

Section A.

1. This is an NXT-robotic device



a. **Name** the sensors marked i. and ii. [2]

i. Sound Sensor

ii. Ultrasonic Sensor

b. **Name** another NXT sensor which is not seen in this device. [1]
Touch sensor, light sensor [Accept reasonable answers]

c. **Name** and **clearly label** one output device you can see on the above robot. [1]
LCD Screen [Do not accept motors as output devices]

d. How would you **modify** the above so that it can follow a line drawn on the ground? [1]
Include a light sensor facing downwards.

2. Computers work with binary numbers.

a. Why do computers work with binary numbers? [1]
Because computers are two-state devices

b. Convert: [4]

i. 10001101 from binary to decimal. 141

ii. 35 from decimal to binary. 100011

iii. 10010101 from binary to hexadecimal. 95

iv. 46 from decimal to hexadecimal. 2E

3. The interface of an Operating System, greatly determines the user experience.
- a. What do the following stand for? [2]
 i. GUI Graphic User Interface
 ii. CLI Command Line Interface
- c. Suggest one **disadvantage** of a CLI interface. [1]
Not user-friendly [Accept reasonable answers]
- b. Name **two** features you would expect from the user interface of a modern tablet. [2]
 i. Option of voice input
 ii. Touch-sensitive display
 [Accept reasonable answers]
4. A dentist keeps a database to manage his/her practice.
- a. One of the files in this database is called 'Patients'.
- i. Name **four fields** you would expect to find in file Patients [2]
ID Number Name Surname Contact Number
 [Accept reasonable answers]
- ii. Which of the above fields would you establish as the **keyfield**? Why? [1]
ID Number, because it uniquely identifies a record.
- b. Suggest **two advantages** of a relational database. [2]
 i. No redundant data entry
 ii. No redundant data so faster to process and update
5. a. Name an **application** for the following input devices: [3]
- | | | |
|------|-----------------|---|
| i. | Graphics Tablet | CAD |
| ii. | OMR | Correction of multiple choice exam papers |
| iii. | Barcode reader | Bill production at a POS |
- [Accept reasonable answers]
- b. Printers may be impact or non-impact. Briefly distinguish between the two. [2]
- | Impact Printers | Non-Impact Printers |
|--|--|
| Noisy | Relatively silent |
| Make physical contact between the printing mechanism and the paper | No physical contact between the printing mechanism and the paper |
- [Accept reasonable answers]
6. Virtual Reality seems to be gaining ground lately.
- a. Name **two** devices you associate with virtual reality. [2]
 i. VR head gear
 ii. data glove
 [Accept reasonable answers]
- b. Briefly explain how virtual reality may enhance our experience of social media (e.g. Facebook, Instagram etc.) [1]
The advent of 3D cameras and VR head gears can give us a 3D VR experience of footage shared by our friends.
 [Accept reasonable answers]

- c. Virtual Reality can create simulations.
- i. Give an example of the use of virtual reality simulators. [1]
Training of soldiers/pilots etc.

- ii. Suggest **one reason** why it may be advantageous to use simulators in the [1]
situation mentioned in (c.i.)
*Training mistakes are rendered less expensive in terms of damaged equipment
and human lives.* [Accept reasonable answers]

7. A system's performance is greatly determined by how efficiently the different parts can communicate.

- a. Distinguish between **serial** and **parallel data transfer**. [1]
*Serial data transfer involves the transfer of one bit at a time whilst parallel involves
the transfer of multiple bits.*

- b. What do you understand by the term **buffering**? [2]
*Buffering refers to the use of a temporary storage location [1]
To free the CPU for other activity while the slower devices catch up [1]*

- c. Which has the **faster** access speed, RAM or the Hard Disk? [1]
RAM

- d. Explain why **disk caching** can improve performance. [1]
*Disk cache holds data that has recently been read and often adjacent data areas that
are likely to be accessed next, it hence improves access speed to this data and
therefore system performance.*

8. The Internet is central to our daily lives.

- a. Name **a feature** you expect from a modern search engine. [1]
Searching of different content (e.g. image, video, etc.), translation function, etc.

[Accept reasonable answers]
- b. Internetworldstats.com states that in 1995 only 0.4% of the world population was [2]
using the Internet, today 50.1% are Internet users.
- Suggest **two** reasons why so many more people are on the Internet today.
- i. Increased affordability of Internet connection

- ii. Increased availability of mobile devices, increased connection speeds etc.

