Quality Assurance Testing Guidelines

Marking Criteria:
The following criteria are used in evaluating this document

Description	
A	Introduction and conclusion: objectives are clear
B	Good introduction into testing methods of respective field including references, explanation of test choice for project
C	Tests; provide a good overview, are clear and not ambiguous, are tied to requirements, are complete and viable and could be done by third party
D	Overall: clarity of document structure, formatting, language and design

The mark /10 is given according to UWA's marking guide, where 5-6 is passed, 6-7 is average, 7-8 is distinction, 8-10 is high distinction.

Tips for quality assurance / quality control testing documents:

All engineering projects will involve stages where you make sure that all the functions of a design work properly, all the requirements are fulfilled and there are no bugs which introduce additional malfunctions. Quality assurance is a preventive measure to avoid defects or problems before the product or service is finished, whereas quality control refers to checking predefined requirements before the product(s) is/are handed over to the customer [1, 2].

For software the quality assurance process makes sure that the needs of the customers are met and it is about continuous improvement, gathering the right requirements and tests which make sense to test against. Quality control on the other hand is to verify that the software meets the predefined requirements by executing a specified set of tests.
For hardware it depends if the product is commissioned or if it is a mass production. Quality assurance makes sure, that the product design and implementation is free of errors and possible problems while quality control can involve sorting out of products from an assembly-line or the final assurance testing in factory (FAT) or at customer site (CAT).

In the industry, the testing documents are often done by the responsible test engineers, sometimes by the engineers who designed and implemented the product.
Testing is the analysis of the product under real life circumstances and assessment of its characteristics (to be later indicated in a manual or specification sheet). Testing is one possible method to verify the function of a system, besides reviews and inspections.
For hardware systems, usually also a qualification or stress testing is done, which is the analysis of the product under extreme conditions and can also be used to simulate long life-times by speeding up the cycles.

Engineering documents are usually written in third person / impersonal. Language should be concise and factual, not conversational / emotive. Make sure that University's policy on academic conduct is met [3]. Visualisation is a powerful tool for such documents. Pictures / diagrams are good to supplement text and give the reader a better understanding of the tests and setups, they should however not just fill pages without explanatory text. Don't forget page number.

Structure:

1) Introduction – objectives, purpose of this document, description of design part to be tested, overall goal of testing, what will be discussed in the following sections
2) *Nomenclature if needed, List of Figures and List of Tables optional*
3) Introduction to Testing Procedures in respective field
4) Quality Assurance Testing with subsections
5) Conclusion – what are the most critical characteristics of the tests
6) Reference list

The document should be around 5-7 pages long.

More detailed explanations:

3) Introduction to Testing

This section should give an introduction and overview to possible testing approaches and methods in the respective field, i.e. hardware design, software design, data analysis and modelling. It should include relevant references. The students should show that they have understood what possibilities exist and should argue why certain methods are chosen.

4) Quality Assurance Testing

All tests in this section should be executable by a third party, which means that the description of the tests should be like a manual with the respective parameters. Indicate the expected outcomes. This document does not have to contain the actual tests and results. These should be included in the final report.

Enumeration of tests makes it easier to later on refer to them.

Sort and prioritize the tests to clearly communicate their relative importance and the sequence in which they are to be executed.

4a Test environment/conditions and overall approach

Agree with your customer and describe in which environment and conditions the tests should be done. Describe which overall approach (referring to the previous chapter) you will be using for testing your design part.
Will the design part be tested against all requirements for the normal range of use and/or for abnormal or unexpected usage?

4b Test overview

If possible give a visual overview or else a listed overview to all the parts of the design and their respective tests. Demonstrate with a high degree of confidence that errors which could lead to unacceptable failure conditions have been removed. Has each element of the design part been exercised during testing? Is it possible to test each and every aspect of the design conclusively?

4c Tests

For each test, the document should have the following structure:

> **Test No. xxx**
> Introduction for test xxx
> **Test Specification**
> Describe which requirements should be met by this test and which parts of your design are tested as well as conditions if they are different from the overall conditions/environment.
> **Test Description**
> Describe exactly how the test should be executed (input commands, data, actions, etc) and what outputs (data, signals, system messages, etc) are expected.
> **Test Result Analysis**
> Describe in which case the test is passed and what aspects of the test have to be included into a test report as deliverable. Discuss the impact of an error or test fail case.

References and more information:

All webpages accessed on 14th September 2015

[1] https://en.wikipedia.org/wiki/Quality_assurance
[2] http://googletesting.blogspot.com.au/2007/03/difference-between-qa-qc-and-test.html
[3] http://www.teachingandlearning.uwa.edu.au/staff/policies/conduct

http://www.tutorialspoint.com/software_testing/software_testing_methods.htm
https://en.wikipedia.org/wiki/Engineering_validation_test
https://en.wikipedia.org/wiki/Category:Hardware_testing