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*(Knowledge for Development)*

## **KIBABII UNIVERSITY**

**UNIVERSITY EXAMINATIONS**

**2021/2022 ACADEMIC YEAR**

**THIRD YEAR FIRST SEMESTER**

**MAIN EXAMINATION**

**FOR THE DEGREE OF BED (SC)**

**COURSE CODE: ESM 312**

**COURSE TITLE: BIOLOGY EDUCATION**

**DATE: 16/5/22**

**TIME: 9:00AM-11:00AM**

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### **INSTRUCTIONS TO CANDIDATES**

Answer Question One and Any other TWO (2) Questions

TIME: 2 Hours

This Paper Consists of 4 Printed Pages. Please Turn Over. ►

**QUESTION ONE (30 MARKS)**

- (a) Science is one of the most established disciplines.
- i. State **four** reasons why biology is considered as a science (4 Marks)
  - ii. Distinguish between biology and biology education (3 Marks)
  - iii. State and explain the steps in the scientific method (4 Marks)
  - iv. Give **three** examples **each** of scientific theories and scientific laws in biology and state their attributes. (6 Marks)

(b) A Form three student carried out a school project to find out the effect of DAP fertilizer (measured in capfuls or cf) on the growth of Zebrina houseplant, and recorded the results below.

**Total Vine Length in Centimeters (cm)**

ITEM	VINE LENGTH PER FERTILIZER DOSE				
	0 cf	½ cf	1 cf	1½ cf	2 cf
Length of vine(0 weeks)	145	150	148	151	149
Length of vine(6 weeks)	166	180	181	179	184
Increase in vine length	21	30	33	28	35

- i. Calculate the **percent increase** in vine length in the plant which received fertilizer compared to the one without fertilizer in the cases receiving the following amounts:
  - A. one-half (1/2) capful of fertilizer
  - B. one (1) capful of fertilizer.
  - C. One and one-half (1 1/2) capfuls of fertilizer
  - D. two (2) capfuls of fertilizer.
 (4 Marks)
- ii. State the **likely hypothesis** the student formed for this project. (1 Mark)
- iii. State any **four** control variables the student identified for the project. (2 Marks)
- iv. What was the **likely conclusion** made by the student from the results? (1 Mark)

## QUESTION TWO

- (a) Discuss the advantages of lesson planning for the purpose of teaching biology. (10 Marks)
- (b) You plan to conduct a double lesson for biology on the topic: 'Construction and use of simple dichotomous keys in classification of plants: The case of Malvaceae family'.
- State **two** knowledge and **two** process skills objectives you would construct to guide the lesson. (4 Marks)
  - Construct the lesson development component you would use to teach the class. (6 Marks)

## QUESTION THREE

The secondary school biology curriculum in Kenya consists of elaborate objectives and content.

- (a) Discuss the nature of the objectives and content of the current secondary school biology syllabus. (10 Marks)
- (b) Outline any **five** problems that impact on the successful realization of the objectives of teaching biology in the secondary schools of Kenya. (10 Marks)

## QUESTION FOUR

- (a) Briefly discuss **five** advantages of teaching aids in the teaching of biology. (10 Marks)
- (b) Describe how you would use the approved class textbook of biology to teach the topic: 'Photosynthesis'. (10 Marks)

## QUESTION FIVE

A biology teacher has developed a test in which the following essay test item was included to assess the Form 4 students' learning of the 'gene concept'.

- What do you understand by the term 'gene'? (2 mks)
  - Explain how genes function to bring about inheritance of characteristics in human beings. (3 mks)
- a) Outline any **three** advantages of using a specification grid in planning for the construction of test items in assessing students' learning of biology. (3 Marks)
- b) Make a marking scheme for this essay test item. (6 Marks)
- c) Outline **three** advantages and **three** disadvantages of using essay type test items in assessing students' learning of biology. (6 Marks)