

Section III

Self-Test Units

This section contains a selection of short questions on the Core Units. Do not attempt a test until you have read through the corresponding Unit in Section II.

TEST ON UNIT 1 - COMPUTERS

Questions 1-4

For each question give one word for a type of computer which best fits the description.

- 1 Large and digital with a variety of fast peripherals and a large backing store.
- 2 Small and has its Control Unit and its ALU both on one chip.
- 3 Small and digital but does not have its Control Unit and its ALU both on one chip.
- 4 Has no store.

Questions 5-11

For each of the devices given select one of the letters A, B or C depending on whether such a device is:

- A digital
 - B analogue
 - C either analogue or digital
- 5 The display on a watch.
 - 6 A slide rule.
 - 7 An electronic calculator.
 - 8 A computer.
 - 9 A computer which stores a program and data.
 - 10 The volume control on a television.
 - 11 A voltmeter.

Questions 12-17

Give names for

- 12 the three main parts of the CPU
- 13 a circuit on the surface of a chip of silicon
- 14 permanent store on which data cannot be written
- 15 store which is not in the central processing unit
- 16 a small store which helps a slow device cope with data sent from a fast device
- 17 a circuit between two devices which makes it possible for them to communicate with one another

TEST ON UNIT 2 - DATA PROCESSING

Questions 1-4

For each question give a name which best fits the description

- 1 A sequence of operations which may be repeated.
- 2 A document which is output by a computer, has some data added to it and is then fed back into the computer as input.
- 3 Cards which are used as part of a manual filing system.
- 4 A document on which data is entered when the data is first collected.

Questions 5–12

For each of the operations on data given select one or more of the letters A,B,C,D,E,F or G depending on whether the operation includes an example of:

- A transfer,
- B transcription,
- C transmission,
- D processing,
- E collection,
- F input,
- G output.

- 5 A botanist sees a plant and records its name in a book.
- 6 A keyboard operator receives a program on coding sheets and keys it on to disc.
- 7 The contents of the immediate access store of a computer are saved on magnetic disc.
- 8 A list of names is read by a computer, is sorted into alphabetical order and a new list is printed out.
- 9 A pupil uses a calculator to add a set of numbers together.
- 10 A scientist sends instructions to a space satellite to correct its orbit.
- 11 An assistant at a supermarket checkout uses a light pen to scan the bar codes on goods. The numbers represented are stored on a tape cassette to be used later for the stock control system.
- 12 A computer sends data to a terminal via a telephone line.

TEST ON UNIT 3 – REPRESENTATION OF DATA

Questions 1–10

Give a name which best fits the description given.

- 1 A character which can either be 1 or 0.
- 2 A character which can be any letter or any digit.
- 3 A bit which is added to a bit string as a check that the string is correct.
- 4 A system for representing numbers as bit strings.
- 5 A system for representing numbers using only the digits 0,1,2,3,4,5,6,7.
- 6 A bit string obtained from another bit string by replacing each 1 by a 0 and each 0 by a 1.
- 7 The result of adding 1 to the bit string obtained in question 6.
- 8 A method of representing numbers using a mantissa and an exponent.
- 9 A code commonly used to represent characters in the store of microcomputers.
- 10 A code commonly used to represent characters on 9-track magnetic tape.

Questions 11–18

For the bit strings $x = 10110111$ and $y = 00110101$ find the following.

- 11 The hexadecimal equivalent of x .
- 12 The ones complement of x .
- 13 The decimal integer represented by y if it is pure binary.
- 14 The decimal integer represented by y if it is BCD.
- 15 The value, in pure binary, of $x + y$.
- 16 The value, in pure binary, of $x - y$.
- 17 The decimal value of x if it is an integer represented by the twos complement method (with the sign bit at the left).
- 18 The decimal value of x if it is an integer represented using the sign-and-magnitude method.

TEST ON UNIT 4 – DIGITAL LOGIC

Questions 1–5

For each question give a name which best describes the following.

- 1 A table showing the outputs of a logical circuit for all possible combinations of the input.
- 2 A logic circuit with one output and one or more inputs.
- 3 A diagram showing how a set of logic elements are connected together to form a circuit.
- 4 A logical device with two inputs and two outputs for which the outputs represent the sum of the inputs.
- 5 A process which uses only one adder to add the contents of two registers.

