## Section 1: The Fundamentals of Hardware and Software

### Check your progress 1

The Power and Light Company processes and sends out monthly bills to consumers of electricity. Identify the input, processing, output and storage.

*A. Input – The reading from the meter*
*Processing – Calculating the amount due using the meter reading, and preparing the bill.*
*Output – The bill for the customer.*

### End-of-topic questions 1

1. You are attending secondary school and your parents have bought a computer system for you. List three tasks you would use your computer to do.
   *A. Prepare and store the assignments and projects.*
   *Research on a topic for school.*
   *Interact with teachers and other classmates.*

2. A computer is calculating the monthly salary for an employee by multiplying the number of days worked for the month by the daily rate of pay. What is the name given to this operation?
   *A. Processing*

3. A computer system was used to print out a list of employees in an organisation and their marital status. What is the name of this operation?
   *A. Output*

4. It is required to keep an electronic copy of a company's timesheets for each month for future use. How can this be done?
   *A. Storage*

5. You have developed a small program to calculate a person's age. What data would your program ask the user to input?
   *A. Date of birth*

### Check your progress 2

Name the hardware components of a computer system that perform each of the following functions:

1. Perform mathematical operations.
   *A. ALU*

2. Store programs and data that are currently being used by the processor.
   *A. RAM*

3. Allow the user to enter data based on a prompt on the screen.
   *A. Input device*

4. Store programs and data to be used in the future.
   *A. Secondary storage*

5. Allow the user to see the results after processing.
   *A. Output device*

### End-of-topic questions 2

1. The processor is often referred to as the “brain” of the computer. Why?
   *A. Because like a brain, it controls all the operations of the computer.*

2. List one hardware component that stores data on a temporary basis and ONE hardware component that retains data permanently.
   *A. Device for temporary storage of data – RAM*
   *Device for permanent storage of data – ROM*

3. You are using your computer with a special program that allows you to design a birthday card for your friend. Which hardware component of the computer currently holds the program and the birthday card you are designing?
   *A. RAM*

4. What are the differences between input and output devices?
   *A. Input devices are used to give instructions to the computer while output devices are used to give the results of processed instructions.*

**Check your progress 3**

1. Consider the following tasks and indicate which primary storage device is being used:
   a. Opening a word processing program.
   b. Indicating the manufacturer’s properties of a CD-ROM.
   c. Indicating the computer’s system time.
   d. Acting as a holding place for data to be processed.
   e. Recording new instructions for the computer to use when it is starting up.
   *A. a. RAM*
   *b. ROM*
   *c. EPROM*
   *d. RAM*
   *e. ROM*

2. State one difference between a ROM and an EPROM.
   *A. The contents of ROM cannot be changed, but the contents of EPROM can be changed many times.*

3. You are using your computer and suddenly the power went off. What would happen to the data in the RAM?
   *A. The contents would be lost as RAM is volatile.*

**End-of-topic questions 3**

1. List two types of ROMs and explain how they are different.
   *A. Two types of ROM are PROM and EPROM.*
   *PROM can be programmed only once while EPROM can be programmed many times.*

2. List the name of the primary storage device that stores information:
   a. permanently
   b. temporarily
   *A. a. ROM*
   *b. RAM*

3. Give an example of an instruction contained in the ROM.
   *A. Boot up or start up instructions.*

4. State one difference between a RAM and a ROM.
   *A. RAM is read/write, volatile memory while ROM is a read only, non-volatile memory.*

5. Explain briefly the term “firmware”.
   *A. Instructions stored in ROM cannot be changed. These instructions are called firmware.*

**End-of-topic questions 4**

1. Your friend bought a 64-bit computer. How many characters of data can your friend’s computer process at a time?
   *A. Since one character is eight bits or a byte it can process eight characters at a time, i.e. 64/8 = 8.*

2. You bought an external storage device that is capable of storing 1.2 TB of data. What is the size of your device in GB?
   *A. 1 TB = 1024 GB*
   *1.2 TB = 1.2 × 1024 = 1228.8 GB*
   *So, the device has a storage capacity of 1228.8 GB.*

