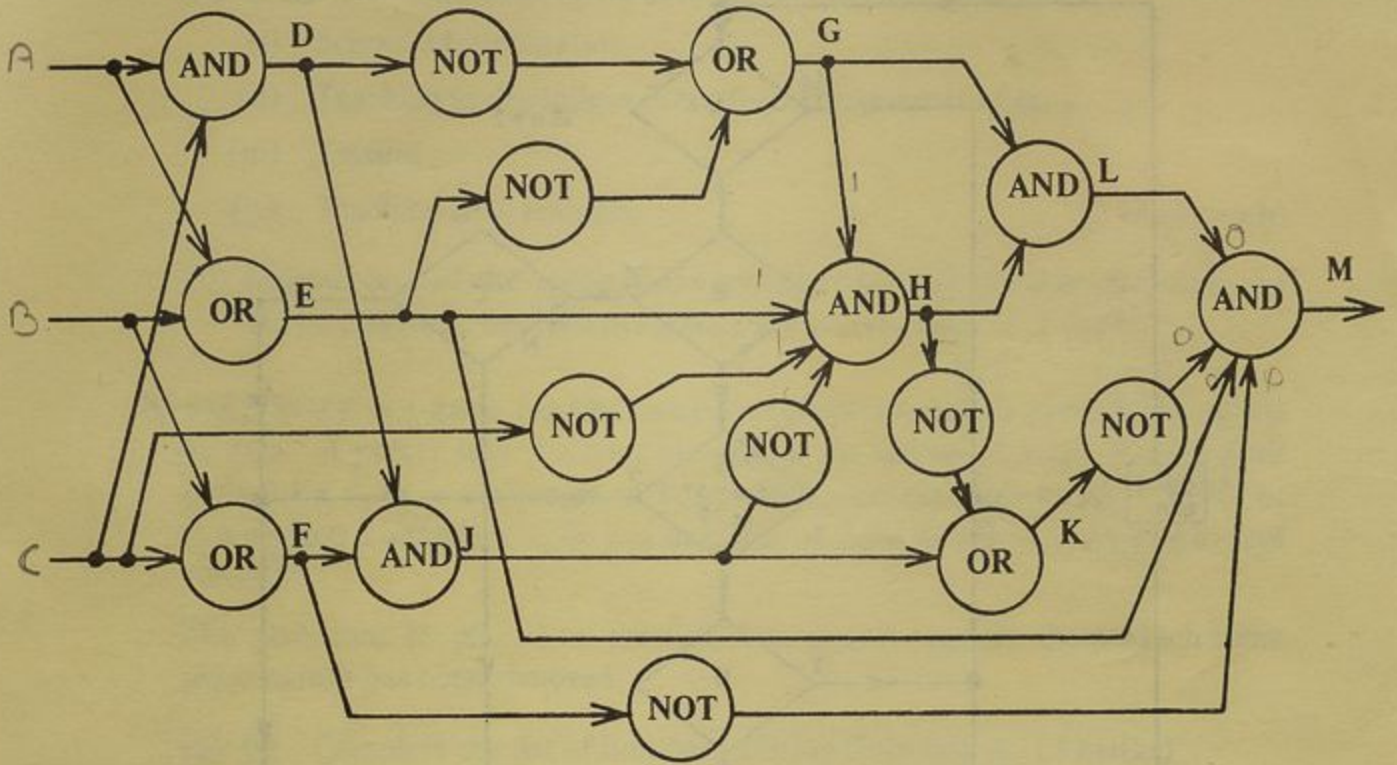   (b) Dry-run the flowchart for values of n from 30 to 50.

      (i)   Complete the question missing from box F. (2 marks)

      (ii) Write down the print-out produced. (4 marks)

Start the count at n

IS n = ?

A

B   C

N

Add 1
to n

IS
n = 57
or 75   Y

Y   D

IS n = ?

E   Y

Print "BUZZ"   Print n   Print "FIZZ"   Print "FIZZ-BUZZ"

N   F

Print
"GAME OVER"

9. For the logic network shown in the diagram, complete the truth table for the lettered points shown for all possible input values at A, B and C.

(20 marks)