[Accept reasonable answers]
- c. Most Internet users have one or more email accounts. Suggest **one** reason why email [1]
is often preferred over traditional post.
*Emails reach the recipient much faster, affordability: sending emails is virtually free,
etc.*

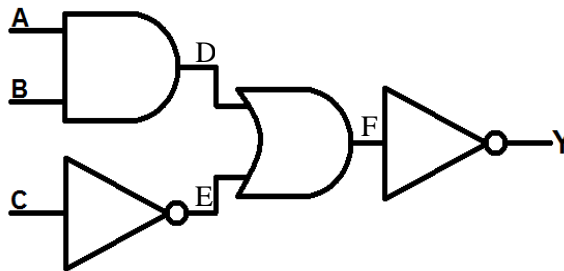
[Accept reasonable answers]

- d. Many people shop online. [1]
Suggest and briefly explain one way to help ensure the security of online shopping.
One may ensure the website s/he's buying from has site security features: e.g. by using security certificates. [Accept reasonable answers]

9. **Name** the type of software you would use in the following circumstances. [5]
The first one has been done as an example.

a.	Software used to manipulate photos.	<i>Image-Editing Software</i>
b.	Software used to produce and format mainly text documents.	<i>Wordprocessor</i>
c.	Software used to locate, detect and remove viruses.	<i>Anti-Virus</i>
d.	Software used for organisation and analysis of data in tabular form.	<i>Spreadsheet application</i>
e.	Software used to improve disk access speed by arranging files on contiguous clusters.	<i>Defragmenter</i>
f.	Software used to locate and display web pages.	<i>Web browser</i>

10. Consider the logic circuit below:



- a. Fill in with the numbers: [2]
one, two and three

(Each number can be used more than once)

This logic circuit has three inputs. It has one AND gate, one OR gate and two NOT gates.

[½ mark for each correct answer]

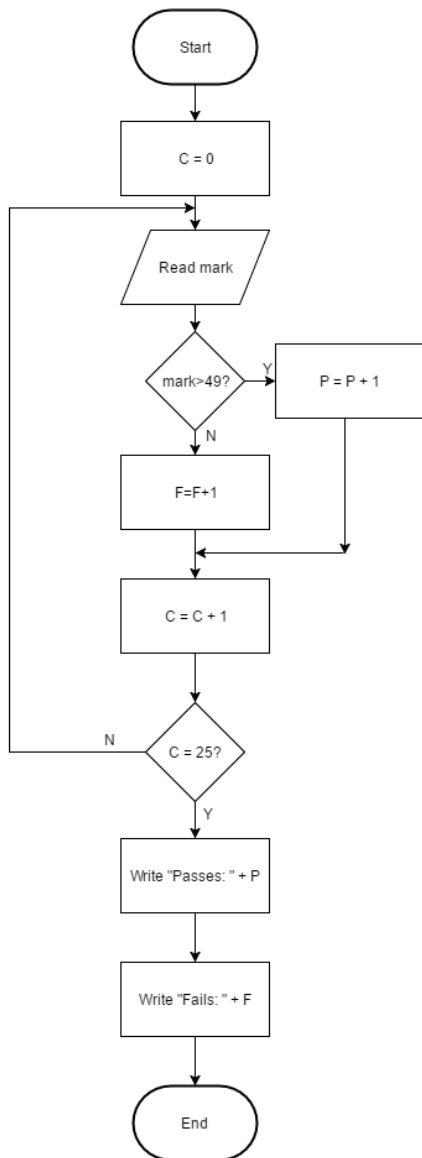
- b. Complete the truth table for the above logic circuit. [3]

A	B	C	D	E	F	Y
0	0	0	0	1	1	0
0	0	1	0	0	0	1
0	1	0	0	1	1	0
0	1	1	0	0	0	1
1	0	0	0	1	1	0
1	0	1	0	0	0	1
1	1	0	1	1	1	0
1	1	1	1	0	1	0

[1 mark for each correct column]

11. Draw the flowchart for an algorithm that reads in 25 marks and outputs the total number of passes and fails. The pass mark is 50. [5]

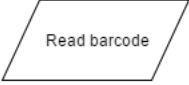
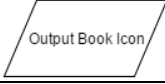



*1 mark for mark input
1 mark for correct loop
1 mark for decision
1 mark for correct output
1 mark for correct flowchart*



Section B

12. A developer is creating an app s/he is calling ‘Book Tracker’. The app will help the user keep track of the books s/he has read or is reading. The app will ask the user to scan the barcode of a book in order to create an icon for it and then the user updates it with her/his progress in the book.

