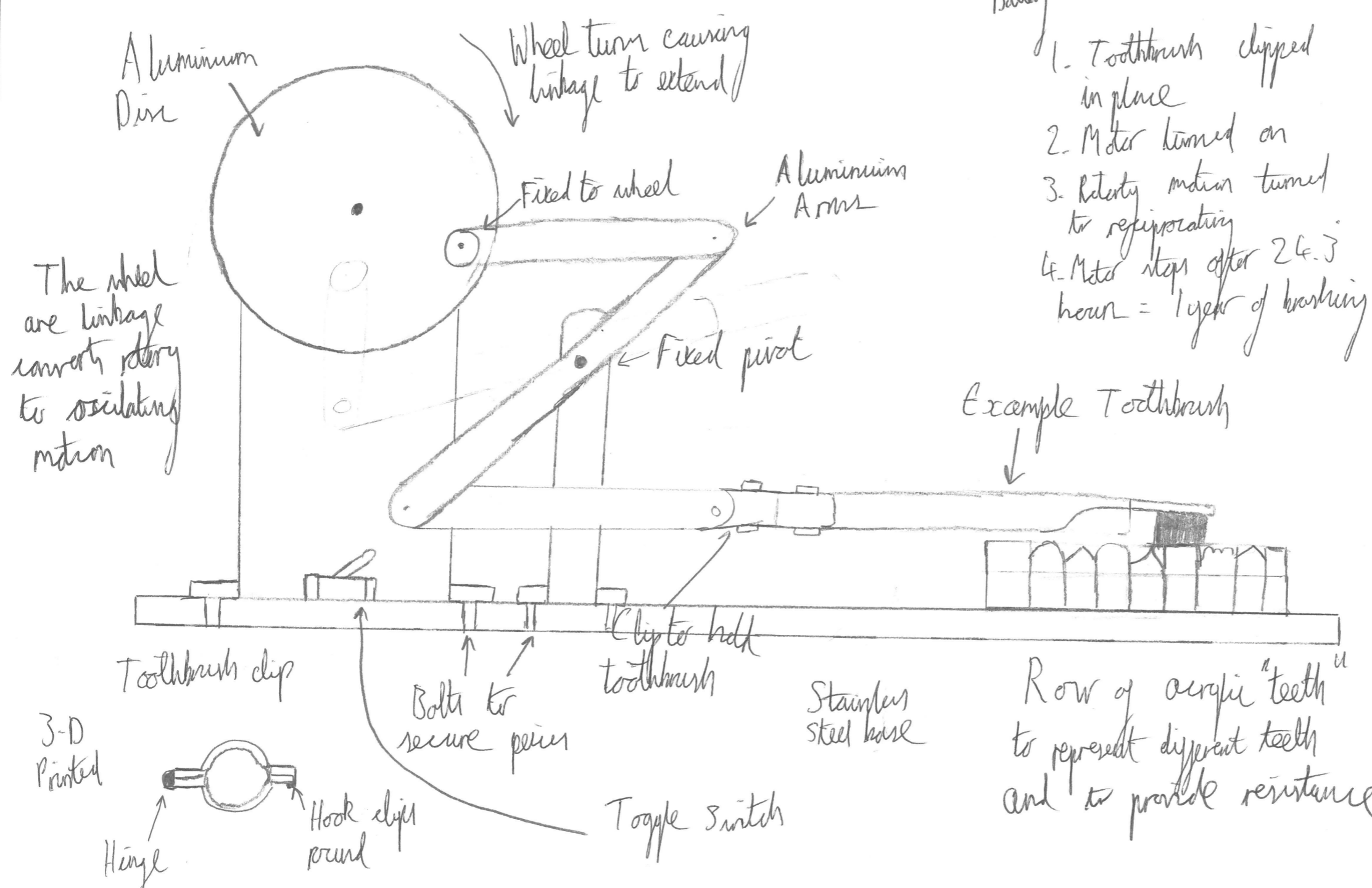
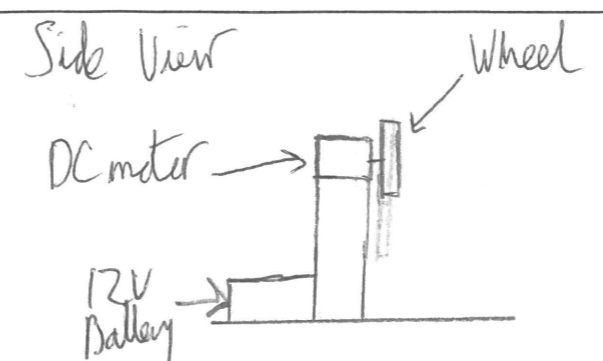


