O' LEVEL BIOLOGY SEMINAR

AT BUDDO SECONDARY SCHOOL

ON SUNDAY 21 JULY 2019

TOPIC 1: DIVERSITY OF LIFE

1. (a). Explain why insects are very successful animals on land. *(04 marks)*
   (b). Describe the life cycle of anopheles mosquito. *(07 marks)*
   (c) How is anopheles mosquito adapted for transmission of the malaria? *(04 marks)*

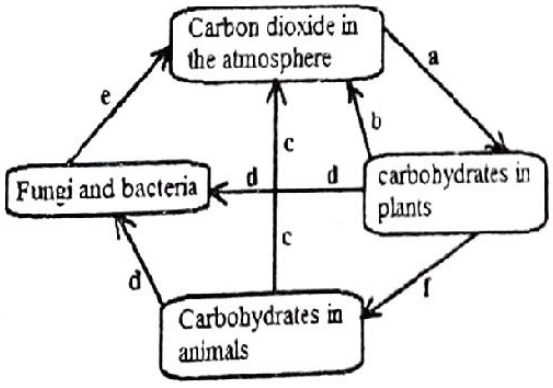
2. (a). What is a **root**? *(01 mark)*
   (b). Draw and label a transverse section of a young dicotyledonous root. *(03 marks)*
   (c). State **three** differences between internal structures of a mature monocotyledonous root and mature root of woody dicotyledonous plant. *(03 marks)*
   (d). Giving examples in each case describe how plant roots are modified to perform different functions *(08 marks)*

3. (a). Distinguish between a **seed** and a **fruit**? *(01 marks)*
   (b). Giving **one** example in case, describe how simple true fruits are classified into different types. *(14 marks)*

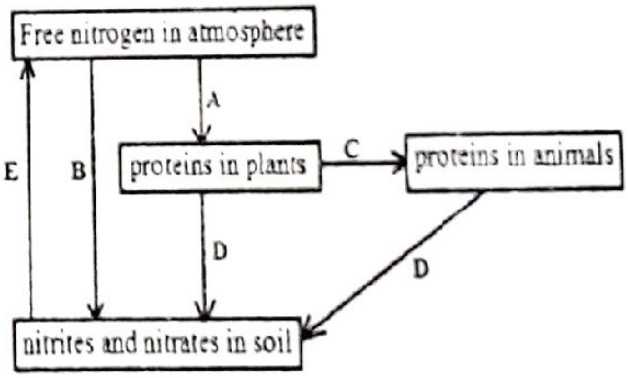
TOPIC 2: SOIL

4. The figures below show the carbon and nitrogen cycles. Study them carefully and answer the questions that follow:

CARBON DIOXIDE CYCLE



NITROGEN CYCLE



a) Name the processes labelled a, b, c, d, e and f in the carbon cycle. *(03 marks)*
b) Names the processes labelled A, C, D, and E in the nitrogen cycle. *(02 marks)*
c) State organisms that cause the labelled processes to occur in the nitrogen cycle. *(04 marks)*
d) Explain why water logged soils always lack nitrates? *(01 marks)*

An experiment was carried out to determine the volume of water that was drained through each of soil sample **X** and **Y** at different time intervals. The results obtained are shown in the table below. Study the data carefully and answer the questions that follow.

Time in seconds	Volume of water drained through soil sample in cm^3	
	X	Y
10	4	8
20	7	13
30	9	18
40	11	24
50	12	33
60	12	40
70	12	42
80	12	42

(a). Using the same axes, plot a suitable graph to represent the above data. *(09 marks)*

(b). From the graph, state the differences in drainage in the two soil samples. *(02 marks)*

(c). Explain the differences in the rate drainage stated in (b) above. *(02 marks)*

(d). Calculate the rate of drainage at 40 seconds for each soil sample. *(03 marks)*

(e). (i). If 100 cm^3 of water was added to each soil sample, calculate the amount of water retained by each soil sample X and Y. *(02 marks)*

(ii). Explain the significance of your results in (c) (i) above to the farmer. *(02 marks)*

6. (a). What is **soil fertility**? *(01 mark)*

(b). Give **three** advantages and **two** disadvantages of mulching. *(05 marks)*

(c). State **four** ways by which soil loses its fertility. *(04 marks)*

7. (a). Describe an experiment you would carry out determine the amount of water and amount of humus present in the garden soil. *(08 marks)*

(b). Explain why humus and water are important to the growth of plants *(03 marks)*

(c). The following shows hypothetical results from an experiment to determine the water and humus content of a garden soil:

- Weight of a crucible = 27 g
- Weight of a crucible + soil = 52 g
- Weight of a crucible + soil after drying to constant weight = 45 g
- Weight of a crucible + soil after heating to red-hot = 41 g