3. Arrange the following units of storage from the largest to the smallest:
   Megabyte, Terabyte, Kilobyte, Gigabyte
   *A. Terabyte, Gigabyte, Megabyte, Kilobyte*

4. Convert 16 Mb to Kilobyte (KB).
   *A. 16 Mb = 16 × 1024 = 16384 Kb*
   *1 byte is 8 bits and 16384 Kb in bytes would be 2048.*

5. A file is transferred from one computer to another at the rate of 320 Kb/sec. How long would it take to complete the transfer if the file was 12.4 MB?
   *A. 320 Kb per second = 40 KB per second*
   *12. 4 MB = 12.4 × 1024 = 12697.60 KB*
   *So the time taken to transfer file would be 12697.6/40/60 = 3mins and 29 sec.*

**End-of-topic questions 5**

1. For each of the following storage media, indicate the access method used to retrieve data:
   a. Hard disk
   b. DVD-ROM
   c. Magnetic tape
   *A. a. direct access*
   *b. direct access*
   *c. serial or sequential access*

2. Name two secondary storage devices that are:
   a. portable
   b. fast
   c. large in capacity
   *A. a. flash drive, floppy disk*
   *b. flash drive, hard disk*
   *c. hard disk, flash drive*

3. Give an example of:
   a. magnetic media
   b. optical media
   *A. a. hard disk*
   *b. Compact Disk*

4. State three factors you would consider in deciding which storage media to use for archiving data.
   *A. Storage capacity, access time and cost.*

5. Give two reasons for using USB flash drives over floppy disks.

*A. USB flash drives have faster access time and larger storage capacity than floppy disks.*

**Check your progress 4**

1. The National Weather Office uses remote sensors to monitor the weather and to provide feedback to a computer, which is used to produce the daily weather forecast. List THREE types of data provided by the remote sensors.
   *A. Temperature, humidity level, wind speed.*

2. List four pointing devices that can be used with a computer system.
   *A. Mouse, joystick, track pad, light pen, graphics tablet, track ball.*

**End-of-topic questions 6**

1. You need to secure your computer system from being used by other persons. List two biometric devices you could use to ensure you alone have access to your computer system.
   *A. fingerprint scanner, voice recognition systems, iris scanner*

2. An engineering company uses a computer system to design its building plans. In addition to a computer system with keyboard and mouse, and a specialised software program, state one device the company could use with the computer system to input data when designing the plans.
   *A. Graphics tablet, light pen*

3. The Ministry of Education would like to read students' responses in an exam paper of multiple-choice questions. What input device would you recommend? Why?
   *A. OMR – because OMR can read marks made by pencil or pen.*

4. List two advantages of using a digital camera over a regular camera.
   *A. It can take more pictures than a regular camera; unlike regular camera the pictures can be viewed and modified before printing.*

5. A retail store is interested in setting up a point of sale system. In addition to the computer system with keyboard and mouse, name one input device that is common in point of sale systems.
   *A. Barcode reader, light pen*

**End-of-topic questions 7**

1. Classify dot-matrix, inkjet and laser printers as impact or non-impact printers.
   *A. Dot matrix – impact*
   *Ink jet, laser printer – non-impact printer*

2. One of your friends is interested in buying a printer to use at home. What printer would you recommend and why?
   *A. Ink jet – because they are not expensive and suitable for printing a small amount of good quality output.*

3. List three organisations that would make use of microfiche.
   *A. Archives, libraries and news paper offices.*

4. What output device would you use to print a large size plan of a building?
   *A. Plotters*

5. State two advantages of using a laser printer.
   *A. Faster in printing than other printers; print quality is better than dot matrix and ink jet printers.*

**Check your progress 5**

1. State the difference between MHz and GHz as it relates to the processor speed.

*A. MHz means that processor can execute approximately one million instructions per second and GHz means that it can execute approximately one billion instructions per second.*

2. Why is it important to know the processor speed?
   *A. Processor speed determines how fast an instruction can be carried out by the processor. The faster the processor speed, the faster the execution of instruction.*

3. What are the two main features of a CPU that you should consider when you are planning to purchase a computer system?
   *A. Processor speed and type.*

**Check your progress 6**

1. List four features of RAM that you should consider when you are about to purchase a RAM chip.
   *A. Storage capacity, type, word size and speed.*

