

Annual Examinations for Secondary Schools 2018

YEAR 9

COMPUTING

TIME: 1h 30min

Name: _____

Class: _____

Directions to Candidates:

Answer ALL questions in Section A and Section B on this paper;

The use of a flow chart template is permitted;

Calculators are NOT allowed;

Good English and orderly presentation are important.

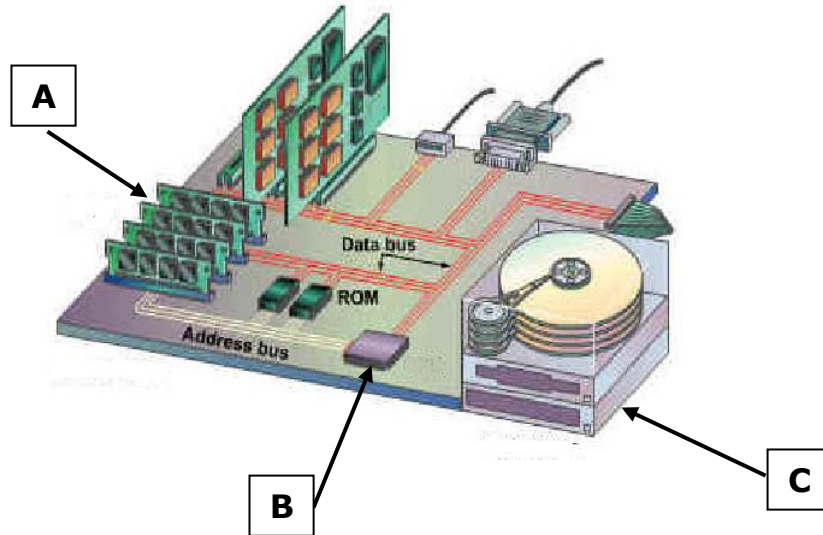
For office use only:

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	Paper Total	Course Work	Final Mark
Max	5	5	5	5	5	5	5	5	5	5	5	15	15	85%	15%	100%
Mark																

Section A

Question 1

- a. The motherboard is the main printed circuit found in microcomputers. It makes it possible for all the internal components such as the CPU, Disk Drives and RAM to communicate with each other. From the diagram below identify the components shown in bold according to the letter.



- A:** _____ [1]
- B:** _____ [1]
- C:** _____ [1]

- b. i. Fill in the missing term/s:

Data is entered in a digital device by means of _____.
It is then processed by the _____ and made available
to the users as Information by means of _____.

- ii. According to the definition in (i), what is the difference
between **Data** and **Information**?

_____ [2]

Question 2

The main memory (MM) of computers is composed of the **RAM** and **ROM**.

State whether the following statements are **True** or **False**.

- i. The RAM is required to run programs: _____
- ii. When the power is switched off, the contents of the ROM will not change: _____
- iii. The RAM is non-volatile: _____
- iv. The RAM stores the bootstrap loader: _____
- v. The more RAM available the better the performance: _____ [5]

Question 3

“The Internet is becoming the town square for the global village of tomorrow.”

(Bill Gates)



- a. What do you understand by the term **Internet**?

[1]

- b. Websites are created using Hyper-text Markup Language (HTML). Name the application that converts HTML into a website.

[1]

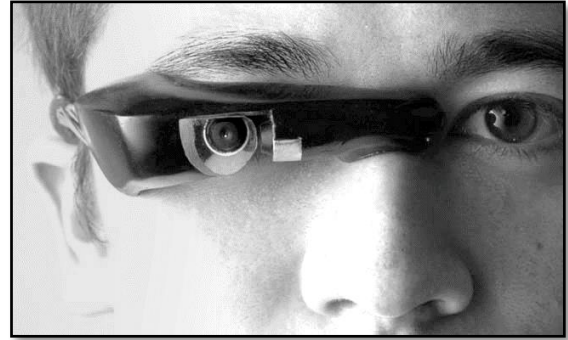
- c. Write the appropriate term used for the following statements:

- i. When clicked on, this will link to other information or websites. _____
- ii. This is used to find websites based on titles and keywords. _____
- iii. This protocol is designed to transfer files over the Internet. _____ [3]

Question 4

Input devices are a vital component of a digital device.

The wearable system shown on the right is first synchronised with the eye retina so it can then be used as an input device to move the screen cursor according to the eye movement.