- a. Put the following instructions in the correct flowchart symbol [4]
The first one has been done to help you

i.	Read barcode	
ii.	Output book icon	
iii.	pagesRead = newCurrentPage - previousCurrentPage	
iv.	Start	
v.	newCurrentPage = totalPages?	

b. Using the barcode, the system can obtain book details online like the name of the book, the author and the total number of pages (totalPages).

- i. If this app were to be introduced on a smartphone. Which of the following features would you expect it to make use of? [2]

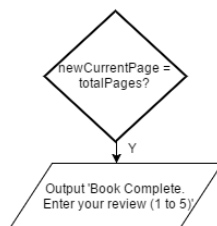
Tick the correct answer/s

Internet connection	X
Speaker	
Voice recognition	
Camera	X

- ii. Explain your answer in i. [2]

*The camera is needed to scan the barcode
 An internet connection is needed to look the book online.*

- iii. Draw a part flowchart that outputs ‘Book complete. Enter your review (1-5)’ when the user completes a book. [2]

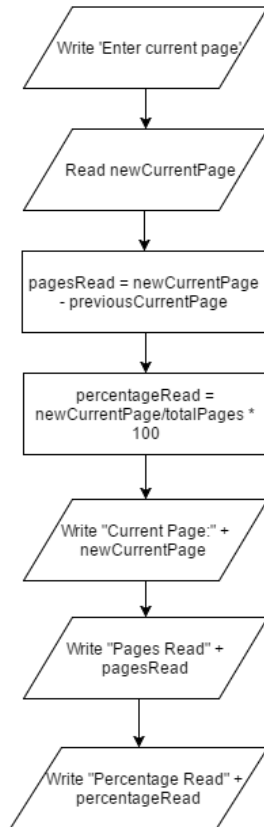


*1 mark for correct output
 1 mark for correct choice of flowchart symbols*

- c. The user may choose the option ‘Enter Book Progress’. Here s/he is asked to enter his new current page (newCurrentPage). The system then outputs his current page, how many pages he’s read since he last entered her/his progress and the percentage of the book s/he’s read. [4]

Draw a **part-flowchart** for the algorithm that is executed when the ‘Enter Book Progress’ option is chosen.

This part-algorithm makes use of the variables previousCurrentPage and totalPages.



*1 mark for correct calculation of
pagesRead
1 mark for correct calculation of
percentageRead
1 mark for correct output
1 mark for correct flowchart*

- d. Suggest **one** other feature or functionality you would also include in this app. [1]
View book details option, delete a book, sort books

[Accept reasonable answers]

13. This question is about storage.

- a. State whether the following are **primary** or **secondary** storage devices. [4]

i.	RAM	<i>Primary</i>
ii.	Hard disk	<i>Secondary</i>
iii.	Pen drive	<i>Secondary</i>
iv.	ROM	<i>Primary</i>

- b. What **capacity** do you expect each to have on an average PC? [3]

- i. RAM (512MB, 6GB, 256GB)
- ii. Pen drive (16MB, 16GB, 16TB)
- iii. Hard disk (32GB, 128MB, 512GB)

- c. Distinguish between **RAM** and **ROM**. [2]

RAM	ROM
<i>volatile</i>	<i>Non-volatile</i>
<i>Read-and-write</i>	<i>Read only</i>

- d. The Hard Disk has been around for many years and is often criticised as dated technology.

- i. Name **one shortcoming** of the traditional hard disk. [1]
Power-consuming, Slow access speed [Accept reasonable answers]

- ii. Suggest **one** reason why the hard disk survives to this day despite its shortcomings. [1]
It is relatively cheap per megabyte; it provides very high capacities.

- e. Direct and Serial Access and their uses.

A direct access storage device can be immediately made to read and write at any addressable location on it. [1]

- i. Name **one advantage** of direct access. [1]
It is faster when data needs to be accessed in no particular order

- ii. Name a **typical use** of direct access. [1]
Libraries, hospitals [Accept reasonable answers]

- iii. What is serial access? [1]
This is when data is accessed sequentially and the time for access depends on the location of the data desired.

- iv. Name a possible **use** of serial access. [1]
Credit card bill production [Accept reasonable answers]