FUNDAMENTALS OF COMPUTER

What are computers?

Computers are machines that perform tasks or calculations according to a set of instructions, or *programs*. The first fully electronic computers, introduced in the 1940s, were huge machines that required teams of people to operate. Compared to those early machines, today's computers are amazing. Not only are they thousands of times faster, they can fit on your desk, in your lap, or even in your pocket.

Computers work through an interaction of hardware and software. *Hardware* refers to the parts of a computer that you can see and touch, including the case and everything inside it. The most important piece of hardware is a tiny rectangular chip inside your computer called the *central processing unit (CPU)*, or *microprocessor*. It's the "brain" of your computer—the part that translates instructions and performs calculations. Hardware items such as your monitor, keyboard, mouse, printer, and other items are often called *hardware devices*, or *devices*.

Software:-

*Software* refers to the instructions, or programs, that tell the hardware what to do. A word processing program that you can use to write letters on your computer is a type of software. The operating system (OS) is software that manages your computer and the devices connected to it. Two well-known operating systems are Windows and Macintoshoperating system. Your computer uses the Windows operating system.

Input/Output Devices

I. Introduction

II. Input Devices

a. Keyboard,mouse,joystick,scanners,digital camera, bar code

reader, touch Sreeen,Speech input device (microphone)

III. Output Devices

a. Monitor , Speaker, Printers ( different types)

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I. Introduction

The computer will be of no use unless it is able to communicate with the outside

world. Input/Output devices are required for users to communicate with the computer.

In simple terms, input devices bring information INTO the computer and output

devices bring information OUT of a computer system. These input/output devices are

also known as peripherals since they surround the CPU and memory of a computer

system.

Some commonly used Input/Output devices are listed in table below.

Input Devices Output Devices

Keyboard

Mouse

Joystick

Scanner

Light Pen

Touch Screen

Monitor

LCD

Printer

Plotter

II. Input Devices

(a) Keyboard

It is a text base input device that allows the user to input alphabets, numbers and

other

characters. It consists of a set of keys mounted on a board.

Alphanumeric Keypad

It consists of keys for English alphabets, 0 to 9 numbers, and special characters like +

−/ \* ( ) etc.

Function Keys

There are twelve function keys labeled F1, F2, F3… F12. The functions assigned to

these keys differ from one software package to another. These keys are also user

programmable keys.

Special-function Keys

These keys have special functions assigned to them and can be used only for those

specific purposes. Functions of some of the important keys are defined below.

Enter

It is similar to the ‘return’ key of the typewriter and is used to execute a command or

program.

Spacebar

It is used to enter a space at the current cursor location.

Backspace

This key is used to move the cursor one position to the left and also delete the

character in that position.

Delete

It is used to delete the character at the cursor position.

Insert

Insert key is used to toggle between insert and overwrite mode during data entry.

Shift

This key is used to type capital letters when pressed along with an alphabet key. Also

used to type the special characters located on the upper-side of a key that has two

characters defined on the same key.

Caps Lock

Cap Lock is used to toggle between the capital lock features. When ‘on’, it locks the

alphanumeric keypad for capital letters input only.

Tab

Tab is used to move the cursor to the next tab position defined in the document. Also,

it is used to insert indentation into a document.

Ctrl

Function Keys

Numeric Keypad

Cursor Movement

Keys

Alphanumeric Keypad/

Special-function Keys

Control key is used in conjunction with other keys to provide additional functionality

on the keyboard.

Alt

Also like the control key, Alt key is always used in combination with other keys to

perform specific tasks.

Esc

This key is usually used to negate a command. Also used to cancel or abort executing

programs.

Numeric Keypad

Numeric keypad is located on the right side of the keyboard and consists of keys

having numbers (0 to 9) and mathematical operators (+ −\* /) defined on them. This

keypad is provided to support quick entry for numeric data.

Cursor Movement Keys

These are arrow keys and are used to move the cursor in the direction indicated by the

arrow (up, down, left, right).

(b) Mouse

The mouse is a small device used to point to a particular place on the screen and

select in order to perform one or more actions. It can be used to select menu

commands, size windows, start programs etc.

The most conventional kind of mouse has two buttons on top: the left one being used

most frequently.

Mouse Actions

Left Click : Used to select an item.

Double Click : Used to start a program or open a file.

Right Click : Usually used to display a set of commands.

