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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

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'.
 - i. State **two** knowledge and **two** process skills objectives you would construct to guide the lesson. (4 Marks)
 - ii. 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'.

- (i) What do you understand by the term 'gene'? (2 mks)
 - (ii) 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)