5

Front View



1. Toothbrush clipped in place
2. Meter turned on
3. Rotary motion turned to reciprocating
4. Meter stops after 24.3 hours = 1 year of brushing

$$4 \times 365 = 1460$$

$$1460 \div 60 = 24.3$$

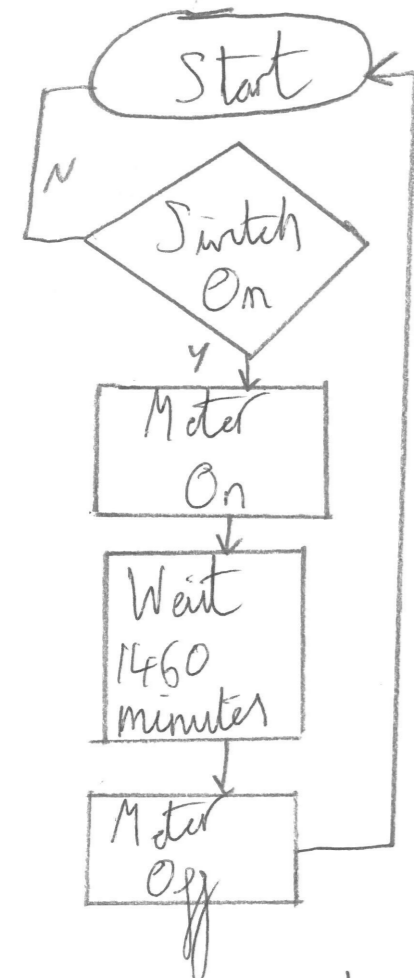
$$1 \text{ year} = 24.3 \text{ hours}$$

This is an example of where a clear yet simple response to the question can score high marks. The candidate has utilised a bell crank to provide reciprocating motion to the toothbrush which brushes realistic 'teeth'. The candidate has also found time to add a 3D representation along with a simple flow chart and circuit diagram. All that's missing is lubrication for the toothbrush.

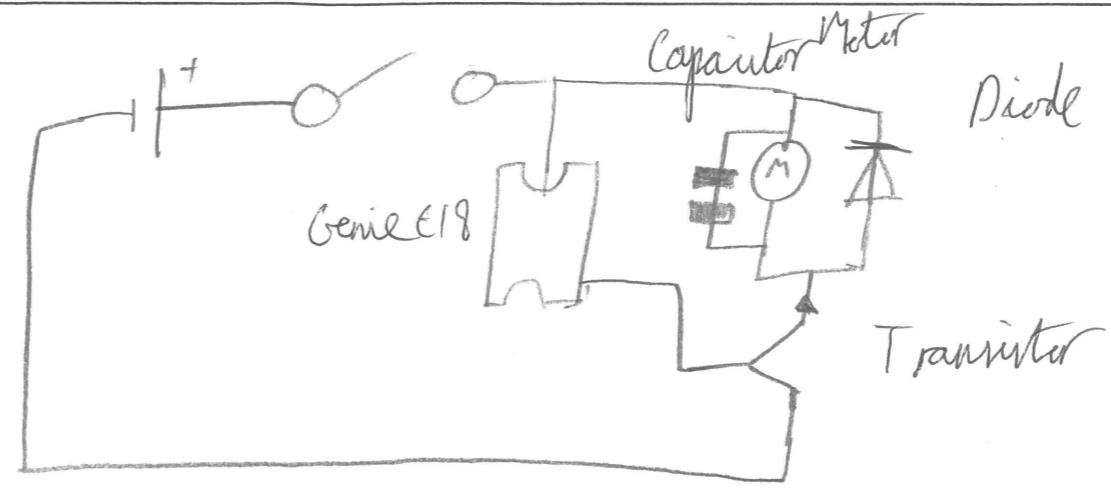
Name: \_\_\_\_\_ School: \_\_\_\_\_

Circle here the two questions you have answered in the exam: 1 (2)

