BINDURA UNIVERSITY OF SCIENCE EDUCATION

FACULTY OF SCIENCE EDUCATION

SCIENCE AND MATHEMATICS EDUCATION DEPARTMENT

DIPLOMA IN SCIENCE EDUCATION

DD004: RESEARCH METHODS AND STATISTICS

TIME : 3 HOURS

INSTRUCTIONS

1. Answer three questions.
2. Answer the compulsory question in Section A
3. Answer one question from each Section B and C
4. Each question answer should start on a new page.
5. Question 1 carries 40 marks. Questions 2, 3, 4 and 5 carry a total of 30 marks each.

JUN 2024

SECTION A: COMPULSORY QUESTION

QUESTION 1

Read the abstract below and then answer the questions which follow:

ABSTRACT

This study attempted to highlight the trend of research in science related subjects specifically in schools. Articles and journals were retrieved from Google scholar under peer reviewed with the aim to highlight the trend of research methods, findings and teaching strategies. The themes were based on pedagogical approaches of teaching science, students' motivation in learning sciences and challenges hindering effectiveness of teaching sciences. The paper contributes to policy makers and science teachers to employ appropriate strategies and integrate suitable technologies for teaching science in secondary schools. Based on the meta-analysis, tables are provided to summarise the research trend and findings. It has been found that the trend of low interest in learning science is still apparent for the past five years. The barriers of effective teaching and motivation have been the main discussion among researchers. Recommendations have been drawn to make teachers involve in action research for effective intervention in teaching and learning science in schools. The limitations of study include the narrow search in the Google scholar rather than in indexed Scopus and ISI journals. Thus the quality of the research journals is not addressed.

From: The Turkish Online Journal of Educational Technology-January 2018, volume 17 issue 1

Question 1

a)	What was the research problem in the abstract?	[2]
b)	Which research design was adopted in the research?	[2]
c)	Justify your answer in 'b' above.	[2]
d)	Write two research questions that could have guided this study.	[8]
e)	Identify the data collection instrument used in this study.	[2]
f)	How is the paper going to contribute to the teaching of sciences?	[2]
g)	Identify three conclusions which the researcher made for this study.	[6]
h)	How did the researcher analyse his/her data in this study?	[2]

i) State the recommendations that were provided for this study? [2]

j) Identify the research approach that was adopted in the research? [2]

Question 2

Explain the differences between qualitative and quantitative research approaches. [10]

SECTION B: RESEARCH METHODS

Answer one (1) question from this section

Question 3

a) Describe Action Research. [7]

b) Illustrate and explain the four main Action Research cycles/stages [8]

c) Describe at least three data collection tools a researcher would use in Action Research. [15]

Question 4

A student may choose a quantitative approach in research. Answer the following questions.

a) Define quantitative research. [3]

b) Compare and contrast cluster sampling with random sampling. [12]

c) Describe circumstances which you can consider to use the following quantitative analytical tools:

i. T-test [4]

ii. Chi-square [4]

iii. Correlation coefficient [4]

iv. Bar graphs [3]

SECTION C: STATISTICS FOR EDUCATIONAL RESEARCH

Answer one (1) question from this section

Question 5

5. An understanding of basic statistics is required to do good research.

a) Define the following terms

i. Sample [2]

ii. Population [2]

iii. Statistic [2]

iv. Parameter [2]

b) Differentiate between descriptive statistics and inferential statistics [4]

c) Figure 1 below presents data on students' performance in a STEM subject

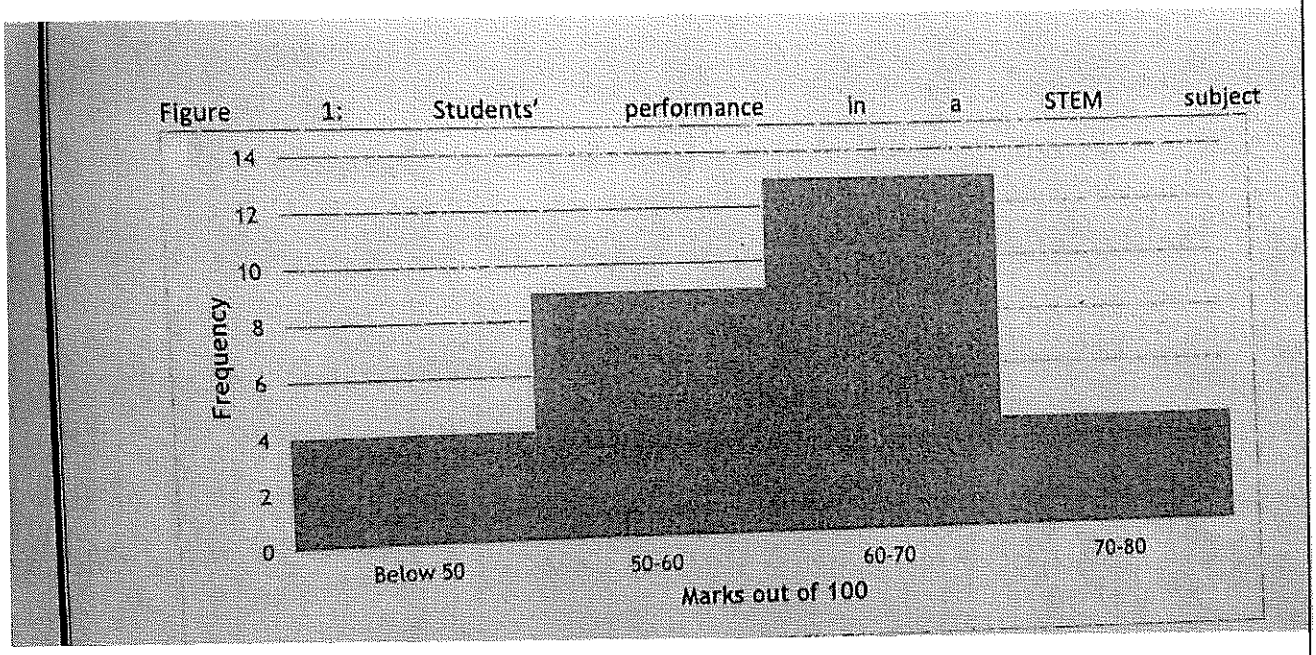

Figure 1: Students' performance in a STEM subject

i. What type of graph is Figure 1 [2]

ii. What type of data is presented in Figure 1 [2]

iii. Suggest any two reasons why Figure 1 was chosen to represent this data. [4]

iv. What conclusion can be drawn from the graph about students' performance in a STEM subject? [6]

v. Give any two limitation of presenting data as in Figure 1
[4]

Question 6

6. Dr. Suzuma was teaching a Statistics course at Bindura University of Science Education. The course prepares students for project work which they do in their final year of study. Table 1 shows the average performance of students in the course.

Table 1: Students' marks

65	72	63	65	47	77	65	48	54	69	63	62	58	67	63
72	63	75	47	51	63	53	49	63	57	58	54	66	54	50

a) State the sample size. [2]

b) What is frequency [2]

c) Use a frequency distribution table to present this data. [6]

d) Define the following measures of central tendency

i. Mode [2]

ii. Mean [2]

iii. Median [2]

iv. Range [2]

e) Calculate:

i. Median [3]

ii. Mean of this data set [3]

f) Which of the two measures of central tendency you have calculated in (e) would be used to predict students' preparedness for project work. [2]

g) Suggest any two reasons for your choice in (f). [2]

h) Predict students' preparedness for project work. [4]

The End