2. What is the advantage of having more memory in a computer system?
   *A. More memory capacity indicates that it can hold more programs at a time, thereby increasing the speed of the computer.*

3. State two differences between SDRAM and RDRAM.
   *A. RDRAMs are faster than SDRAMs; RDRAMs are more expensive than SDRAM.*

4. State the purpose of word size.
   *A. Word size determines the number of bits that can be stored and processed at a time by the CPU.*

**Check your progress 7**

1. List two specifications of hard disk you should take into consideration when you are about to purchase it.
   *A. Storage capacity and speed.*

2. What are the two common measurements of hard disk speed?
   *A. Data transfer rates or revolutions per minute (rpm).*

3. Why is it important to know the hard disk capacity when you are about to purchase a computer system?
   *A. The storage capacity of a hard disk determines the amount of information that it can store for later use. More hard disk space means you can store more programs and data.*

**End-of-topic questions 8**

1. What is the use of ports in a computer system?
   *A. A port is a piece of technology that is used to connect external devices to a computer system.*

2. Give the purpose of a firewire port in a computer system.
   *A. It is used to transfer video images from digital devices.*

3. List three main types of expansion slots used in modern PCs.
   *A. PCI (Peripheral Component Interconnect), AGP (Accelerated Graphics Card), ISA (Industry Standard Architecture)*

4. List two common uses of PCI slots.
   *A. PCI slots are used for attaching sound cards, network cards and video cards.*

**Check your progress 8**

1. List two advantages of software that can be bought from a retailer over custom-written software.

*A. They are readily available; they are cheaper than custom-written software.*

2. What is the difference between a software suite and integrated software?
   *A. A software suite is a combination of application programs sold as a package that can run as separate applications, while integrated software is also a combination of application programs, but it can run only as a single program.*

3. List two advantages and two disadvantages of integrated software.
   *A. Advantages:*
   *1. They cost less than buying individual programs.*
   *2. Learning will be easier, since similar screen displays are used.*

   *Disadvantages:*
   *1. Programs that may not be used have to be installed as they come as a single program, especially in integrated software.*
   *2. Some features that are available individually may not be available in these packages.*

4. Define the term customisation.
   *A. Customisation is the modification of a computer program to fit the exact needs of a user.*

5. List two advantages of an organisation of having software custom-written for them.
   *A. Custom written software meets their specific needs; modifications can be made easily.*

**Check your progress 9**

1. The operating system is the most important software in a computer system. List five functions of operating systems.
   *A. Process management, file management, memory management, input/output device management, provide security.*

2. What does the process management function of operating system involve?
   *A. The process management function of the operating system involves allocating adequate time and resources of the CPU to each process.*

3. List three examples of commonly used operating systems.
   *A. Windows, Linux, DOS.*

4. How does the operating system provide security?
   *A. The operating system provides security with password protection and back-up, and recovery routines in case of system failure.*

**End-of-topic questions 9**

1. State the difference between:
   a. multitasking and multiprocessing
   b. multiprocessing and timesharing
   c. multiprogramming and multitasking
   *A. a. Multitasking occurs when the operating system allows the user to perform several tasks at the same time, switch between them and share information. Multiprocessing occurs when users can run two or more programs using multiple processors.*
   *b. Multiprocessing occurs when users can run two or more programs using multiple processors. Timesharing is when each user is given a 'time slice' so that each user feels that they get the full attention of the CPU.*
   *c. Multitasking occurs when the operating system allows the user to perform several tasks at the same time, switch between them and share information. Multiprogramming is where users can run two or more programs at the same time using a single processor.*

2. What is a utility software? Give three examples.
   *A. Utilities are system programs that can be added to the operating system to carry out extra tasks. Examples of utilities are text editors, anti-virus software, back-up software, compression utility.*

3. What is the purpose of a translator?
   *A. Translators are used to convert other programming language instructions to binary.*

4. List three types of translators used by computers.
   *A. Compilers, interpreters and assemblers.*

**End-of-topic questions 10**

1. State the difference between batch processing and online processing.
   *A. Batch processing is a method for processing data, in which the data is collected and stored over a period of time, then all the data is processed together. Online processing is a method for processing data in which the data is collected and processed immediately.*