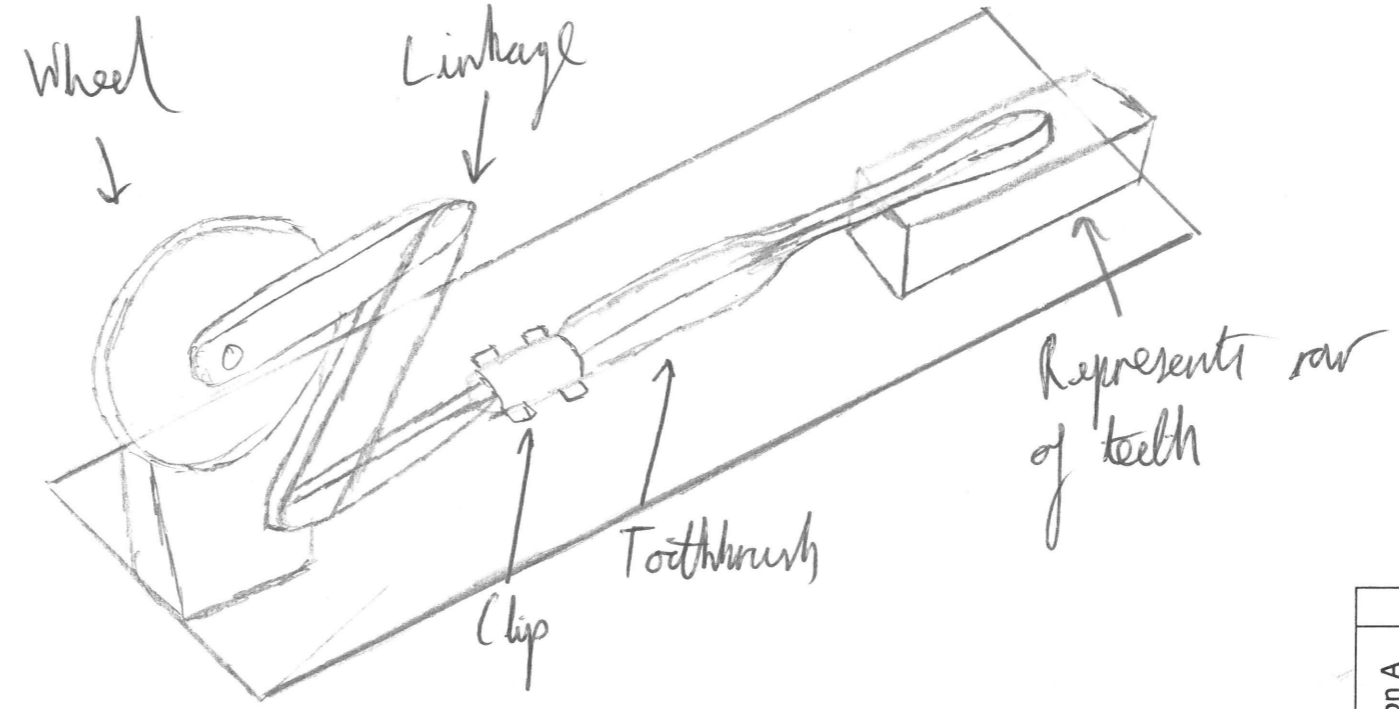
Please staple here



Flowchart to show sequence of events



Circuit design for the system



For Examiner use only		
Section A	Function and creativity of the 3 concepts	/30
	Technical knowledge & the quality of your explanations	/15
<b>Total for Section A</b>		<b>/45</b>
Section B	Function of the Proposal	/30
	Materials, components and construction	/15
	<b>Total for Section B</b>	<b>/45</b>
<b>Communication</b>		<b>/10</b>
<b>Total</b>		<b>/100</b>