*Self-Test Units**Questions 6–8*

For each question select one or more of the letters A, B or C to indicate which of the following gates can fit the given description.

- A NOT
- B AND
- C OR

- 6 The output is logic 1 when all the inputs are logic 1.
- 7 The output is the complement of the input.
- 8 The output is logic 1 when only one of the inputs is logic 1.

Questions 9–14

For each of the logic gates described select one or more of the letters A, B, C, D, E or F to indicate which of the following can fit the given description.

- A NOT
- B AND
- C OR
- D Exclusive OR (i.e. non-equivalence)
- E NAND
- F NOR

- 9 When the two inputs are logic 1 and logic 0, the output is logic 1.
- 10 The output is logic 0 whenever the two inputs are equal to one another.
- 11 The output is logic 0 whenever the two inputs are not equal to one another.
- 12 It can be combined with other gates of the same type to make up any of the other gates.
- 13 There is only one input.
- 14 When the two inputs are connected together it behaves like a NOT gate.

TEST ON UNIT 5 – HARDWARE; DATA PREPARATION AND INPUT

Questions 1–5

Give a name which best describes the following.

- 1 An input, output or backing storage device which is on-line to the central processing unit.
- 2 A method of input where a keyboard operator types data straight into a computer using an on-line terminal.
- 3 A method where data is keyed on to an input medium at a key station which is not connected to the computer.
- 4 The input of hand-written or printed characters by a computer peripheral.
- 5 The input of specially printed characters from bank cheques.

Questions 6, 7

Name:

- 6 Two methods of reading bar codes.
- 7 Two methods of reading pencil marks.

Questions 8–11

For each question select one or more of the letters A, B and C to indicate which of the statements given are true.

- 8 An advantage of mark reading over keyboard preparation is
 - A a faster input speed.
 - B a faster preparation speed.
 - C that the preparation is done without machinery.
- 9 An advantage of MICR over OCR is that
 - A documents can be read even when they are creased.
 - B the characters can be hand-printed.
 - C the characters cannot be forged.
- 10 An advantage of key-to-disc over punched cards is that
 - A data is read more quickly by the input device.
 - B the medium can be read without machinery.
 - C the preparation device is cheaper.

- 11 A light pen works by
- A shining a light onto a screen.
 - B reading numbers.
 - C detecting the presence or absence of light.

TEST ON UNIT 6 – INPUT/OUTPUT DEVICES AND OUTPUT DEVICES

Questions 1–3

Name one or more input/output devices

- 1 which print on paper.
- 2 which give output on a screen.
- 3 which often have a means of input other than a keyboard.

Questions 4–9

Give a name which fits the description best.

- 4 A speed of 1 bit per second.
- 5 A device which makes it possible to use a telephone line to connect a terminal to a computer without necessarily using the telephone handset.
- 6 A device which makes it possible to use a telephone line to connect a terminal to a computer and which has to use the telephone handset.
- 7 A fast impact printer.
- 8 Two completely different types of output device which produce graphics.
- 9 A plotter which can also print characters.

Questions 10–12

For each question select one or more of the letters A, B and C to indicate which of the statements given are true.

- 10 A disadvantage of a teletype compared with a lineprinter is that
- A the characters are often not as clearly printed.
 - B it prints far more slowly.
 - C it is more expensive to buy.
- 11 An advantage of an acoustic coupler over a modem is that it
- A can transmit at higher speeds.
 - B is cheaper to buy.
 - C can be used with any telephone line.
- 12 On a drum plotter
- A the paper is held flat.
 - B the pen and the paper both move.
 - C the results appear on a screen.

Questions 13–15

Name an output device which

- 13 Has all the characters on the spokes of a small wheel.
- 14 Produces print so small that a special reader is needed to read it.
- 15 Has each character made up of small dots.

TEST ON UNIT 7 – STORAGE DEVICES AND MEDIA

Questions 1–6

Give a name for the type of store which best fits the description.