2. List two advantages of online processing over batch processing.
   *A. Faster than batch processing; user can directly interact with the system.*

3. Give one disadvantage of online processing compared to batch processing.
   *A. A system must be dedicated to do the operations.*

4. State the difference between online and real-time processing systems.
   *A. Real-time processing is a method for inputting, processing and outputting data continuously, and is used to control activities as they happen. In online processing there is still a slight delay for processing but in real-time processing, the updating of data will take place in real time.*

5. For each of the following tasks, suggest an appropriate processing mode:
   a. controlling a robotic arm
   b. monthly stock processing
   c. checking criminal records
   d. ATM transactions
   e. reserving a movie

   *A. a. real time*
   *b. batch*
   *c. real time*
   *d. online*
   *e. real time*

**End-of-topic questions 11**

1. List two types of menus that are available in a menu-driven interface and suggest how these menus help in carrying out different operations.
   *A. Pull-down and pop-up menus - both provide the user with a list of options.*

2. Give one main interfacing device for:
   a. command driven interfaces
   b. graphical user interfaces

   *A. a. keyboard*
   *b. mouse*

3. State two advantages and one disadvantage of using a GUI.
   *A. Advantages: easier to use as you don't have to remember commands and syntax; more attractive than command driven.*
   *Disadvantage: slower than command-driven menus.*

4. List three hardware interfaces that are available for physically challenged persons.
   *A. Sensors, touch screens and Braille keyboards.*

5. "Command-driven interfaces are more suitable for expert users." Do you agree? Support your answer.
   *A. Yes they are suitable for expert users because they require in-depth knowledge of the commands and syntax.*

**Check your progress 10**

1. All data being inputted must be converted into binary. Suggest one reason for this.
   *A. Because binary is the only language the computer can understand.*

2. List the digits that are available in
   a. the octal number system.
   b. hexadecimal number system.
   c. decimal number system.
   *A. a. 0,1,2,3,4,5,6 and 7*
   *b. 0,1,2,3,4,5,6,7,8, 9, A, B,C,D,E,F*
   *c. 0,1,2,3,4,5,6,7,8 and 9*

**Check your progress 11**

Convert the following decimal numbers into eight-bit binary numbers:
a. $99_{10}$
b. $64_{10}$
c. $127_{10}$
d. $17_{10}$
e. $39_{10}$
*A. a. $01100011_2$*
*b. $01000000_2$*
*c. $01111111_2$*
*d. $00001001_2$*
*e. $00010011_2$*

**Check your progress 12**

1. Give the decimal values of the following binary numbers:
   a. 01001111
   b. 00101010
   c. 00011011
   d. 01110111
   e. 01011011
   *A. a. $79_{10}$*
   *b. $42_{10}$*
   *c. $27_{10}$*
   *d. $119_{10}$*
   *e. $91_{10}$*

2. Perform the following binary additions:
   a. 11111 + 11011
   b. 11011 + 101111
   c. 10111 + 1001
   d. 111000 + 10000
   e. 11111 + 111111

*A. a. 111010*
*b. 1001010*
*c. 100000*
*d. 1001000*
*e. 1011110*

**Check your progress 13**

1. Convert the following decimal numbers into octal:
   a. $84_{10}$
   b. $32_{10}$
   c. $96_{10}$
   d. $132_{10}$
   e. $176_{10}$
   *A. a. $124_8$*
   *b. $40_8$*
   *c. $140_8$*
   *d. $204_8$*
   *e. $260_8$*

2. Convert the following octal numbers to decimal:
   a. $33_8$
   b. $57_8$
   c. $64_8$
   d. $173_8$
   e. $100_8$
   *A. a. $27_{10}$*
   *b. $47_{10}$*
   *c. $52_{10}$*
   *d. $113_{10}$*
   *e. $64_{10}$*

**Check your progress 14**

1. Convert the following binary numbers into octal:
   a. 110111001
   b. 1110111
   c. 110110011
   d. 1100110011
   e. 10001000001
   *A. a. $671_8$*
   *b. $167_8$*
   *c. $663_8$*
   *d. $1463_8$*
   *e. $2108_8$*