Drag and Drop : It allows you to select and move an item from one location to

another. To achieve this place the cursor over an item on the screen, click the left

mouse button and while holding the button down move the cursor to where you want

to place the item, and then release it.

(c) Joystick

The joystick is a vertical stick which moves the graphic cursor in a direction the stick

is moved. It typically has a button on top that is used to select the option pointed by

the cursor. Joystick is used as an input device primarily used with video games,

training simulators and controlling robots

(d)Scanner

Scanner is an input device used for direct data entry from the source document into

the computer system. It converts the document image into digital form so that it can

be fed into the computer. Capturing information like this reduces the possibility of

errors typically experienced during large data entry.

Hand-held scanners are commonly seen in big stores to scan codes and price

information for each of the items. They are also termed the bar code readers.

(e) Bar codes

A bar code is a set of lines of different thicknesses that represent a number. Bar Code

Readers are used to input data from bar codes. Most products in shops have bar codes

on them.Bar code readers work by shining a beam of light on the lines that make up

the bar code and detecting the amount of light that is reflected back

(f) Light Pen

It is a pen shaped device used to select objects on a display screen. It is quite like the

mouse (in its functionality) but uses a light pen to move the pointer and select any

object on the screen by pointing to the object.

Users of Computer Aided Design (CAD) applications commonly use the light pens to

directly draw on screen.

(g) Touch Screen

It allows the user to operate/make selections by simply touching the display screen.

Common examples of touch screen include information kiosks, and bank ATMs.

(h)Digital camera

A digital camera can store many more pictures than an ordinary camera. Pictures

taken using a digital camera are stored inside its memory and can be transferred to a

computer by connecting the camera to it. A digital camera takes pictures by

converting the light passing through the lens at the front into a digital image.

(i) The Speech Input Device

The “Microphones - Speech Recognition” is a speech Input device. To operate it we

require using a microphone to talk to the computer. Also we need to add a sound card

to the computer. The Sound card digitizes audio input into 0/1s .A speech recognition

program can process the input and convert it into machine-recognized commands

or input.

III. Output Devices

(a) Monitor

Monitor is an output device that resembles the television screen and uses a Cathode

Ray Tube (CRT) to display information. The monitor is associated with a keyboard

for manual input of characters and displays the information as it is keyed in. It also

displays the program or application output. Like the television, monitors are also

available in different sizes.

(b) Liquid Crystal Display (LCD)

LCD was introduced in the 1970s and is now applied to display terminals also. Its

advantages like low energy consumption, smaller and lighter have paved its way for

usage in portable computers (laptops).

(c) Printer

Printers are used to produce paper (commonly known as hardcopy) output. Based on

the technology used, they can be classified as Impact or Non-impact printers.

Impact printers use the typewriting printing mechanism wherein a hammer strikes

the paper through a ribbon in order to produce output. Dot-matrix and Character

printers fall under this category.

Non-impact printers do not touch the paper while printing. They use chemical, heat

or electrical signals to etch the symbols on paper. Inkjet, Deskjet, Laser, Thermal

printers fall under this category of printers.

When we talk about printers we refer to two basic qualities associated with printers:

resolution, and speed. Print resolution is measured in terms of number of dots per

inch (dpi). Print speed is measured in terms of number of characters printed in a unit

of time and is represented as characters-per-second (cps), lines-per-minute (lpm), or

pages-per-minute (ppm).

(d) Plotter

Plotters are used to print graphical output on paper. It interprets computer commands

and makes line drawings on paper using multicolored automated pens. It is capable of

producing graphs, drawings, charts, maps etc.

Computer Aided Engineering (CAE) applications like CAD (Computer Aided

Design) and CAM (Computer Aided Manufacturing) are typical usage areas for

plotters.

(e) Audio Output: Sound Cards and Speakers:

The Audio output is the ability of the computer to output sound. Two components are

needed: Sound card – Plays contents of digitized recordings, Speakers – Attached to

sound card.

