HERE UNDER SETS

# GUIDELINES AND REQUIREMENTS
# FOR WRITING AND SUBMISSION
# OF A
# TECHNICAL REPORT

As a partial requirement towards certification of an Engineer

**GUIDELINES AND REQUIREMENTS FOR A TECHNICAL REPORT**

Completing a satisfactory technical report is a requirement for certification of an Engineer. This document provides requirements and guidelines for preparing and submitting a technical report.

The technical report must be no fewer than 3,000 words (excluding executive summary, table of contents, references, bibliography, and appendices). The subject must relate directly to the discipline in which the applicant seeks certification.

Applicants should pay particular attention to the six areas indicated below while preparing the report.

## 1.   SUBJECT OF THE REPORT

The report must be related to the discipline in which the applicant is seeking certification. The report must demonstrate engineering, (including elements of design and application of theory). This will illustrate that the author has a clear understanding and mastery of the subject.

The technical report must attempt to discuss engineering such as:

- Critical analysis of technical issues involved in the implementation of a project.

- Evaluation of alternate resolutions and how the recommendations were derived

- Justification of photographs and figures ( insert source and dates captured)

- Acknowledgement of sources (bibliography, references, and footnotes) that not only indicate intellectual courtesy and honesty, but also enable the examiner to confirm reference materials.

Technical Reports usually fall into one of three general categories.

- **Scientific Research Report:** It requires an extensive search of all sources of material related to the subject (libraries, manufacturing specification sheets, literature and brochures, etc…).  An example of a research report would be a study of recent and on-going investigations into Harmonics and their deleterious effects.

- **Analytical (Laboratory) Investigative Report:** it would involve analysis of a process, system, or equipment.  An example of an analytical laboratory investigative report may be a particular application for a programmable controller, or studying various aspects of a software package for analyzing distribution systems. It may also involve the laboratory tests on materials, geotechnical, natural hazards, etc…

- **The Project Report:**  It may require the applicant to complete performance tests, write specifications, or explore a range of applications.  The emphasis of the report must be on the application of technology rather than the project phase itself.

## 2.  ACADEMICS/COMPETENCY AND LEVEL OF PRACTICE

The technical report is expected to demonstrate not only the ability to write a technical report but the capacity of applicants to apply the knowledge they have acquired during earlier academic studies and/or work experience.

The technical report must demonstrate academics/competency and level of practice of an engineer.

## 3.  FORMAT OF THE REPORT

The technical report must adhere to specific REC/IER guidelines and must contain appropriate elements of a technical report (*see REC Technical Report Components on page 5*).

## 4.  SUBMISSION OF THE REPORT

The report should be submitted to the Registrar.  It will then be evaluated by the IER Examination committee who will mark and grade the technical report. The committee will make one of the following decisions:

| NO | REPORT STATUS | DECISION |
|---|---|---|
| A | Every applicant will have to present an oral defence of the report to the committee. | The committee will decide if the report is worth to be defended or it can be improved. |
| B | The applicant whose report will not satisfy the committee will have to remain a trainee until he/she satisfies the committee | The applicant will remain a Graduate Member |

The decision of the committee will be submitted to the council for approval and then communicated to the applicant by the Registrar.

## 5.  DECLARATION OF AUTHORSHIP

A completed Declaration of Authorship must accompany the technical report (*see Declaration of Authorship on page 17*).

## 6.  MARKING FORMAT

The general marking format used to evaluate a technical report is as follows:

- Report Format                                         /10
- Executive Summary                                /10
- Figures                                                     /10
- Technical Content                                 /50

- Conclusion/Recommendations /10
- Proper use of References /10

*Note:*
1. *Passing Mark for Technical Report equals to 70%*
2. *Any Plagiarism will result in a mark of 0%*

**TECHNICAL REPORT COMPONENTS (REPORT FORMAT)**

Below is an ordered list of components of technical report. Each section is the start of a new page.

**1. COVER**

A standard binder or report cover is an appropriate cover.

**2. TITLE PAGE**

This page must show the **REPORT TITLE** and the **AUTHOR'S NAME**. Both of these must be centred on the page.

*EXAMPLE:*

*VARIABLE SPEED MOTOR DRIVES:*
*AN OVERVIEW OFCURRENT TRENDS*

*AND*

*SYSTEMS APPLICATIONS*

*PREPARED FOR …. BY*

*(Insert your names)*

## 3. ACKNOWLEDGMENTS

It is appropriate to acknowledge and thank individuals who aided, contributed, or acted as a technical advisor to the author.

*EXAMPLE:*

*I would like to thank Eng. ……………….. for the mentoring she provided during this project. I would also like to acknowledge Eng. ……………….. for allowing my access to the laboratory and use of the test equipment.*

## 4. TABLE OF CONTENTS

The Table of Contents lists major topics and the related page numbers.  Minor topics are included as sub-topics under the appropriate major topic.

