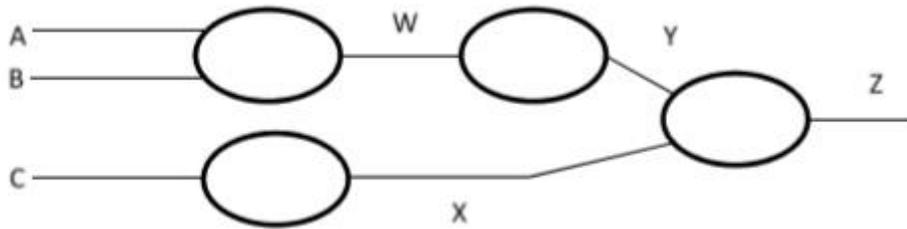SEC COMPUTING MAY 2019 PAPER 1 SOLUTIONS

1.

   a. $E3_{16} = 1110\ 0011_2$
   b. $EA_{16} = 14 \times 16 + 10 \times 1 = 234_{10}$
   c. $11001011_2 = 128 + 64 + 8 + 2 + 1 = 203_{10}$
   d. Because it is very simple to convert hex to binary and vice versa. Hex is a short way to substitute long strings of ones and zeros.

2.



From the truth table we see that when A=1 and B=0, W=1. Therefore, the gate whose output is W is an OR gate. The gates with outputs Y and X are NOTs since they have only one input. We know from the table that when A=0, B=1 and C=0, Z=0. With these values Y=0 and X=1. Since these values give an output of 0 then the gate with output Z must be an and.

The truth table is the following:

| A | B | C | W | X | Y | Z |
|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 1 | 1 | 1 |
| 0 | 0 | 1 | 0 | 0 | 1 | 0 |
| 0 | 1 | 0 | 1 | 1 | 0 | 0 |
| 0 | 1 | 1 | 1 | 0 | 0 | 0 |
| 1 | 0 | 0 | 1 | 1 | 0 | 0 |
| 1 | 0 | 1 | 1 | 0 | 0 | 0 |
| 1 | 1 | 0 | 1 | 1 | 0 | 0 |
| 1 | 1 | 1 | 1 | 0 | 0 | 0 |

3.
   a. Analogue data, in this particular case, represents the sound waves of speed.
   b. Two benefits are the following:
      i. Speech is a more natural way to enter data than a keyboard or a mouse.
      ii. It can facilitate input for disabled users.

      While two possible problems are the following:

      i. The speech recognition device may fail with particular voices since not all voices are the same.
      iii. Some particular kinds of input e.g. a mathematical formula may be difficult to enter.
   c. The voice (analogue) is divided into a number of intervals. Each interval is averaged and the resulting value will represent the interval (digital). Many such values will represent the voice.
4.
   a. The RAM will hold (1) the kernel of the operating system, (2) the programs being executed and (3) the values required by the program.
   b. The more RAM there is the faster the computer will be since more RAM will result in less swaps between RAM and the secondary storage.
   c. A dual-core processor is actually two processors combined in one. This allows parallelism as two cores can be working at the same time on two different problems.
   d. 1.9GHz means $1.9 \times 10^9$ operations in one second.
5.
   a. Idnumber:text; dateOfBirth:date; name:text; surname:text; age:number; classID:text.
   b. Idnumber
   c. The field 'age' is unnecessary because it can be calculated from the field 'dateOfBirth'.
   d. The foreign key is likely to be 'classID' since it will create a link with a table containing classes.

    e.
- i. The direct access is generally quicker since it picks directly the desired record without having to read the records from the start.
- ii. Direct access.
- iii. Serial access: it is quicker method in this case.

6.
a. Web server
b. HTML
c. Web client
d. URL
e. Attachment
f. Bookmark

7.
a. The IDE is used in the programming environment. It provides an environment where a programmer can write and execute the program. It also provides a debugger.
b. A media player is widely used to listen to audio clips and radio from the Internet on computers, tablets and smartphones.
c. It is used for audio editing. It lets you record and edit music, voice and other audio recordings.
d. A CD ripper copies data from a CD to a hard disk. However, the copied data is modified during the ripping process so that it can be played on a computer.

8.
a. Touch screen
b.
- i. Smart phones
- ii. Virtual keyboard
- iii. It recognizes the place where the touch is performed and it transforms the coordinates in the code of the desired letter.
- iv. Displayed on the screen.

9.
a. It consists of input, processing and output of information but executes only one program for which it is dedicated.

b. A long-term storage is secondary storage. In this case an SSD would be very appropriate.

c. It holds the operating system, it holds the program that reads the remote control, it holds the program that streams live data or programs on demand etc.

d. Remote control.

10.

a. The device driver is the interface between the operating system and the device.

b. Shareable resources can be used by several processes at the same time e.g. program code, RAM. Non-shareable resources can be used by one process at the same time e.g. CPU, printer.

c. Networked system advantage is communication between users. An advantage of a standalone system is that it can rarely be touched by malware like a virus.

d. A distributed database is a database that consists of two or more files located in different sites either on the same network or on entirely different networks.

11.

a. It is required so that the old system is analysed thoroughly before planning the new system.

b.

    i. How data is entered in the system, searched or deleted i.e. data about a new car that has been acquired, a sale etc.

    ii. From an environmental point of view, it saves paper. It is also easy to search.

c. Technical documentation are written instructions for operation, maintenance, and repair procedures of hardware while program documentation shows the algorithms (e.g. flowcharts and pseudocode) and the tests performed on the software.

d. Parallel running means that for some time both the old system and the new system are run in parallel.

e. Two reasons for parallel running are:

i. It gives time for the users to get used to it and by comparing the new and the old results they get confidence in the new system.
   ii. Errors in the new system can be found and because of the old system work can still go on.

12.

a.
   i. break
   ii. for loop

b.
   i. (10+2*5)
   ii. 20
   iii. (10+2)*5
   iv. 60

c.
   i. There should be a 'break' after each 'monthText = …'
   ii. Logical error.
   iii. In program tracing the programmer can see how variables' values change during execution.
   iv. Syntax error is an error in the grammar of the language. With such an error the program will not be compiled. The other error is runtime error which occurs while the program is running e.g. when a program attempts to open a file that does not exist.