- 1 Any data item stored can be read without having to read any other items first.
- 2 Reading some of the items stored takes much longer than reading others.
- 3 If the power is lost so are the contents of the store.
- 4 Not only are the contents of the store not lost when the power is switched off, but they cannot be changed when the computer is working.
- 5 The storage medium is contained in a peripheral device.
- 6 A type of immediate access store still in use but being superseded.

*Self-Test Units**Questions 7-13*

State the storage medium you would use for the purpose given.

- 7 As direct access backing store for a microcomputer.
- 8 As direct access backing store for a main-frame computer.
- 9 As serial access backing store for a main-frame computer.
- 10 To store programs and data temporarily.
- 11 To store system programs permanently.
- 12 To store a library of applications programs so that they are readily available to users of a time-sharing system.
- 13 To store little used programs cheaply.

Questions 14-16

Give a name for each of the following.

- 14 A set of tracks vertically above one another on a disc pack.
- 15 The time taken by movable read/write heads to move across the disc surface to the appropriate track.
- 16 1 millionth part of a second.

TEST ON UNIT 8 - LOW-LEVEL PROGRAMS

Questions 1-6

Give a name which best fits the description.

- 1 A location, often with special properties, which is used for a particular purpose.
- 2 The sequence of events in which an instruction is transferred to the control unit and carried out.
- 3 A set of pathways connecting parts of the central processing unit and along which data is transferred.
- 4 A program which has been translated into machine code.
- 5 An instruction which causes the computer to depart from executing a program in sequence.
- 6 A name given to a function code so that it is easy to remember.

Questions 7-9

For each question select one or more of the letters A, B and C to indicate which of the statements given is true.

- 7 The program counter is a register which
 - A finds the instruction which is to be executed.
 - B is associated with the control unit.
 - C stores the address of the next instruction.
- 8 Sequence control register is another name for
 - A the current instruction register.
 - B an index register.
 - C the program counter.
- 9 An assembler translates
 - A a program written in a low-level language into machine code.
 - B a program written in a high-level language into machine code.
 - C an object program into a source program.

Questions 10-12

Name a register in which is stored the following.

- 10 The instruction which is being executed.
- 11 The result of executing an instruction.
- 12 An amount which is to be added to an address to modify it.

Questions 13-15

Name an addressing mode for which

- 13 the instruction does not have an address part.
- 14 the address part is not an address but is an actual value to be operated on.
- 15 the address part is the address of a location, which itself contains another address.

TEST ON UNIT 9 - HIGH LEVEL PROGRAMMING

Questions 1-10

Give a name which best fits the description.

- 1 A program which translates a high level program into a machine code program.
- 2 A programming language designed for commercial applications and in which the program statements look like English sentences.
- 3 A programming language originally intended as an interactive teaching language and invented at Dartmouth College, USA.
- 4 A name invented by a programmer for an item, or a group of items, of data.
- 5 A quantity whose value does not change.
- 6 A sequence of instructions which is executed repeatedly until a particular condition is met.
- 7 A sequence of instructions to which control is transferred and which is executed before control returns to the main program.
- 8 An identifier which cannot be used by the programmer because it already has a special significance to the interpreter or compiler.
- 9 A set of variables which all have the same identifier.
- 10 One of the numbers which are used to distinguish between the variables described in question 9.

Questions 11-15

For each question select one of the letters A, B or C to indicate whether the property is an advantage:

- A of high level programming over low level,
 - B of low level programming over high level,
 - C of neither over the other.
- 11 Writing programs is easier.
 - 12 The programs run more efficiently.
 - 13 Programs can be entered directly from a keyboard.
 - 14 It is relatively easy to modify programs written for one type of computer so that they run on another.
 - 15 The object code of a program to carry out the same task takes up less store.

Questions 16, 17

Name a type of program statement which, when executed,

- 16 calculates the value of an expression and gives that value to a named variable.
- 17 reads a value from an input device and gives that value to a named variable.

TEST ON UNIT 10 - PROGRAM DESIGN AND DEVELOPMENT

Questions 1-6

Give a name which best fits the description.

