BINDURA UNIVERSITY OF SCIENCE EDUCATION

Faculty of Science Education

AUG 2023

Programme: Master of Science Education Part 1

Course: PCE501 Advanced Research Methods and Statistics

Semester Examinations Time: 3 Hours

Instructions

(i) Answer **three** citing specific examples from your subject area.

(ii) Answer at least **one** question from each section.

(iii) Begin each question on a fresh page and number your work correctly.

Section A: Research Methods

A1. (a) Justify why a well-prepared abstract can be the most important single paragraph in a research report. **[10 marks]**

(b). Explain the importance of a detailed Theoretical framework in research. **[15 marks]**

A2. Ethical issues are indispensable in research. Discuss. **[25 marks]**

A3. Describe how embracing the teacher-researcher notion by mathematics teachers can contribute to the realization of the goal of lifelong learning education. **[25 marks]**

Section B: Statistics

B4. (a) Describe Steven's (1945) levels of data measurement and justify why levels of data of data measurement are a crucial consideration in data analysis. **[12 marks]**

(b). For the population: 5, 8, 9, 5, 4, 6, 6, 6, 8,8.

Calculate the (i) mean, **[2 marks]**

(ii) standard deviation. **[3 marks]**

(c). (i) Distinguish between absolute and relative dispersion of a distribution. **[2 marks]**

(ii). Distribution *A* has a mean of 40 and a standard deviation of 8.74. Another distribution *B* has a mean of 32 and a standard deviation of 5.76. For each distribution, find the coefficient of dispersion and interpret your findings. **[6 marks]**

5. (a). Define the terms:

(i). critical region, **[3 marks]**

(ii). Statistical significance. **[3 marks]**

(b). Distinguish between type 1 and type II errors and discuss their implications in educational research contexts. **[12 marks]**

(c). A variable has a known variance of 49 and is normal with a mean of 68.5. A random sample of 64 observations of the variable a mean of 71,3.

(i) Is there sufficient evidence of a significant increase in the mean at 5% level? **[7 marks]**

END OF PAPER