747. First computer in India was manufactured by

a) CMC b) ECIL

c) BEL d) HCL

**Ans: B**

1) Indicate which of the following, best describes the term “software”

a)Systems programs only b)Application programs only c)Both (a) and (b)

d)None of the above

2) A translator is best described as

a) An Application software b) A system software c) A hardware component

d)None of the above

3) Indicate which of the following is not true about an interpreter

a)Interpreter generates an object program from the source program

b) Interpreter is a kind of translator

c) Interpreter analyses each source statement every time it is to be executed

d) None of the above

4) The errors that can be pointed out by the compiler are

a)Syntax errors b)Semantic errors c)Logical errors d)None of the above

5) C is

a) An assembly language b) A third generation high level language

c) A machine language d)None of the above

6) A graph preapared by a computer

a) is its output b) is the piece of information to use c)is a hard copy

d) all of the above

7)Which of the following does not represent on I/O device

a) speaker which beeps b) joystick c) plotter d)ALU

8)The communication line between the CPU, memory and peripherals is called a

a)Bus b) line c)media d) none of these

9)Memories which can be read only are called………….. memories

a)RAM b)ROM(read only memory) c)PROM

d)EPROM

10)Example of non-numerical data is

a) Employee address b) Examination score c)Bank balance

d)None of the above

11)One thousand bytes represent a

a)Megabyte b)Gigabyte c)Kilobyte d)None of the above

12)The language that the computer can understand and execute is called

a)Machine language b)Application software c)System program

d)None of the above

13)A step by step procedure used to solve a problem is called

a)Operating system b)Algorithm c)Application Program d)None of the above

14)Which of the following holds the ROM, CPU, RAM and expansion cards

a)Hard disk b)Cache memory c)Mother board d)None of the above

15)The errors that can be pointed out by the compiler are

a)Syntax errors b)Semantic errors c)Logical errors d)None of the above

16)A computer cannot “boot” if it does not have the

a)Compiler b)Loader c)Operating system d)Assembler

17) The access method used for magnetic tape is\_\_\_\_\_\_\_\_\_

a) Direct b) Random c) Sequential d) None of the above

18) By Processing we understand \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

a) Processing string of only words b) None of the above c) String manipulation only

d) Processing string of numbers and special symbols

19) The difference between memory and storage is that the memory is\_\_\_\_\_\_\_\_\_\_ and storage is\_\_\_\_\_\_\_\_\_

a) Temporary, permanent b) Permanent, temporary c) Slow, fast

d) None of the above

20) Which of the Following holds the ROM, CPU, RAM and expansion cards

a) Hard disk b) Floppy disk c) Mother board d) None of the above

21) The language that the computer can understand and execute is called \_\_\_\_\_\_

a) Machine language b) Application software c) System program

d) None of the above

22) Which of the following devices can be used to directly input printed text

a) OCR b) OMR c) MICR d) None of the above

23) A floppy disk contains

a) Circular tracks only b) Sectors only c) Both circular tracks and sectors

d) None of the above

24) CD-ROM is a

a) Semiconductor memory b) Memory register c) Magnetic memory

d) None of the above

25) Actual execution of instructions in a computer takes place in

a) ALU b) Control Unit c) Storage unit d) None of the above

26) Which of the following is used as a primary storage device

a) Magnetic tape b) PROM c) Floppy disk d) None of the above

27) Information retrieval is faster from

a) Floppy disk b) Magnetic tape c) Hard disk d) None of the above

28) Operating system is

a) A collection of hardware components c) A collection of software routines

b) A collection of input-output devices d) none of the above

29) Operating system

a) Link a program with the subroutines it references

b) Provides a layered, user-friendly interface

c) Enables a programmer to draw a flowchart d) None of the above

30) Execution of two or more programs by a single CPU is known as :

a) Multiprocessing b) Time sharing c) Multiprogramming

d) None of the above

31) Modem stands for

a) A type of secondary memory b) Modulator demodulator

c) Mainframe operating device memory d) None of the above

32)Third generation computers

a)Were the first to use built-in error detecting device

b)Used transistors instead of vaccum tubes

c)Were the first to use neural network

d)None of the above

33)A Winchester disk is a

a)Disk stack b)Removable disk c)Flexible disk d)None of the above

34) A computer can be defined as an electronic device that can be(choose the most precise definition):

a) carry out arithmetical operation b) carry out logical function

c) accept and process data using a set of stored instructions

d) present information on a VDU

35) The Central Processing Unit:

a) is operated from the control panel. b) is controlled by the input data entering

the system

c) controls the auxiliary storage unit d) controls all input, output and

processing.

36) Computer follows a simple principle called GIGO which means:

a)garbage input good output b) garbage in garbage out

c) great instructions great output d) good input good output.