- 1 A report prepared by a systems analyst to help a firm decide whether a new system is realistic.
- 2 A document on which a programmer writes out a program neatly so that it can be typed onto a computer input medium by a keyboard operator.
- 3 Explanatory comments written in the margin of a flowchart.
- 4 A set of rules which gives a sequence of operations to solve a problem.
- 5 A flowchart symbol which can be used to represent a conditional branch instruction in a program.
- 6 A table designed to show what actions are to be taken when certain conditions are met.

Questions 7-10

Name a type of flowchart which might include a symbol to show the following.

- 7 A clerical operation on data.
- 8 An individual program instruction.
- 9 A module of a program as one box.
- 10 The type of medium on which the output is produced.

Questions 11–15

For each question select one or more of the letters A, B and C to indicate whether each of the items listed is intended mainly for the benefit of

- A a user of the program,
 - B the programmer who writes the program,
 - C another programmer who wishes to understand the program and modify it.
- 11 Details of how to collect data for the program.
 - 12 A systems flowchart.
 - 13 Comment statements in the program.
 - 14 A list of the variables used by the program.
 - 15 A program flowchart.

TEST ON UNIT 11 – ERRORS

Questions 1–8

Give the correct terms to complete the following passage (the answers are all different from one another).

The first time the program was loaded it contained a (1). This was caused by a (2) made when the program was keyed in and was detected by the compiler which printed a (3). After this the program compiled successfully. However it still contained a (4), because when run with the (5) it did not give the expected results. In fact the programmer had to look at his flowchart and do a (6) by drawing a (7) before he was able to find the (8).

Questions 9–12

Give names which best describe

- 9 A print out produced by adding instructions to a program so that the results of each calculation are shown.
- 10 A copy of all or part of the immediate access store printed out on a printer.
- 11 A digit added to a number to ensure that if, after any operation, the number is changed then the error will be detected.
- 12 The operation of finding errors in a program and correcting them.

Questions 13–15

Choose one of the letters A or B to indicate whether the operations described are examples of:

- A verification of data,
 - B validation of data.
- 13 Checking some data stored in a file against the source documents from which it was typed, to see that they are the same.
 - 14 Checking parts numbers to see that they do not contain any letters.
 - 15 Seeing that the recorded ages of a particular group of pupils are each not greater than 16.

TEST ON UNIT 12 – FILES

Questions 1–5

Give the feature which distinguishes

- 1 A data bank from a data base.
- 2 A fixed length field from a variable length field.
- 3 A sequential file from a direct access file.
- 4 A selection sort from an insertion sort.
- 5 A grandfather file from a father file.

Questions 6–8

For each question select one or more of the letters A, B and C to indicate which of the statements are true.

- 6 A write permit ring is a
 - A means of checking that only an authorized person uses a file.
 - B means of ensuring that data is not accidentally erased.
 - C device which can be attached to a magnetic tape.

- 7 A bubble sort on a set of numbers works by
 - A repeatedly picking out the smallest number.
 - B repeatedly exchanging numbers with their neighbours.
 - C putting sorted groups of numbers onto backing store.
- 8 One of the possible operations carried out while updating a file is
 - A the deletion of a record.
 - B producing a new transaction file.
 - C changing a record.

Questions 9–12

Name the following.

- 9 A file which is the main source of information in a particular file operation.
- 10 A temporary file from which data is used to carry out a processing operation on a more permanent file.
- 11 A field in each record of a file which is used to identify the record uniquely.
- 12 A sub-division of a file consisting of a group of related items which together can be treated as a unit.

TEST ON UNIT 13 – SOFTWARE AND SYSTEMS

Questions 1–4

For each question select one or more of the letters A, B, C and D to indicate which of the following processing system types could be used in the given situation:

- A real time,
 - B multi-access,
 - C batch processing,
 - D interactive single-user.
- 1 An airline booking system where travel agents use terminals to check on the availability of seats and to book them.
 - 2 A time-sharing system for students developing programs.
 - 3 A stock control system in which data is sent from shops to a computer centre to be keyed onto magnetic tape and then processed.
 - 4 A research worker using a microcomputer to control a series of experiments.

Questions 5–13

Give a name which best fits the description.

