NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF APPLIED SCIENCES

DEPARTMENT OF APPLIED CHEMISTRY

PROFESSIONAL STUDIES

SCH 1103

First Semester Examination Paper

November/December 2017

This examination paper consists of 4 printed pages

Time Allowed:	3 hours
Total Marks:	100
Special Requirements:	None
Examiner:	Mr M. Moyo

INSTRUCTIONS & INFORMATION

1. Answer **all** questions in Section A and **any three** questions from Section B. Where all four questions in Section B have been answered, the best three shall be selected as contributors to the final mark.
2. Section A carries 40 marks and each question in Section B carries 20 marks.

MARK ALLOCATION

QUESTION	MARKS
1.	40
2.	20
3.	20
4.	20
5.	20
TOTAL POSSIBLE MARKS	**100**

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SECTION A: COMPULSORY

(Answer the entire question)

QUESTION 1

(a) Give the **five (5)** principal elements of research proposal writing.

[5 marks]

(b) List **five (5)** considerations to be made when selecting a research topic.

[5 marks]

(c) Describe **three (3)** errors often made during data analysis.

[3 marks]

(d) Describe **two (2)** ways in which experiments can be controlled.

[4 marks]

(e) Draw a flowchart that outlines the process of conducting a literature review.

[8 marks]

(f) State **six (6)** types of experimental research designs.

[6 marks]

(g) The following is a passage found in a research report.

> *Palladium nanoparticle-poly(N-vinyl-2-pyrrolidone)/CMK-3 (Pd-PVP/CMK-3) composite was prepared by in situ polymerization method which was effectively employed as a novel heterogeneous catalyst for the Suzuki–Miyaura cross-coupling reaction. The physical and chemical properties of Pd nanoparticle-PVP/CMK-3 were investigated using FT-IR, XRD, BET, UV–vis, TEM and TGA techniques. The reaction was carried out between aryl halides and phenylboronic acid in the presence of water at room temperature. The stability of the catalyst was good and could be reused 10 times without much loss of activity in the Suzuki–Miyaura reaction.*

State and explain the section from which the passage was extracted.

[6 marks]

(h) What is the difference between a bibliography and a reference list?

[3 marks]

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SECTION B: ELECTIVE

(Answer any three questions)

QUESTION 2

(a) Distinguish between primary and secondary sources of information and determine whether the following are primary or secondary sources:

   (i)   *Zimbabwean Journal of Science and Technology*
   (ii) *Trend in Biochemistry*
   (iii) *Scientific Review*
   (iv) *Proceedings of the National Society of Chemistry*

[6 marks]

(b) After studying the literature, you make the following notes:

Note 1:   *Authors propose that Ag nanoparticles act as catalysts for degradation of endocrine disrupting compounds in water.*

Source: -   A research article titled "Catalytic degradation of endocrine disruptors by silver nanoparticles immobilised on activated carbon" in volume 13 of the Southern African Journal of catalysis (pages 13 to 27) published in 2012 and authored by A. B. Lumeko, D. Smith Jr., T. Siziba and C. Samkange

Note 2:   *Authors dispute the above and prove that it is actually aqueous Ag^+ ions that catalyse the reaction.*

Source: -   A chapter in a book edited by Prof. Z. Ming and Dr. J. Chuma published in Gweru by Mambo Press with the following details:

   Chapter title: *Homogeneous silver catalysts*

   Chapter pages in book: 78-92

   Book title: *Precious metal catalysis*

   Chapter authors: Manjoro, James F.; Sihwa, Tobias A.

   -   A 2015 second edition published in London by Macmillan Book written by J.F. Manjoro, T.P. Sibutha and B.V. Volkovskey titled *"Misconceptions pertaining to the catalytic activity of zero-valent silver in the degradation of endocrine disruptors"*.

   Using the **(i)** Vancouver system, and **(ii)** Harvard system write **one** brief paragraph capturing **all** the notes and citing the corresponding literature sources. In each instance, give the matching reference list.

[14 marks]

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QUESTION 3

With the aid of a detailed example, explain the meaning of hypothesis and describe the characteristics of a hypothesis.

[20 marks]

QUESTION 4

Discuss the reasons for preferred use of reference management software such as Mendeley, Endnote, Qiqqa and Zotero.

[20 marks]

QUESTION 5

You have been invited to orally present the findings of your research for which you decide to use Microsoft PowerPoint as a delivery tool. Discuss **five (5)** points that would help ensure your slides support what you are saying in your presentation.

[20 marks]

End of Question Paper.