- a. For which of the following scenarios would the above wearable device be best suited?

- Individuals with physical impairment
- Individuals with visual impairment
- To improve the visual component of a game

[1]

- b. Another specialised input device is the **braille** keyboard. Who can benefit from using this device? And why?

[2]

- c. With regards to your answer in part (b), name a specialised software that can also be used.

[1]

- d. Students with dyslexia may have difficulties in reading, writing and spelling. Name **ONE** feature in a word processor which can help these students.

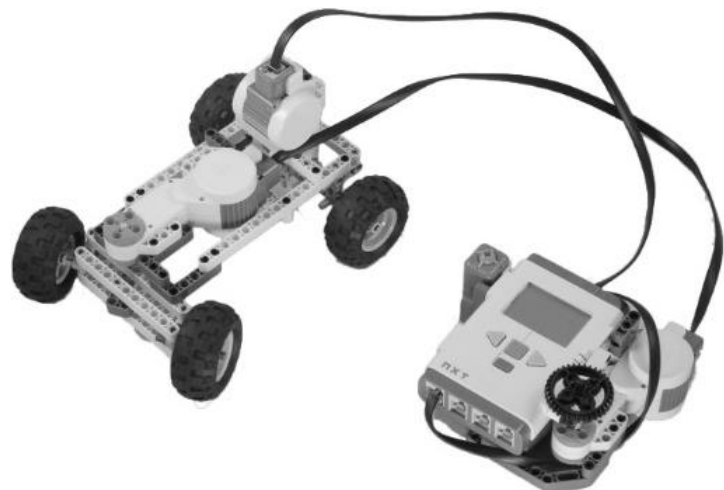
[1]

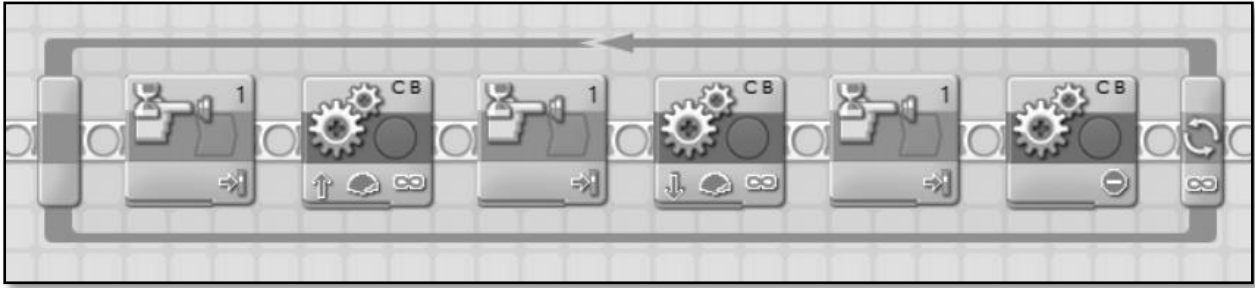
Question 5

This 4-wheeled car shown on the right turns its front wheels to the left and to the right like a real car.

It is controlled by a wired remote control which has:

- a steering wheel to control the steering,
- one touch sensor that makes the car go forward, in reverse or stop.





- a. The above program snippet is used to program our 4-wheeled car. To which ports are the touch sensor and the motors attached?

TOUCH SENSOR:		[1]
MOTORS:		

- b. What is the duration time set for this program?

- c. What is the function of the above snippet?

- d. Which sensor can be used so that the car will stop moving forward if an obstacle is detected?

- e. What programming concept should be added to the program snippet shown above so that the car will stop moving forward when an object is detected?

Question 6

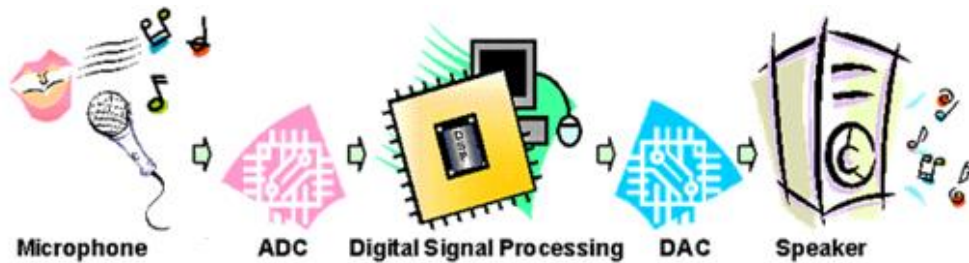
Draw a flowchart for the program snippet as shown in question 5 part (a)

Draw flowchart here:

[5]

Question 7

7. Marija wanted to create an **Audio Book** as part of a school project. She used a microphone to record her voice (**analogue data**). Afterwards, she used a sound editing application to edit her recordings prior to finalising her project. The entire process is simplified in the diagram below.



