NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF INDUSTRIAL TECHNOLOGY
BACHELOR OF ENGINEERING (HONS) DEGREE
Part Three Examination May 2011

TCE 3208 Research Methodology

Duration of Examination 3Hours

Instructions to Candidates

1. Answer **ALL** questions in Section A and **TWO** question from Section B
2. Start the answers for each question on a new page.

SECTION A

1. Give two examples and explain fully how pure research was applied successfully. (8)

2. State and explain five sources of information which are not reliable when doing serious scientific research. (10)

3. Describe how a researcher can come up with a research title or topic. (8)

4. State the difference between the following terms;

   i) A summary and an abstract (4)
   ii) A glossary and an index (4)

5. State and explain four obstacles which can be encountered when doing a research. (8)

6. State and explain two methods used for collecting data. (6)

7. What is the difference between survey and experiment? (3)

8. State and explain three measures of dispersion. (9)

SECTION B

1. There is less research carried out at NUST due to existing problems hence this institution has produced less publications in internationally recognized journals. State and explain the problems encountered by the researchers in this institution, and give solutions to these problems. (20)

2. Describe how in a research project the information extracted from the following sources of information should be recorded under the references section:

a) Book (6)
b) Journal (6)
c) Internet (4)
d) Conference proceedings (4)

3. In a laboratory an experiment to precipitate gold in cyanide solution using ferrous sulphate in alkaline media was carried out. There were six test runs which were carried out and the concentrations of gold in solution taken at 10 minutes interval were recorded. These results are shown in the table below (the initial concentration of gold in solution was recorded to be 0.1210 mg/L)

Time (mm)	Gold concentration (mg/L)					
	1	2	3	4	5	6
10	0.1155	0.1155	0.1155	0.1155	0.1155	0.1155
20	0.1155	0.1155	0.116	0.1155	0.1155	0.1155
30	0.115	0.1151	1.116	0.1155	0.1154	0.115
40	0.113	0.114	0.1132	0.1144	0.1139	0.1137
50	0.11	0.1099	0.111	0.1113	0.111	0.1099
60	0.108	0.107	0.108	0.1082	0.1081	0.108
70	0.105	0.104	0.105	0.104	0.105	0.105
80	0.104	0.102	0.103	0.102	0.102	0.101
90	0.098	0.102	0.099	0.1011	0.098	0.098
100	0.0951	0.096	0.0943	0.0943	0.0948	0.095
110	0.0871	0.0895	0.092	0.091	0.090	0.0890
120	0.0791	0.0822	0.080	0.0798	0.0818	0.0799

Using the information given in the table, answer the following questions;

a) Calculate

i) percentage of precipitated gold for each test run. (4)

ii) the mean/average percentage of gold precipitated for each interval. (4)

iii) the standard mean deviation of percentage of gold precipitated for each interval. (4)

b) Plot a graph of percentage of gold precipitated versus time and comment on the plotted graph. (8)

END OF EXAM