Calculate the percentage of water and humus content in the soil. *(04 marks)*

TOPIC 3: NUTRITION

8. Figure show the rate of photosynthesis under different conditions.

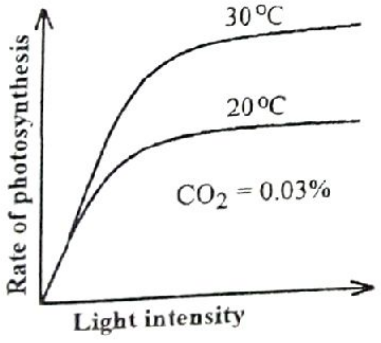


Fig. (i)

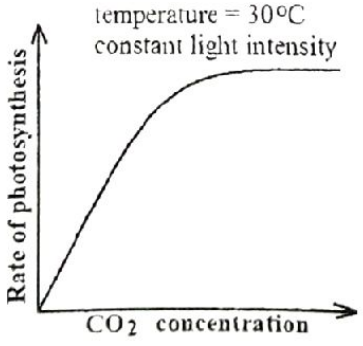


Fig. (ii)

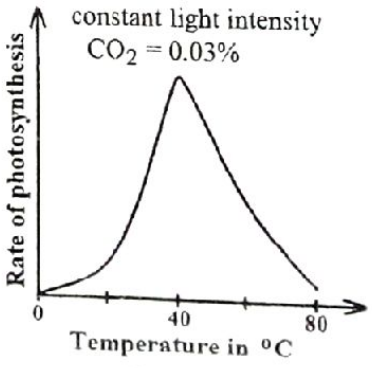
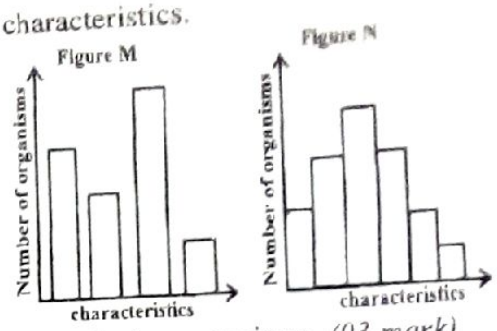


Fig. (iii)

38. The figures on the right represent the variation in different characteristics.



(a). (i). What is **variation**? *(01 marks)*

(ii). What type of variation is represented by each figure? *(02 mark)*

(b). How do the two types of variation you named in (a) above differ? *(04 marks)*

(c). (i). For each type of variation, state **two** examples of characteristics. *(04 marks)*

(ii). Name **three** sources of variation in sexually reproducing organisms. *(03 mark)*

(d) Blood group system **ABO** is an example of multiple alleles. Using relevant genetic symbols carry out a genetic cross to determine the genotypes and phenotypes of the offspring when man of blood group **B** heterozygous married a woman of blood group **A** homozygous. *(06 marks)*

TOPIC 12: ECOLOGY (INTER-RELATIONSHIP)

39. The data in the table below shows the population growth curve for the rats in a cage.

Time (months)	0	2	4	6	8	10	12	14	16
Number of rats	20	20	65	115	310	455	455	190	145

(a). Plot a graph to represent the data in the table above. *(07 marks)*

(b). on your graph, label the parts of the graph that represent the following phases of population growth: *(02 marks)*

i. Log phase.
ii. Lag phase.
iii. Decline phase.
iv. Stationary phase.

(c). State the carrying capacity of the cage. *(01 marks)*

(d). (i). Describe the changes in population of rats during the time of the study. *(04 marks)*

(ii). Account for the changes in the population of rats during the time of the study. *(04)*

(e). (i). Between which months was the population change greatest? *(01 marks)*

(ii). Calculate the rate of population change over the period you have stated in (e) (i) above. *(01 marks)*

40. (a). Distinguish between the following population and ecosystem. *(02 marks)*

(b). An avocado tree was found infested with 1000 caterpillars feeding on its leaves, 3 hawks feeding on the lizards, 10 lizards feeding on the caterpillars. Use the information to sketch the following:

i. food chain *(01 marks)*
ii. Pyramid of numbers *(02 marks)*
iii. Pyramid of energy *(02 marks)*

(c). Describe the effect of the different air pollutants. *(08 marks)*

41. (a). Giving two examples in each case, explain what you understand by the following terms:
(i) Parasitism (ii) Symbiosis *(04 marks)*

(b). Describe the lifecycle of tapeworm. *(06 marks)*

(c). Describe how tapeworms are adapted to their parasitic feeding mode. *(05 marks)*

~ END ~ *We wish success in your examinations. God bless you.*