- 5 A system with several central processors sharing the same peripheral devices.
- 6 A system in which a number of processors can each be used independently or as part of a network.
- 7 The process of obtaining a connection to a computer using a terminal to type in a password and the appropriate instructions.
- 8 A small amount of time allocated in turn to each user of a time-sharing system.
- 9 A language with which a user informs the operating system how a particular program is to be run.
- 10 The part of the operating system which organizes the use of the peripherals.
- 11 An organization which produces program packages.
- 12 A program which is readily available to users of a computer as part of the software.
- 13 A systems program which performs one commonplace task.
- 14 Select one or more of the letters A, B, C, D, E or F to indicate which of the following tasks are performed by the operating system
 - A switching the computer on,
 - B dealing with execution errors,
 - C producing a log of programs run,
 - D checking users passwords,
 - E diagnosing syntax errors,
 - F requesting an operator to put paper in a printer.

TEST ON UNIT 14 – APPLICATIONS

- 1 Give **three** means by which employees may receive their pay.

- 2 State **three** types of document which might be produced by an accounting system to be sent out to customers.
- 3 Define the term 'stock'.
- 4 Give **three** activities in a library where a computer might be used.
- 5 Give **two** banking operations where a computer might be used.
- 6 Name **four** types of data which the police have on file.
- 7 State **three** tasks a word processor would help with.

Questions 8–11

For each question select one or more of the letters A, B, C, D, E and F to indicate which of the following applications would probably make use of the given item

- A payroll
 - B customer accounts and invoices
 - C a police information system
 - D the banks' system for clearing cheques
 - E stock control
 - F a library
- 8 Bar codes.
 - 9 A batch processing system.
 - 10 MICR.
 - 11 Interactive terminals.

TEST ON UNIT 15 – JOBS IN COMPUTING

Questions 1–6

Give the correct job names to complete the following passage (the answers are all different from one another).

The work arrived at the computer centre on source documents and was given to one of the (1). The (2) then took it to the data preparation department where the (3) decided which of the (4) should type it on to magnetic tape. The tape was loaded onto a tape unit by one of the (5) and the program also required a library file which was provided by the (6).

Questions 7–12

For each question name the person whose duty is described.

- 7 Advising on the **changeover** from one system to another.
- 8 Producing detailed **program** flowcharts.
- 9 Allocation of duties to staff in the computer department.
- 10 Coordinating **operations** in the computer room.
- 11 Preparing a **timetable** for a particular shift.
- 12 Supervision of **junior** programmers.

TEST ON UNIT 16 – THE SOCIAL IMPACT OF COMPUTERS

- 1 Give **four** applications of microcomputers which previous types of computer have not been used for.
- 2 Give **three** ways in **which** people's rights to personal privacy may be affected by the use of computers to store **information**.
- 3 Name **two** Government agencies which hold large files of data.
- 4 Name **two** countries whose data protection laws provide more protection for individual citizens than is the **case** in Britain.
- 5 Give **two** arguments **that** new technology has a beneficial **effect** on the employment situation.
- 6 Give **two** arguments **that** new technology has a detrimental effect on the employment situation.

TEST ON UNIT 17 – HISTORY OF INFORMATION PROCESSING

Questions 1–10

For each question select one of the letters A, B, C, D, E and F to indicate whether the item

mentioned was introduced in the period.

- A before 1600 AD
 - B 1600–1700
 - C 1700–1900
 - D 1900–1940
 - E 1940–1960
 - F after 1960
- 1 The binary system.
 - 2 The decimal point.
 - 3 The abacus.
 - 4 A mechanical calculator.
 - 5 An electronic calculator.
 - 6 A Difference Engine.
 - 7 Punched cards.
 - 8 A digital computer.
 - 9 An electronic digital computer.
 - 10 A computer with integrated circuits.

Questions 11–16

Name a person who

- 11 invented an automatic loom which used punched cards.
- 12 introduced the use of punched cards for data processing.
- 13 made an Analytical Engine.
- 14 suggested programs for the Analytical Engine.
- 15 invented logarithms.
- 16 suggested computers should have a stored program.

Questions 17–20

Name a development which made possible

- 17 the First Generation of computers.
- 18 the Second Generation.
- 19 the Third Generation.
- 20 microprocessors.