Name: \_\_\_\_\_

School: \_\_\_\_\_

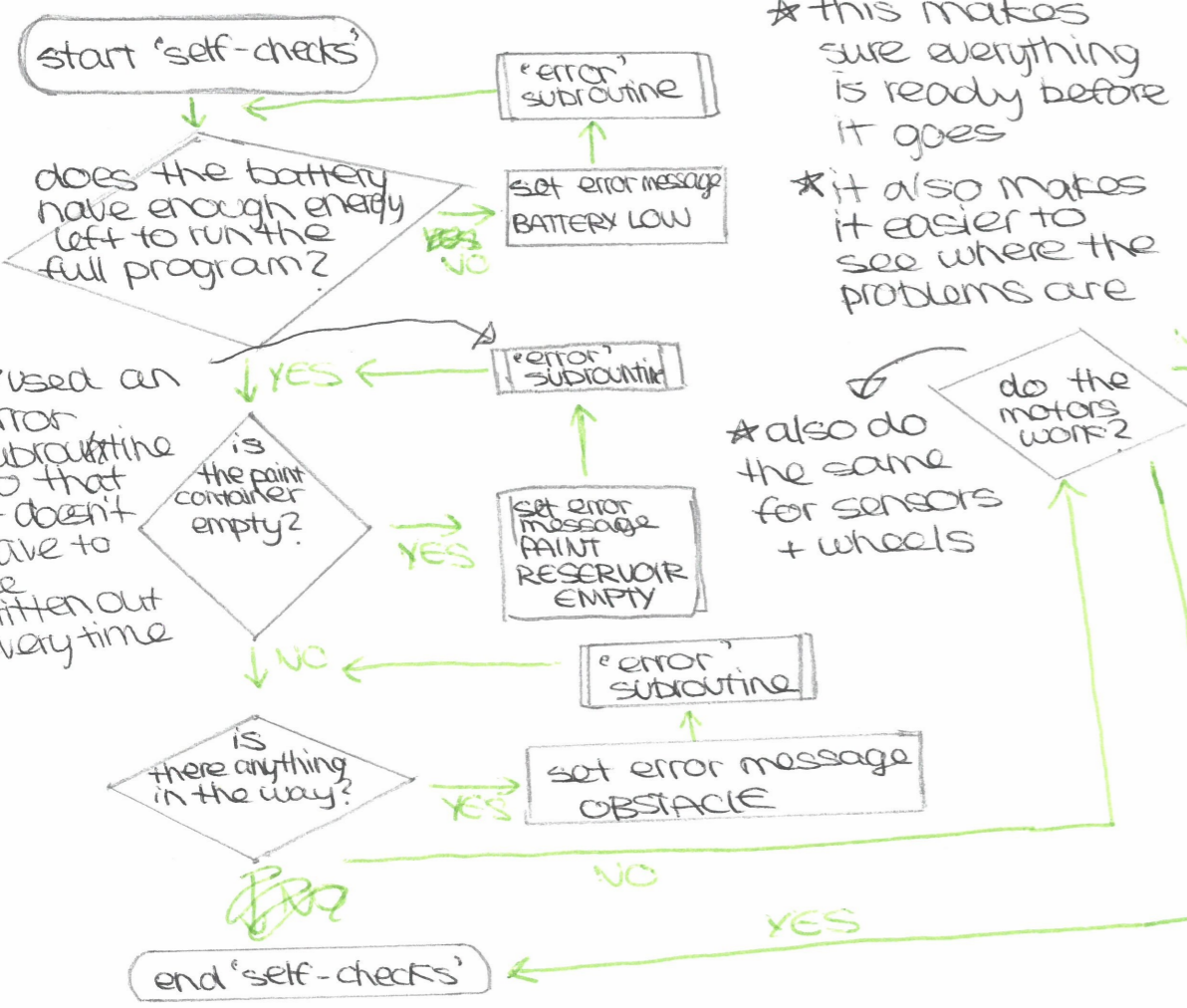
Circle here the two questions you have answered in the exam: 1 2 3 4 5 6

breaking the algorithms up into subroutines makes it easier for the programme to be tested and debugged

also makes it easier to test

self-check subroutine  
start up algorithm:

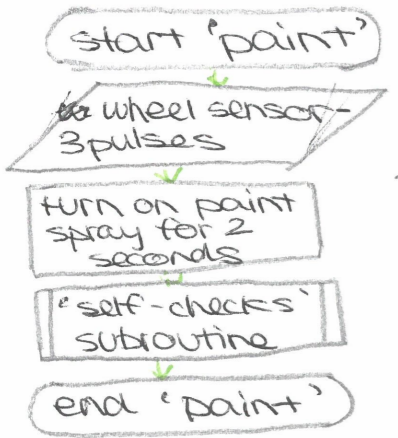
- \* this part occurs immediately after the machine is turned on
- \* contains self-checks to make sure everything is working before it runs



\* this makes sure everything is ready before it goes  
\* it also makes it easier to see where the problems are

\* used an error subroutine so that it doesn't have to be written out every time

paint subroutine:



\* similar to flow chart in question, but doesn't contain 'paint container' decision as it is a part of the 'self-checks' subroutine that is added later

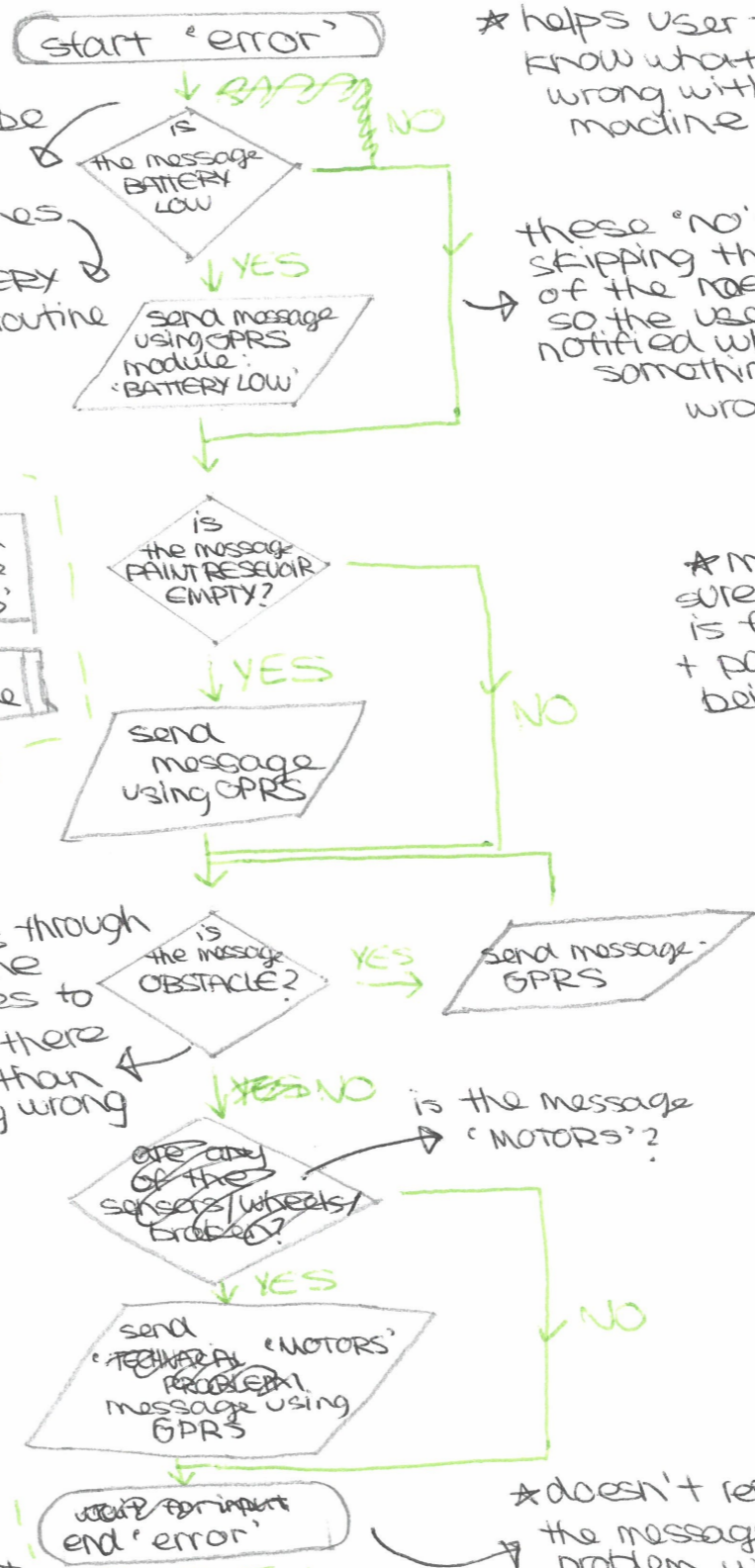
\* the wheel sensor senses 3 as that adds up to 3m which is the interval between paints