**Check your progress 15**

1. Convert the following octal numbers into binary:
   a. $73_8$
   b. $21_8$
   c. $653_8$
   d. $460_8$
   e. $732_8$
   *A. a. 111011*

*b. 011001*
*c. 110101011*
*d. 100110000*
*e. 111011010*

**Check your progress 16**

1. Convert the following decimal numbers to hexadecimal:
   a. $64_{10}$
   b. $256_{10}$
   c. $128_{10}$
   d. $87_{10}$
   e. $160_{10}$

*A. a. $40_{16}$*
*b. $100_{16}$*
*c. $80_{16}$*
*d. $57_{16}$*
*e. $A0_{16}$*

**Check your progress 17**

1. Convert the following hexadecimal numbers to decimal:
   a. $2B_{16}$
   b. $8A_{16}$
   c. $9C1_{16}$
   d. $6DF_{16}$
   e. $160_{16}$

*A. a. $43_{10}$*
*b. $138_{10}$*
*c. $2497_{16}$*
*d. $1759_{16}$*
*e. $352_{16}$*

**Check your progress 18**

1. Convert the following binary numbers to hexadecimal:
   a. 10110111
   b. 110010001011
   c. 0101101100
   d. 10110110001
   e. 11001001000110

*A. a. $B7_{16}$*
*b. $C8B_{16}$*
*c. $16C_{16}$*
*d. $5D1_{16}$*
*e. $3246_{16}$*

**Check your progress 19**

1. Convert the following hexadecimal numbers to binary:
   a. $AC_{16}$
   b. $82B_{16}$
   c. $7D5_{16}$
   d. $EF3_{16}$
   e. $364_{16}$

*A. a. 10101100*
*b. 010000101011*
*c. 011111010101*
*d. 00111011110011*
*e. 001101100100*

**End-of-topic questions 12**

1. Convert the following decimal numbers into eight-bit binary numbers:
   a. $25_{10}$
   b. $201_{10}$
   c. $96_{10}$
   *A. a. 00011001*
   *b. 11001001*
   *c. 01100000*

2. Give the decimal values of the following binary numbers:
   a. 00100011
   b. 10111010
   c. 01011001
   *A. a. $35_{10}$*
   *b. $186_{10}$*
   *c. $89_{10}$*

3. Perform the following binary additions:
   a. 11101 + 1010
   b. 11010 + 101011
   c. 111011 + 1111
   *A. a. 100111*
   *b. 1000101*
   *c. 1001010*

4. Convert the following decimal numbers into octal:
   a. $66_{10}$
   b. $157_{10}$
   c. $23_{10}$
   *A. a. $102_8$*
   *b. $235_8$*
   *c. $27_8$*

5. Convert the following octal numbers to decimal:
   a. $75_8$
   b. $406_8$
   c. $2310_8$
   *A. a. $61_{10}$*
   *b. $262_{10}$*
   *c. $1224_{10}$*

6. Convert the following binary numbers into octal:
   a. 111011
   b. 1000110
   c. 1001011001
   *A. a. $73_8$*
   *b. $106_8$*
   *c. $1131_8$*

7. Convert the following octal numbers into binary:
   a. $62_8$
   b. $300_8$
   c. $25_8$
   *A. a. 110010*
   *b. 011000000*
   *c. 010101*

8. Convert the following decimal numbers to hexadecimal:
   a. $83_{10}$
   b. $617_{10}$
   *A. a. $53_{16}$*
   *b. $269_{16}$*

9. Convert the following hexadecimal numbers to decimal:
   a. $E5_{16}$
   b. $816_{16}$
   c. $C00_{16}$
   *A. a. $245_{16}$*
   *b. $2070_{16}$*
   *c. $3072_{16}$*

10. Convert the following binary numbers to hexadecimal:
    a. 10010101
    b. 110110
    c. 10011011011
    *A. a. $95_{16}$*
    *b. $76_{16}$*
    *c. $4DB_{16}$*

11. Convert the following hexadecimal numbers to binary:
    a. $38_{16}$
    b. $1C9_{16}$
    c. $C7B_{16}$
    *A. a. 00111000*
    *b. 000111001001*
    *c. 110001111011*