- a. What do you understand by Audio Book?

_____ [1]

- b. Name the input and output device used in the diagram.

Input: _____

Output: _____ [1]

- c. What do the acronyms **ADC** and **DAC** stand for?

ADC: _____

DAC: _____ [1]

- d. Explain why ADC and DAC are two very essential processes in this particular situation.

_____ [1]

- e. Which component inside Marija's Laptop is used as an ADC/DAC for creating an Audio Book?

Component: _____ [1]

Question 8

8. Ray Tomlinson was a pioneering American computer programmer known and credited as the inventor of email back in 1971. Nowadays, there are over 2.6 billion active users and over 4.6 billion email accounts in operation.

- a. Give two reasons why email is the most important and widely used communication medium on the Internet.

Reason 1: _____

Reason 2: _____

[1]

- b. Mention and briefly explain one precaution that every user should take when using emails.

[1]

- c. Generally, there is a limit in the size of the files that can be attached with an email. What **system software** can be used to send more than one file together as one attachment to minimize the file size as much as possible?

Software: _____

[1]

- d. Initially, when Ray Tomlinson invented the email, messages could only be sent to others who used the same computer. He then used the @ sign **to separate the user name from the name of the email server**. This is the idea behind the format of the email addresses as we know it today which permitted emails to be used worldwide.

By giving an example of an email address, briefly explain the sentence written in **bold**.

Address: _____

Explanation: _____

[2]

Question 9

- a. ASCII (American Standard Code for Information Interchange) is used to represent text in a computer system. Briefly describe how the 8-bit ASCII system is used to represent characters.

_____ [1]

- b. As can be shown on the right, the word 'English' can be written in several different languages.



- i. State why ASCII is not suitable for this scenario.
- ii. What other character coding system can be used?

i. **Reason:** _____

ii. **Coding System:** _____ [2]

- c. **Bytes, Kilobytes, Megabytes** and **Gigabytes** are all units of data storage. For each item below state which of these units is most appropriate.

- i. A page of a document: _____
- ii. A high-resolution photograph: _____
- iii. A person's name: _____
- iv. A movie: _____ [2]

Question 10

a. For the Malta Robotics Olympiad, the organizers decided to advertise the event by using posters printed on A4 size papers to distribute in schools and public places, as well as using billboards across Malta and Gozo. When developing the design of these adverts, the graphic designer noticed that the high resolution images used for the posters could not be used for the billboards. The reason being that the images could not be enlarged without losing quality.

- i. What **type** of images would be appropriate to use for an A4 size poster? **Explain.**
- ii. What **type** of images would you recommend for a billboard size advert design? **Explain.**

i. **Type:** _____
Explain: _____

ii. **Type:** _____
Explain: _____
_____ [2]

b. The printer they used to print the A4 size posters has the following specifications:

- Resolution (Black): 600x600 dpi
- Resolution (Colour): 600x600 dpi
- Print Technology: Laser
- Processor Speed: 1200Mhz



i. The processor speed of this printer is 1200MHz. What is the measure in GHz? [1]

ii. The resolution of this printer is that of 600 x 600 dpi. What is meant by dpi? [1]

iii. Define the term resolution in relation to printers. [1]

Question 11

A car dealer holds information about the cars and clients in a Database (DB). The screenshot below is a sample of the clients' DB file (table) that the auto dealer uses.

ID	NameSurname	Address	Town	Click
1	Doreen Pace	5, Parish Street	Gudja	
2	Josette Tabone	27, Windmill Street	Ghaxaq	
3	Vince Abela	87, Council Street	Mosta	
4	George Said	34, Church Street	Naxxar	
*	(New)			

a. Distinguish between **spreadsheets** and **databases**.

_____ [1]

b. From the diagram above give an example of a **field** and a **record**.