*EXAMPLE:*

Table of Contents

## 5. LIST OF FIGURES

*EXAMPLE:*

```
List of Figures

                                                       Page

Figure 1, (Example) System drawing........................... 36
Figure 2, (Example) Test results............................... 37
Figure 3, (Example) cost comparison......................... 38
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## 6. LIST OF ACRONYMS (OPTIONAL)

*EXAMPLE:*

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Acronyms

OSB – Oriented Stand Board
TWT – Traveling Wave Tube
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## 7. EXECUTIVE SUMMARY

The executive summary includes (very briefly):

- Why the investigation was initiated/ why you chose to work on that project

- How the investigation was performed/ Your tasks on the project

- An overview of the results

- The conclusions based on the results

- The recommendation (actions) based on the conclusion

*Rationale: A brief description of the report content. As the name suggests, the executive summary is a summary at the beginning of the report provided as a courtesy to the reader (possibly a busy executive) who may not have time to read the entire report. It should be written*

*so a reader with some knowledge of the subject matter can determine if they need to read the entire report to get more detail.*

*The executive summary is brief (a few paragraphs to a page or two) and should be written last. Once the report has been written, highlight the important aspects of the report in the executive summary.* **The Executive Summary is marked out of 10.**

## 8. INTRODUCTION

The introduction may include (in no particular order):

- The scope of the report

- The purpose of writing the report

- General sources of information

- Who authorized the report (if appropriate)

*Rationale: A brief introduction to the report content. The introduction should not impact the material covered in the remainder of the report.* **The Introduction is marked out of 10.**

## 9. BODY OF REPORT AND PAGE NUMBERING

- The entire report must be in A4 format, 1.5 spaced, and printed on one side only with minimum of 25mm margins

- Times New Roman 12 font

- Page numbers must be:

    o Lower-case Roman numerals for introductory pages, centred at the bottom of each page.

    o Arabic numerals for the body of the report, centred at the bottom of each page.

- The author may state the opinions of sources, but must not include any conclusions or opinion of the author, just data.

*Rationale: Proper formatting ensures that the technical report is organized effectively and logically. **Report Format is marked out of 10.***

### Discussion (Body of Report)

The discussion is the body of the report and will include the details of the investigation/own tasks. The discussion will include the procedure used and data collected during the evaluation (voluminous amounts of data should be included in the appendices and simply referred to in the discussion). The discussion should be divided into subsections as needed to provide a clear presentation of the subject matter.

*Rational: The technical report must attempt to solve engineering or applied science issue. The report must demonstrate a critical analysis of a technical issue. **Technical Content is marked out of 50.***

### In-Text Citations

The technical report must be the original work of the author of the report, but every report will require outside sources of information to substantiate and validate the report author's results. It is not only required to research the subject matter of the report and include that research in the report, but it is also required to properly document the source of the research material.

In-text citations indicate where to find the source of the outside information. The references are numbered sequentially as they appear in the body of the report. Also indicated in the citation is the page number where the quote can be found. The citations are listed numerically in the reference section where additional information is provided.

*For more information on documenting sources, please review an appropriate style guide (for example, the APA Style Guide).*

*EXAMPLE:*

Test 6 and 7 of the investigation were performed outside in February when the temperature reached -40$_0$ C. The results obtained were consistent with results obtained above this temperature, but it should be noted that the instrument manufacturer indicates the "lowest reliable operating temperature is -30$_0$ C" **[1, p185]**

*Footnotes*

Explanations and other notes not easily incorporated in the text may be inserted as footnotes. They will appear at the bottom of the page.

*EXAMPLE:*

**Forms of Footnotes**

\* See, for example, Andrew Catalog 25, pp. 69-111, Andrew Corporation, Orlando Park, Illinois, 1967.

\*\* By the same token, when reflection is from an open circuit, it is the voltage that is unaffected, and the current is reversed in phase. Both of these phenomena can be explained mathematically. See for example (a) Terman, F.E: Electronic and Radio Engineering, 4th ed., pp. 82-87, explained by elaborate example, as in (b) DeFrance, JJ.: Communications Electronics Circuits, pp. 382-389, Holt Rinehart and Winston Inc., New York, 1966.

\*\* These are well described in Galsier, E.V.D. and H.R.L. Lamont: Transmission and Propagation, Vol. 5 in The Services' Textbook of Radio, pp. 370-374, H.M.S.O. London 1958.

*Quotations*

Short direct quotations of not more than two or three lines should be made part of the text and enclosed in double quotation marks ("…").

Quotations longer than three typewritten lines begin on a new line, are introduced by a colon, are single-spaced, and are not enclosed in quotation marks. It is best to indent such quotations from both sides of the page to set them off clearly from the text. Follow the paragraphing and punctuation of the original. All quotations must be exact.

Identify all direct quotations by using a footnote, which gives precise details of title, authorship, publication and exact page. The singular abbreviation for page is "p" (plural "pp").