37) The term ‘baud’ is a measure of the:

a) speed at which data travels over the communication line

b) memory capacity

c) instruction execution time

d) all of the above

38) A bootstrap is:

a) a memory device b) a device to support the computer

c) a small initialisation program to start up a computer

d) an error correction technique

39) Which of the following is not hardware:

a) Magnetic tape b) Printer c) VDU terminal d) Assembler

40) Pick out the wrong definition :

a) Access time – time needed to access the output

b) EDP- acronym for Electronic Data Processing

c) COBOL – a language used for business data processing

d) Control unit – heart of a computer.

41) Terminal is a:

a) device to give power supply to computer

b) point at which data enters or leaves the computer

c) the last instruction in a program

d) any input /output device.

42) Multiple choice examination answer sheets can be evaluated automically by

a) Optical Mark Reader b)Optical Character Reader c) Magnetic tape reader

d) Magnetic ink character reader.

43) An operating system

a) is not required on large computers b) is always supplied with the copmuter

c) is always supplied with the BASIC

d) consists of programs that help in the operation of computer.

44)Which of the following would cause quickest acess

a) direct access from a magnetic tape

b) direct access from a hard disk

c) direct access from a floppy disk

d) direct access from a cassette tape

45) The process of retaining data for future use is called

a) reading b)writing c)storing d)coding

46)A file is corrected immediately after the input of a transaction.This is an example of

a) sorting b)batching c)on-line updating d) off-line updating

47)Magnetic tapes are good storage media for

a) backup and low volume data

b)backup and high volume data

c)storing original but low volume data

d)storing original but high volume data

48)Which of the following is a computercode

a) EPROM b) JAVA c) EBCDIC d)None of the above

49)Data is generally coded in 8-bit units, such a unit is also called

a) k b) Word c)field d)byte

50) Half adder is logic CKT that adds. ………Digit at a time

a) Two b) one c) three d) zero

51) Half adder consist of. ……&…..Gates

a) EX-OR&AND b) EX-OR&OR

c) EX-OR&NOT d) None of this

52)In half adder EX-OR gate O/P is …………

a) Carry b) Remainder c) Sum d) Non of this

53)In half adder AND gate O/P is …………

a) Carry b) Reminder c) Sum d) Non of this

54)Subtract ( 1010)2 from ( 1101 )2 using 1st complement..

a)(1100)2 b)(0011)2 c)(1001)2 d)(0101)2

55)Using 2’s Complement, subtraction, of (1010)2 from (0011)2 is

a) (0111)2 b) (1001)2 c) –(0111)2 d) –(1001)2

56)In 1st Complement a number to be subtracted is known as………

a) Subtrahend b) Minuend c) carry d) none of thi

57)In 1st Complement a number which is Subtracted from other number

Is known as……….

a) Carry b) subtrahend c) minuend d) Non of this

58)In a 2nd Complement a number which is subtracted from other

Number is known as………..

a) Carry b) Subtrahend c) Minuend d) Non of this

59)In 2nd Complement a number which is subtracted from other number

Is known as………….

a) Carry b) Subtrahend c) Minuend d) Non of this

60)The full adder CKT adds. ………Digit at a time

a) 1 b) 2 c) 3 d) 4

61)Full adder is constructed by using …………….

a) Two Half Adder& one OR gate b) two OR gate &one HA

c) One HA & two OR gate d) One OR gate & one HA

62)HA gives……………. O/P

a) 1 b) 2 c) 3 d) non of this

63)FA gives……….. O/P

a) 1 b) 2 c) 3 d) non of this

64) The O/P of Half adder is in the form of.

a) Sum b) carry c) sum & carry d) none of these

65)The O/P of Full adder is in the form of …………

a) Sum b) carry c) sum & carry d) none of these

66)……….Are used for converting one type of number system in to other form.

a) Encoder b) logic gate c) half adder d) FA

67)……… Are used for converting one type of number system in to the other form

a) Decoder b) logic gate c) half adder d) Full adder

68)Multiplexer means …………………………

a) One in to many b) many in to one c) many in to many d) none of these

69)Multiplexers is also known as.

a) mux b) demux c) adder d) subtractor

70)ASCII code is a ……… bit code.

a) 1 b) 2 c) 7 d) 8

71)8421 codes is also called as.

a) Gray code b) ASCII code c) excess 3-code d) BCD code

72)The decimal number is converted in to excess 3 codes by adding. to each decimal digit.

a) 4 b) 8 c) 2 d) 3

73)The binary system, 1+1=…………

(a) 2 (b) 0 (c) 1 (d) none of these

74)110+110=…………

(a) 2 (b) 0 (c) 1 (d) none of these

75) 12+12=………..