**Check your progress 20**

1. Give the sign and magnitude values of the following integers:
   a. +60 and -60
   *A. +60 = 00111100*
   *−60 = 10111100*
   b. -90 and +90
   *A. +90 = 01100010*
   *−90 = 11100010*
   c. −29 and +29
   *A. +29 = 00011101*
   *−29 = 10011101*

**Check your progress 21**

1. Give the one's complement representation of the following integers:

a. −79
b. −80
c. −47

*A. a. 10110000*
*b. 10101111*
*c. 11010000*

2. Give the two's complement representation of the following integers:
   a. −91
   b. −57
   c. −38

*A. a. 10100101*
*b. 11000111*
*c. 11011010*

**Check your progress 22**

1. What is the decimal value of the following two's complement representations:
   a. 11001101
   b. 10110111
   c. 11100011
   d. 11001100
   e. 11011111

*A. a. −51*
*b. −58*
*c. −29*
*d. −52*
*e. −33*

**Check your progress 23**

1. Using two's complement ONLY, perform the following calculations:
   a. 90 – 30
   b. 52 – 27
   c. 88 – 49

*A. a. 00111100*
*b. 00011001*
*c. 00100111*

**End-of-topic questions 13**

1. Give the sign and magnitude values of the following integers:
   a. +24
   b. −24
   c. −119

*A. a. 00011000*
*b. 10011000*
*c. 11110111*

2. Give the two's complement representation of the following integers:
   a. −37
   b. −95
   c. −1

*A. a. 11011011*
*b. 10100001*

*c. 11111111*

3. What is the decimal value of the following two's complement representations?
   a. 10001011
   b. 01001111
   c. 11100010

*A. a. −117*
*b. +79*
*c. −30*

4. Using two's complement ONLY, perform the following calculations:
   a. 121 − 7
   b. 75 − 37

*A. a. 01110010*
*b. 00100110*

**Check your progress 24**

1. Give the BCD representations of the following numbers:
   a. 91
   b. 430
   c. 256
   d. 781
   e. 2852

*A. a. 10010001*
*b. 010000110000*
*c. 001001010110*
*d. 011110000001*
*e. 0010100001010010*

**Check your progress 25**

1. If the binary representation 100000000101 is a BCD representation of an integer, what is its decimal value?

*A. 805*

2. Convert the following BCD values into decimal:
   a. 00101001
   b. 00110000
   c. 01110101
   d. 10010111
   e. 10000001

*A. a. 29*
*b. 30*
*c. 75*
*d. 93*
*e. 81*

**Check your progress 26**

1. Convert the following binary integers to BCD:
   a. $1101_2$
   b. $110100_2$
   c. $11010101_2$
   d. $1110011_2$

e. $10000000_2$

*A. a. 00010011*
*b. 01010010*
*c. 001000010011*
*d. 10010101*
*e. 000100101000*

**Check your progress 27**

1. Convert the following to BCD values to binary integers:
   a. 0101
   b. 00110100
   c. 01010101
   d. 01110011
   e. 10000000

*A. a. 00000101*
*b. 00100010*
*c. 00110111*
*d. 00100101*
*e. 01010000*

**Check your progress 28**

1. The ASCII representation of letter F has a decimal value of 70. What is the ASCII representation of letter K? Try not to use Table 1.3.

*A. Since F is 70, K will be 75 (K = 70+5, because K is 5 letters after F) and its ASCII representation would be 1001011.*

2. Suppose the ASCII representation of letter J is 1001010, what is the representation of letters F, M, Q and Y?

*A. Since J is 1001010 which is 74 in decimal, F will be 70 (F = 74-4, because F is 4 letters before J); M will be 77 (M= 74+3, because M is 3 letters after J); Q will be 81(Q = 74+7 = 81, because Q is 7 letters away from J); Y will be 89 (Y = 74+15, because Y is 15 letters after J) and the ASCIII representations of these letters would be:*