Field: _____

Record: _____ [1]

c. What is a **key field**?

_____ [1]

d. How can a user sort the above file by **surname**?

_____ [1]

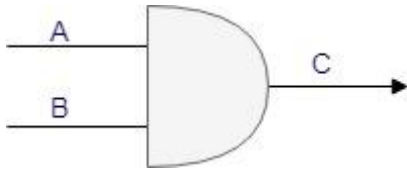
e. The cars' and clients' files (tables) are related together. Why are **relational** databases important?

_____ [1]

Section B

Question 12

- a. The symbol for the **AND** gate together with its truth table are shown below:



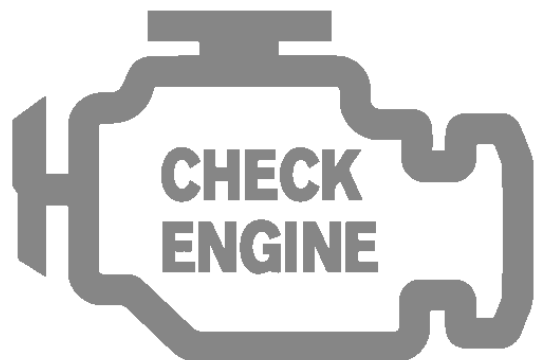
A	B	C
0	0	0
0	1	0
1	0	0
1	1	1

In the space below draw the symbol and truth table for the **OR** and **NOT** gate.

OR gate symbol	OR gate truth table
NOT gate symbol	NOT gate truth table

[4]

- b. Modern cars have a number of sensors to warn the driver of any malfunction. Two of these sensors are the Oxygen Sensor (**O₂**) which measures how much fuel is the engine burning and the Mass Flow Sensor (**Mf**) which measures the amount of air that enters the engine to determine how much fuel is needed to run the engine efficiently.



A Check-Engine Light (**CeL**) is displayed on the dashboard ($CeL=1$) if:

1. **ANY ONE** of the above-mentioned sensors is faulty ($O2=1$) ($Mf=1$)
2. The engine is switched on ($E = 1$)

- i. Draw the Logic Circuit for the Check-Engine Light
- ii. Justify your answer by drawing the Truth Table

i. *Space for logic circuit*

ii. *Space for truth table*

[3]

[4]

- c. When the Check-Engine Light is displayed, it is recommended that the driver goes to a mechanic as soon as possible to avoid further engine damage. The mechanic plugs a diagnostic device to the car's CPU, called the Electronic Control Unit (ECU), to check for any error messages. In this situation the diagnostic device can either display **ERR_6B** or **ERR_D3**; where *6B* and *D3* are hexadecimal values.

The technical section on the car's manual indicates that error with value 211_{10} indicates a faulty O2 sensor.

- i. According to the above HEX codes that could be generated by the diagnostic device, which error message indicates a faulty O2 sensor? Show how you arrived to your answer (working).
- ii. Hence, what would be the error value in decimal of a faulty Mf sensor? Show how you arrived to your answer (working).

i. *Working Space:*

Answer: _____ [2]

ii. *Working Space:*

Answer: _____ [2]

Question 13

The local council of Nadur, in Gozo, decided to allow locals to borrow books from the library for free. Therefore, the current Lending System software needed an update to be able to better manage the increase in the daily transactions. After analysing the situation, it was decided that three essential files/tables are required. One of these tables is called the 'Members' table and includes the following fields:



- Member ID
- Name
- Surname
- Date of Birth
- Address
- Contact Number
- Email

- a. List the other two tables that are required for the system to work efficiently. Also, state the primary key to be used for each table.

Table 1: _____ [1]

Table 2: _____ [1]

It was also decided that a number of functions are required to facilitate the librarian's work. Three of these functions are:

- 'Add a new member' function which allows the librarian to enter the necessary members' details.
- 'List of active members' function which generates a list of all members including their details and counts the total number of active members.
- 'Overdue Books' function which generates a list of members who have overdue books.

- b. List any other 2 functions that you think will further facilitate the librarian's work.