*Rationale: Proper documentation of sources not only indicates intellectual courtesy and honesty; it also enables the examiner to confirm reference materials.* **Proper use of References is marked out of 10.**

*Figures*

A proper technical report is supported by data. This data is often in the form of tables, charts, drawings, graphs, pictures, etc.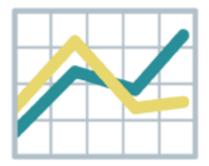 which are considered 'Figures'. Figures are numbered sequentially from the beginning of the report using the format below (Figure #, Title) and must be included in the List of Figures.

Figure 1, Title

Any drawings included should be readable and clear.

*Rationale: A technical report involves an investigation of a technical matter and must be supported by tables, charts, drawings, graphs, pictures, etc. These are all considered 'Figures' and must be listed at the beginning of the report.* **Figures are marked out of 10.**


## 10.        CONCLUSION

The conclusion contains the author's conclusions on the data.  In many cases it is convenient to number conclusions.

*Rationale: The conclusion is the culmination of the investigation and interpretation of the results. The interpretation and explanation of the results must demonstrate the author's ability to think critically. Often this is done by comparing and contrasting the results with known theory, the expected results, or the results of similar investigations.*

*The conclusion contains the author's interpretation of the results (i.e. the selection, analysis, design, evaluation, etc.). The conclusion clearly articulates how the results achieved in the discussion section relate to the purpose for writing the report that was indicated in the introduction. The conclusion is a demonstration of critical thinking related to the author's investigation. There are often a number of conclusions that can range from the interpretation of*

*the results to an interpretation of the underlying theory, or possibly an interpretation of the validity of the test procedures used.*

*It is important that the applicant clearly demonstrates a technologist level of academics /competency and a technologist level of practice (i.e. consistent with the technologist profile), as the conclusion contributes significantly to the report evaluation.*

## 11. RECOMMENDATION(S)

Recommendations correspond to specific conclusions and refer to actions that are required based on the author's interpretation of the data.

*Rationale: The recommendations are linked to the conclusion and provide the author with additional opportunity to demonstrate critical thinking.*

*The recommendations are suggestions for change based on the conclusion(s). In the introduction a purpose of the report was indicated. The recommendation section details potential resolution to the underlying issues that were the purpose for writing the report. There must be a recommendation for each conclusion. **The Conclusion and Recommendations are marked out of 10.***

## 12. REFERENCE LIST

References can be cited by inserting a reference number into the report at the appropriate point. The list of references is limited to materials that are definitely cited, and the entries are arranged in the order in which they are first cited. *For more information on listing references, please review an appropriate style guide (for example, the APA Style Guide).*

*EXAMPLE:*

**References**

1.   Smith, P.H.:Transmission Line Calculator, <u>Electronics,</u> January, 1939 (original reference) p. 29.

2.   Smith, P.H.: An Improved Transmission Line Calculator, <u>Electronics</u>, January, 1944, p. 130

3.   Krauss.  H.L.: Transmission Line Charts, <u>Electron. Eng.,</u> September 1949, pp. 767-768.

4.   Bromwell, A.B., and R.E. Beam: <u>Theory and Application of Microwaves.</u>  McGraw-Hill Book Company, New York, 1847. p. 165.

5.   Terman, P. P., and J.M. Pettit: <u>Electronic Measurements,</u> McGraw-Hill Book Company, New York, 1952, pp. 57-61.

## 13.       BIBLIOGRAPHY (OPTIONAL)

The Bibliography includes an alphabetical list of books, articles and works reviewed in the preparation of the report.  **The Bibliography should not contain those sources included in Reference List.**

*EXAMPLE:*

**Bibliography**

1. <u>The Merriam-Webster Dictionary,</u> Pocket Books, New York, 1974.

## 14. APPENDICES

Supplementary data **created by** the author that may be too voluminous for the body of the report but not essential to the body of the report should be included as an appendix.

## 15. ANNEXES

Supplementary data **not created by** the author that may be too voluminous for the body of the report but not essential to the body of the report should be included in the appendix (for example, data sheets and manufacturers data).

## 16. INDEX (OPTIONAL)

An Index is alphabetical list of specific topics in the report.

## 17. GLOSSARY OF TERMS (OPTIONAL)

A glossary of terms is an alphabetical list of terms and words used in the report.

**DECLARATION OF AUTHORSHIP**

The following declaration is to be signed by the applicant, and countersigned by a supervisor who should be an immediate advisor or manager of the applicant.  Self-employed applicants will require the signature of a recognized professional.  This declaration of authorship must be submitted with your technical report.

I,_____, hereby affirm that the enclosed manuscript

entitled_____, is my own composition.  I declare that I have personal knowledge of the facts and conclusions set out therein, except where I have stated otherwise, and have in no degree committed plagiarism.  On this basis I agree to have the report judged.

_____

Signature of Applicant

Supervisor's Declaration

I have taken all fair precautions necessary to enable me to assure the Governing Council of Engineers in Rwanda that the above statement is true.

Signature of Supervisor_____

Name: _____

Title and Company

*N.B: This declaration when signed should be bound in the report and may follow the letter of transmittal.*