(a) 2 (b) 0 (c) 1 (d) none of these

76) The digital system usually operated on ………system.

(a) binary (b) decimal (c)octal (d) hexadecimal

77) The binary system use powers of……….for positional values.

(a) 2 (b)10 (c) 8 (d)16

78) After counting 0, 1, 10, 11, the next binary number is

(a) 12 (b) 100 (c)101 (d) 110

79) The 2’s complement of 10002 is

(a)0111 (b)0101 (c) 1000 (d)0001

80) The chief reason why digital computers use complemental subtraction is that is

(a) simplifies their circuitry (b) is a very simple process

(c) can handle negative numbers easily (d) avoids direct substraction

81) In logic algebra, variables can assume only two values:either……….or 1.

(a) 2 (b) 0 (c) 3 (d) 4

82) The………. gate is also called any-or-all gate.

(a) OR (b) AND (c) NOT (d) EX-OR

83) A logic gate is an electronic circuit which

(a) makes logic decisions (b) allows electron flow only in one direction

(c) works on binary algebra (d) alternates between 0&1 values

84) In positive logic, logic gate 1 corresponds to

(a) positive voltage (b) higher voltage level

(c) zero voltage level (d) lower voltage level

85) In negative logic, the logic state 1 corresponds to

(a) negative logic (b) zero voltage

(c) more negative voltage (d) lower voltage level

86) The output of a 2-input OR the gate is 0 only when it’s

(a) both inputs are 0 (b) either input is 1

(c) both inputs are 1 (d) either input is 0

87) An X-OR gate produces an output only when it’s two inputs are

(a) high (b) low (c) different (d) same

88) An AND gate

(a) implements logic addition (b) is equivalent to a series switching circuit

(c) is an any-or-all gate (d)is equivalent to a parallel switching circuit

89) When an input electrical signal A=10100 is applied to a NOT gate, it’s output

Signal is

(a) 01011 (b) 10101 (c) 10100 (d)00101

90) The only function of a NOT gate is to

(a) stop a signal (b) recomplement a signal

(c) invert an input signal (d) act as a universal set

91) A NOR gate is ON only when all it’s inputs are

(a) ON (b) positive (c) high (d) OFF

92) Karnaugh map (K-map) technique provides a systematic method for simplifying -----------

a) multiplexers b) lgic gates c) Boolean expressions d) none of these .

93) K-map technique generally used up to --------Variables

a) 2 b) 8 c) 7 d) 6

94)In K-map a quad is group of --------- 1’s

a) 2 b) 6 c) 4 d) 8

95) A octal is group of -------1’s

a) 2 b) 6 c) 4 d) 8

96) K –map for Half adder is of ---------- Variables

a)2 b) 3 c) 4 d) None of these

97)K-map for Full adder is of ----------- Variables

a) 2 b) 3 c) 4 d) None of these

98) A Register is a group of ---------

a) OR gates b)OR & AND gate c)Flip-flops d)None of these

99) Each Flip-flop stores ---------- bits

a) 1 bit B) 8 bit c) 16 bit d)2 bit

100) In Boolean algebra , A+ A= -----------

a)A b)1 c)0 d)None of these

101) In Boolean algebra , A . A=-----------

a) A2 b) A c)2A d)1

102) In Boolean algebra A+ AB =-----------

a) B b) A c)AB d)A+B

103)The First Microprocessor was\_\_\_\_\_\_\_\_\_\_

a) Intel 4004 b) 8080 c) 8085 d) 4008

104)8085 was introduced in \_\_\_\_\_\_\_\_\_\_

a) 1971 b) 1976 c) 1972 d) 1978

105)In 1978 Intel introduced the 16 bit Microprocessor 8086 now called as\_\_\_\_\_\_\_\_