\* the 'self-checks' subroutine is added to make sure there is enough paint + battery, and to check if there are any new obstacles

so that the paint markings are at regular intervals

can be added at beginning but putting it at the end makes it easier to fit into the 'path' subroutine

error subroutine:



\* could be done in smaller subroutines e.g. 'BATTERY LOW' subroutine

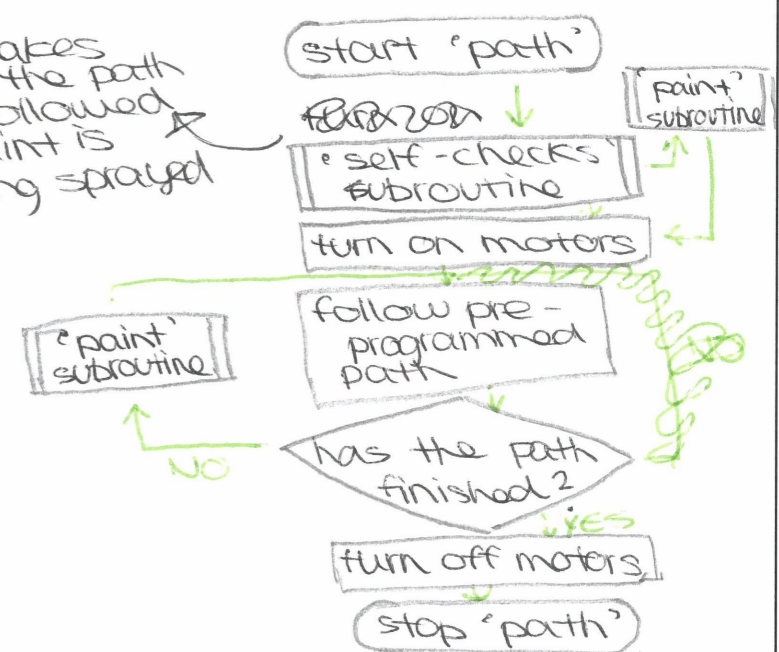
\* goes through all of the messages to check if there is more than one thing wrong

\* helps user to know what is wrong with the machine

these 'no's are skipping the output of the message so the user isn't notified when something isn't wrong

should have added a section which says not to start motors if 'error' subroutine is triggered

path subroutine:



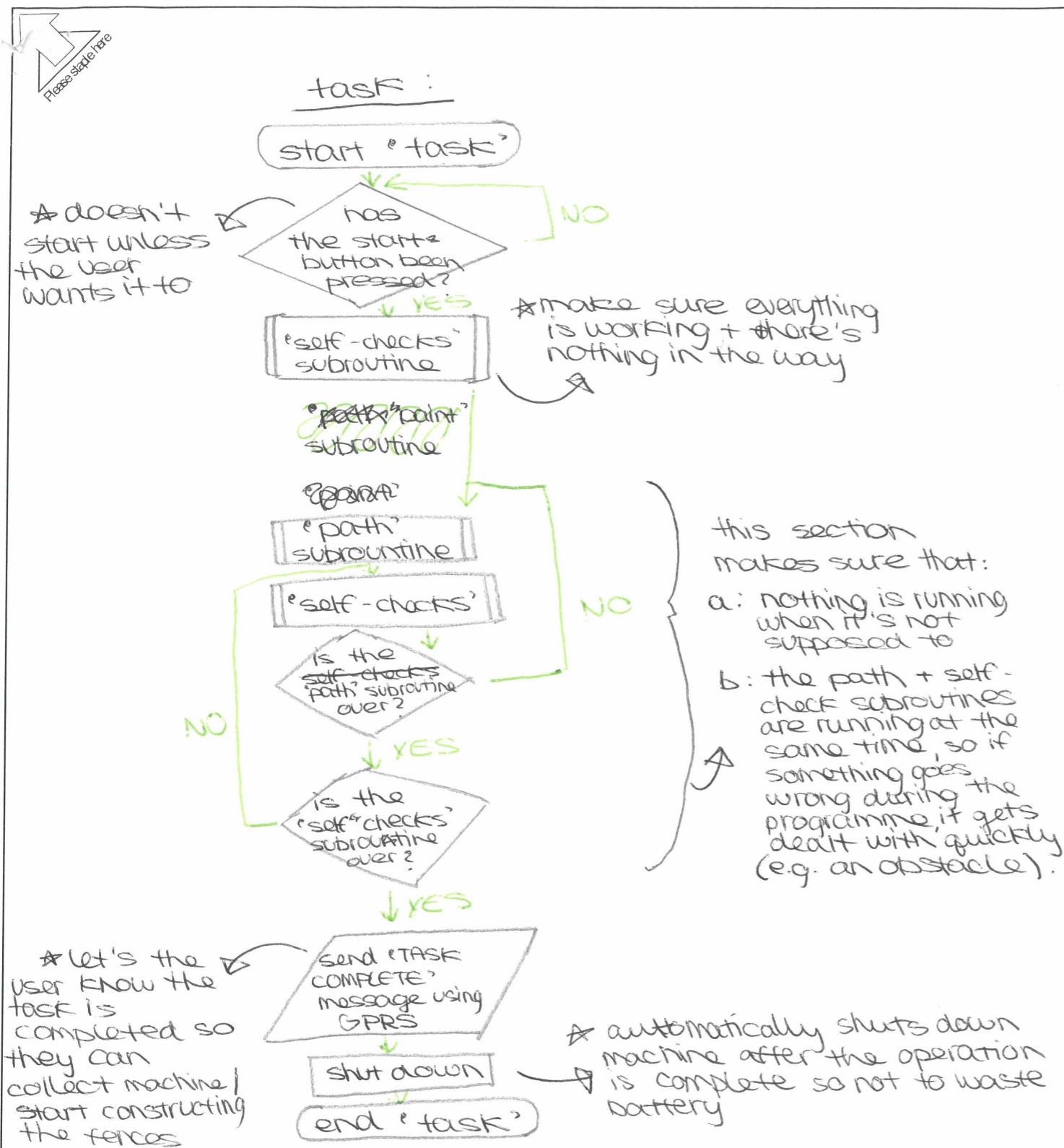
\* makes sure the path is followed + paint is being sprayed

\* doesn't repeat so the message about a problem won't be sent multiple times

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Section A	Function and creativity of the 3 concepts	/30
	Technical knowledge & the quality of your explanations	/15
	<b>Total for Section A</b>	<b>/45</b>
Section B	Function of the Proposal	/30
	Materials, components and construction	/15
	<b>Total for Section B</b>	<b>/45</b>
	<b>Communication</b>	<b>/10</b>
	<b>Total</b>	<b>/100</b>

Name: \_\_\_\_\_ School: \_\_\_\_\_

Circle here the two questions you have answered in the exam: ① 2 3 4 5 ⑥



This answer has clear evidence of higher-level thinking. In addition to checking the contents of the paint container and the state of the battery at the start of the process, the applicant has embedded these checks into a subroutine to ensure that these systems are continually being monitored.

The flowchart has clearly been modified as the applicant considers how the various subroutines interact and the additional comments help justify the need for changes to be made. The candidate would have scored higher by fully analysing the problem and defining the solution for each part of the problem before compiling the flowchart.

use only	
activity	/30
the ons	/15
n A	/45
	/30
ents	/15
n B	/45
	/10
<b>Total</b>	<b>/100</b>

Name: \_\_\_\_\_

School: \_\_\_\_\_

Circle here the two questions you have answered in the exam: ① 2 3 4 5 ⑥