*F = 1000110*
*M = 1001101*
*Q = 1010001*
*Y = 1011001*

**End-of-topic questions 14**

1. Give the BCD representations of the following numbers:
   a. 79
   b. 856
   c. 5901

*A. a. 01111001*
*b. 100001010110*
*c. 0101100100000001*

2. Convert the following BCD values into decimal:
   a. 10010011
   b. 011100100001
   c. 100010010000

*A. a. 93*
*b. 721*
*c. 890*

3. Convert the following binary integers to BCD:
   a. $111010_2$
   b. $11010011_2$
   c. $11111111_2$
   *A. a. 01011001*
   *b. 001000010001*
   *c. 001101010101*

4. Convert the following to BCD values to binary integers:
   a. 01110001
   b. 10000001
   c. 01000101
   *A. a. 00100011*
   *b. 01010001*
   *c. 00101101*

5. The ASCII representation of letter P has a decimal value of 80. What is the ASCII representation of letter S?
   *A. S =1010011*

**End-of-section questions**
**Multiple-choice questions**

1. Which of the following is a major function of the Control Unit?
   A To store information that is currently being used.
   B To read and interpret instructions.
   C To store information that is not currently being used.
   D To perform logical operations
   *A. B*

2. Which of the following statements best describes word size?
   A The number of seconds a computer takes to complete an operation.
   B The number of times the process needs to be executed to complete an operation.
   C The number of bits that computer can handle in one operation.
   D The number of bytes or kilobytes in a sector of a secondary storage medium.
   *A. C*

3. John got an email with a size of 100b, the total number of characters that the email would contain would be:
   A 1024
   B 100
   C 1000
   D 102400
   *A. B*

4. The secondary storage medium commonly used in archiving is:
   A flash memory
   B fixed head hard disk
   C movable head hard disk
   D magnetic tape
   *A. D*

5. Which of the following is a direct access secondary storage medium?
   A reel to reel tape
   B cartridge tape
   C magnetic disk
   D magnetic tape

*A. C*

6. An input device commonly used in marking multiple-choice examination questions are:
   A OCR
   B OMR
   C MICR
   D POS
   *A. B*

7. The following are all non-impact printers except:
   A Laser
   B Ink jet
   C Plotter
   D Dot matrix
   *A. A*

8. Which of the following is the most suitable output device to print an architectural drawing on a very large paper?
   A laser printer
   B ink jet printer
   C dot matrix printer
   D plotter
   *A. D*

9. The decimal value of BCD representation 010101110001 is:
   A 560
   B 570
   C 561
   D 571
   *A. D*

10. Which of the following are functions of an operating system?
    I. process management
    II. memory management
    III. user interface
    IV. security
    a. I and II only
    b. I, II and III only
    c. I, II and IV only
    d. I, II, III and IV
    *A. D*

**Structured questions**

1. A computer system completes a task by using four stages of operations: input, processing, output and storage.
   a. State the difference between input and output.
   b. What is processing?
   c. Why is storage needed in a computer system?

*A. a. It is when the computer works through the given instructions.*
*b. The input is the instructions given to the computer and the output is the results of processing.*
*c. To store data and programs that are currently being used by the computer and for later use.*

2. Two types of ROM are PROM and EPROM.
   a. What do the abbreviations PROM and EPROM stand for?
   b. State the difference between PROM and EPROM.

c. Give one application in which PROM can be used.
d. Give one application in which EPROM can be used.

*A. a. PROM – Programmable Read Only Memory*
*EPROM – Erasable Programmable Read Only Memory*
*b. PROM's contents can be changed only once but EPROM's contents can be changed many times by exposure to UV rays.*
*c. For speed control devices, video BIOS.*
*d. Experimental software development, video BIOS.*

3. In terms of storage size, state the difference between:
   a. Megabyte and Terabyte
   b. Gigabyte and Kilobyte
   c. Word and Byte

*A. a. Megabyte is appropximately one million bytes. Terabyte is approximately one trillion bytes.*
*b. Gigabyte is approximately one billion bytes. Kilobyte is 1024bytes*
*c. Word is the largest amount of data the computer can handle in a single operation. Byte is the smallest amount of data the computer handle in a single operation.*

4. The following descriptions refer to secondary storage media and devices. Give the correct terms they describe.
   a. A device that reads/writes information on disks.
   b. The concentric circles or rings into which a disk is divided.
   c. The pie-shaped sections found on the concentric circles.
   d. The same track numbers joined together in a hard disk.
   e. Making electronic marks on a disk in preparation for storage.