a) M6 800 b) APX 80 c) Zylog z8000 d) Intel 8086

106)Which is a 8 bit Microprocessor \_\_\_\_\_\_\_\_\_\_

a) Intel 4040 b) Pentium – I c) 8088 d) Motorala MC-6801

107)Pentium-I, Pentium-II, Pentium-III and Pentium-IV are recently introduced

microprocessor by\_\_\_\_\_\_\_\_\_\_

a) Motorala b) Intel c) Stephen Mors d) None

108)The address bus flow in \_\_\_\_\_\_\_\_\_\_

a) bidirection b) unidirection c) Mulidirection d) Circular

109)Status register is also called as \_\_\_\_\_\_\_\_\_\_\_

a) Accumulator b) Stack c) Counter d) flags

110)The 8085 is based in a \_\_\_\_\_ pin DIP

a) 40 b) 45 c) 20 d) 35

111)The 8085 Microprocessor uses\_\_\_\_\_\_\_\_\_\_ V power supply

a) +5V b) -5V c) +12v d) -12v

112)The address / data bus in 8085 is \_\_\_\_\_\_\_\_\_\_

a) Multiplexed b) demultiplexed c) decoded d) loaded

113)The Stack pointer holds\_\_\_\_\_\_\_\_\_\_

a) 16 bit address b) 16 bit data c) 8 bit address d) 8 bit data

114)The First electronic computer was completed in \_\_\_\_\_\_\_\_\_\_

a) 1946 b) 1938 c) 1941 d) 1950

115)The First Generation of computer appeared during the period\_\_\_\_\_\_\_\_\_\_

a) 1945 to 1954 b) 1964 to 1974 c) 1934 to 1944 d) 1937 to 1949

116)The Second Generation of computers used \_\_\_\_\_\_\_\_\_\_

a) IC-Chip b) Transistors c) Vaccum tubes d) Microprocessor chip

117)The fourth Generation began in \_\_\_\_\_\_\_\_\_\_

a) 1974 b) 1935 c) 1965 d) 1975

118)\_\_\_\_\_\_\_\_\_\_is used to create Large program on internet

a) C++ b) HTML c) C language d) Java script

119)The Device which converts instructions into the binary form that is understood by the computer and supply to the computer is known as\_\_\_\_\_\_\_\_\_\_

a) Input b) Output c) Automatic d) Memory

120)Laptop PCs are also known as \_\_\_\_\_\_\_\_\_\_Computers

a) Mainframe b) Super c) Notebook d) personal

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1.a |  | 21.a |  | 41.b |  | 61.a |  | 81.b |  | 101.b |
| 2.b |  | 22.a |  | 42.a |  | 62.b |  | 82.d |  | 102.b |
| 3.b |  | 23.c |  | 43.d |  | 63.b |  | 83.a |  | 103.a |
| 4.a |  | 24.d |  | 44.b |  | 64.c |  | 84.b |  | 104.b |
| 5.b |  | 25.a |  | 45.c |  | 65.c |  | 85.d |  | 105.b |
| 6.d |  | 26.b |  | 46.c |  | 66.a |  | 86.a |  | 106.d |
| 7.d |  | 27.c |  | 47.b |  | 67.a |  | 87.c |  | 107.b |
| 8.a |  | 28.c |  | 48.c |  | 68.b |  | 88.b |  | 108.b |
| 9.b |  | 29.b |  | 49.d |  | 69.a |  | 89.a |  | 109.d |
| 10.a |  | 30.c |  | 50.a |  | 70.c |  | 90.c |  | 110.a |
| 11.c |  | 31.b |  | 51.a |  | 71.d |  | 91.d |  | 111.a |
| 12.a |  | 32.d |  | 52.c |  | 72.d |  | 92.c |  | 112.a |
| 13.b |  | 33.a |  | 53.a |  | 73.c |  | 93.d |  | 113.a |
| 14.c |  | 34.c |  | 54.b |  | 74.a |  | 94.c |  | 114.a |
| 15.a |  | 35.d |  | 55.c |  | 75.c |  | 95.d |  | 115.a |
| 16.c |  | 36.b |  | 56.a |  | 76.a |  | 96.a |  | 116.b |
| 17.c |  | 37.a |  | 57.c |  | 77.a |  | 97.b |  | 117.d |
| 18.b |  | 38.c |  | 58.b |  | 78.b |  | 98.c |  | 118.d |
| 19.a |  | 39.d |  | 59.c |  | 79.c |  | 99.a |  | 119.a |
| 20.c |  | 40.a |  | 60.c |  | 80.a |  | 100.b |  | 120.c |