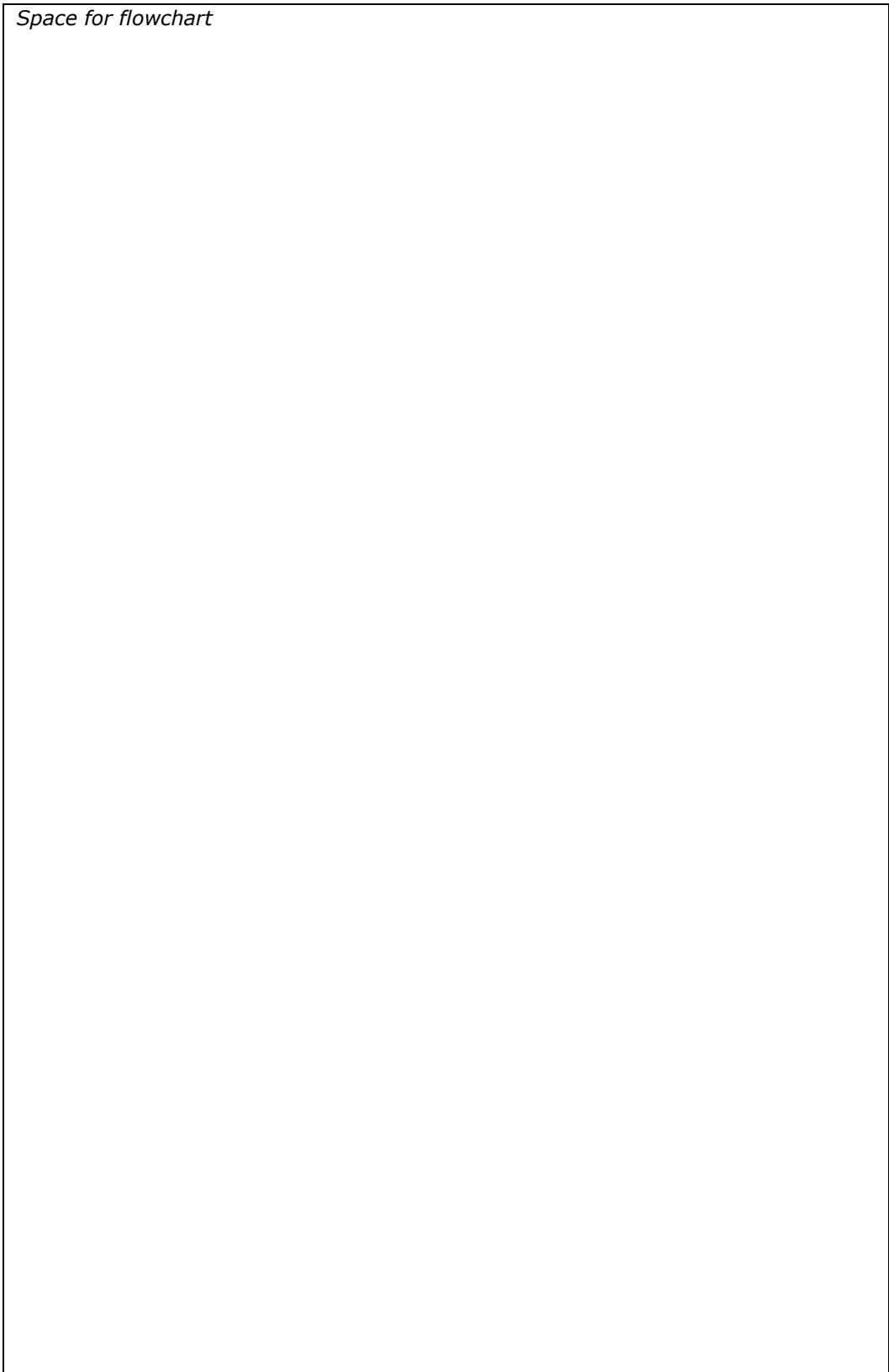
Function 1: _____	[1]
Function 2: _____	[1]

- c. The function 'Add a new Member' works as follows:

- The librarian inputs the member's ID
- The system checks whether the ID is already in the system or not
- If it already exists, it displays 'Member already exists' message
- If the ID is not already in the system
 - it allows the librarian to enter the rest of the member's details,
 - increments the number of members by 1,
 - saves details of new record in database, and
 - displays 'Member Saved' message
- Ends the 'Add a new Member' function

- i. Draw the flowchart for this scenario.

Space for flowchart



[9]

- ii. Besides flowcharts, name **two** other methods that can be used to describe a system.

Method 1: _____

Method 2: _____ [2]