*A. a. Read/write head*
*b. Tracks*
*c. Sectors*
*d. Cylinder*
*e. Formatting*

5. Two popular character readers are OCR and MICR.
   a. What do the abbreviations OCR and MICR stand for?
   b. Give one application in which MICR is commonly used.
   c. Give one application in which OCR is commonly used.
   d. List two advantages of using OCR/MICR for data entry over using manual methods.

*A. a. OCR – Optical Character Reader/Recognition*
*MICR – Magnetic Ink Character Reader/ Recognition*
*b. Processing cheques at the banks*
*c. Used in Post offices for mail sorting, to make turn around documents in billing*
*d. Advantages: Faster than manual methods as data is read directly from the source; less prone to error.*

6. Suggest suitable input devices for the following tasks:
   a. to video chat
   b. to make a soft copy text from hard copy text
   c. to accept voice instructions and give answers
   d. to indicate temperature differences
   e. to input text data

*A. a. Webcam*
*b. OCR*
*c. Voice Response Unit*
*d. Sensors*
*e. Keyboard*

7. If a system uses Binary Coded Decimal for representing integers, what will be the representation of the following:

i. $3901_{10}$
ii.$2875_{10}$

*A. i. 0011100100000001*
*ii. 0010100001110101*

b. What will be the decimal value of the following BCD representations?
i. 100100000011
ii. 000101100111

*A. i. $907_{10}$*
*ii. $167_{10}$*

8. a. Convert the following:
i. $35_{10}$ to hexadecimal
ii. $35_{10}$ to octal.
iii. $1001001001_2$ in octal
iv. $1001001001_2$ in hexadecimal

*A. i. $23_{16}$*
*ii. $43_8$*
*iii. $1111_8$*
*iv. $249_{16}$*

b. Suppose the two's complement representation of an integer is 10010011, what is its decimal equivalent?

*A. −109*

c. ASCII is one of the most popular character representations.
i. What does the abbreviation ASCII stand for?
ii. Suppose the ASCII representation of letter H is 1001000, what is the representation of M and D?

*A. i. American Standard Code for Information Interchange*
*ii. M= 1001101*
*D = 1000100*

9. Harry went to a computer shop to get the specification for the computer system he intended to purchase. The sales man gave him the following specifications:
Intel Pentium IV 2.6 GHz
2 GB DDR RAM (Max 4 GB) 256 MHz
1.5 TB SATA HDD 10000 rpm
6 USB Ports
1 Firewire port
1 wireless keyboard
1 wireless mouse

a. List TWO reasons why it is important to know the specifications of a computer system before you purchase it.

*A. The specifications will let you know what you are purchasing; it is an indicator of the type of performance the computer gives.*

b. From the specifications given above, list:
i. the speed of the processor
ii. the storage capacity of the hard disk
iii. the memory size
iv. the memory type
v. the memory speed
vi. the speed of hard the disk

*A. i. 2.6 GHz*
*ii. 1.5TB*
*iii. 2 GB*
*iv. DDR*
*v. 256 MHz*
*vi. 10000 rpm*

c. What is the purpose of a firewire port in a computer system?

d. In the second line of specification (2 GB DDR RAM (Max 4 GB) 256 MHz) what does Max 4 GB represent?

*A. c. They are used to transfer video images from digital devices.*
*d. It means that the memory capacity can be extended to 4 GB.*

10. Access time and storage capacity are two factors that you should consider when you are purchasing storage media.
    a. State why it is important to know the access time of a storage media.
    b. List the following in order of their access time, fastest first:
    Floppy disk, fixed head hard disk, CD, movable head hard disk, pen drive
    c. What is meant by 'storage capacity'?
    d. List the following in order of their storage capacity, largest first.
    Floppy disk, hard disk, CD, pen drive

*A. a. The access time determines how fast information can be retrieved from a storage medium.*
*b. Fixed head hard disk, movable head hard disk, CD, pen drive, floppy disk*
*c. Storage capacity determines the amount of information a storage medium can store.*
*d. Hard disk, pen drive, CD, floppy disk*