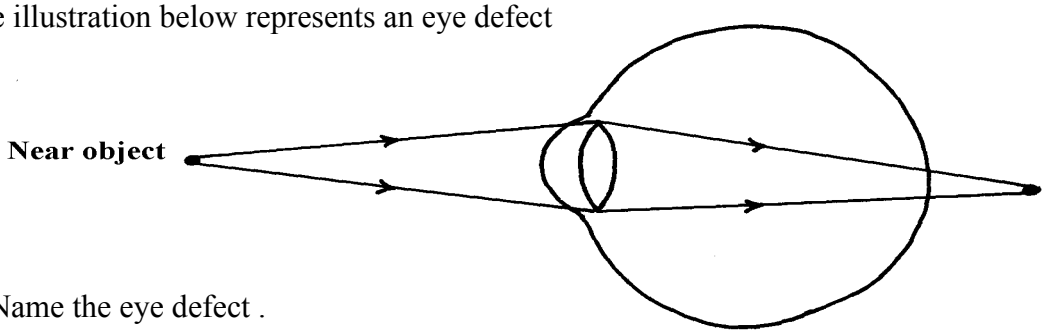
11. Growth and development in (a) plants (b) animals

1. a) Name the hormone which controls moulting in insects.

   b) State the importance of moultng in insects.

2. The illustration below represents an eye defect



   a) Name the eye defect .

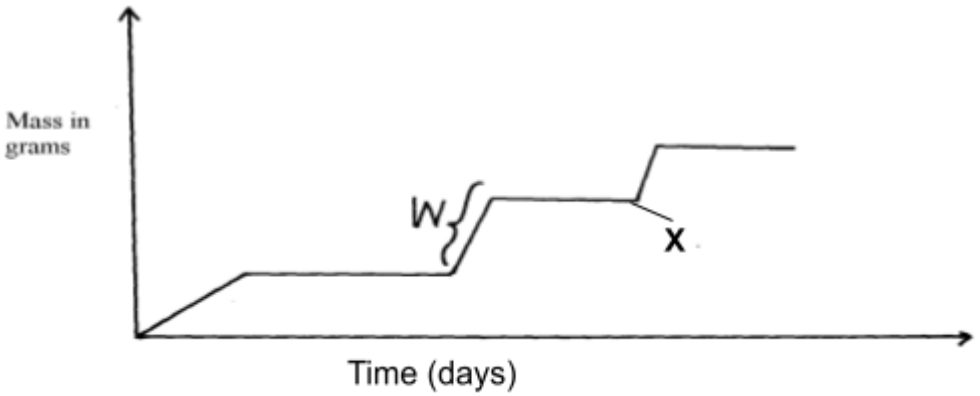
   b) Name the lenses that can be used to correct the defect.

3. (a) State **two** functions of the kidney

   (b) Name **two** substances that are not found in urine of a healthy person

   (c) Name **two** diseases that affect the kidney

4. The diagram below represents a growth pattern of arthropods.

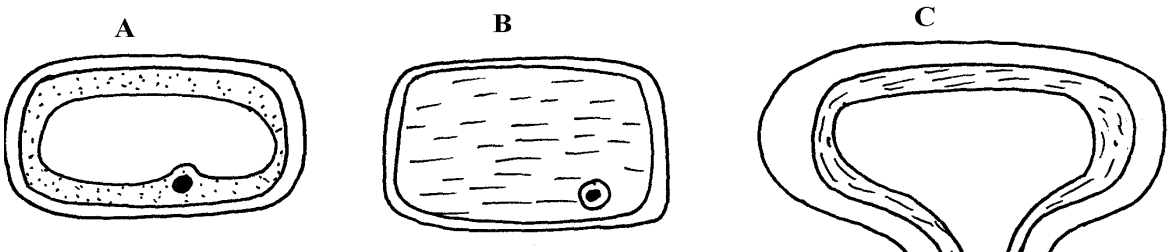


   (a) Name the type of growth pattern represented on the graph.

   (b)Identify the process represented by **X**.

   (c) Which hormone is responsible for process at **X** in 15 (b) above?

5. Distinguish between natural and acquired immunity.

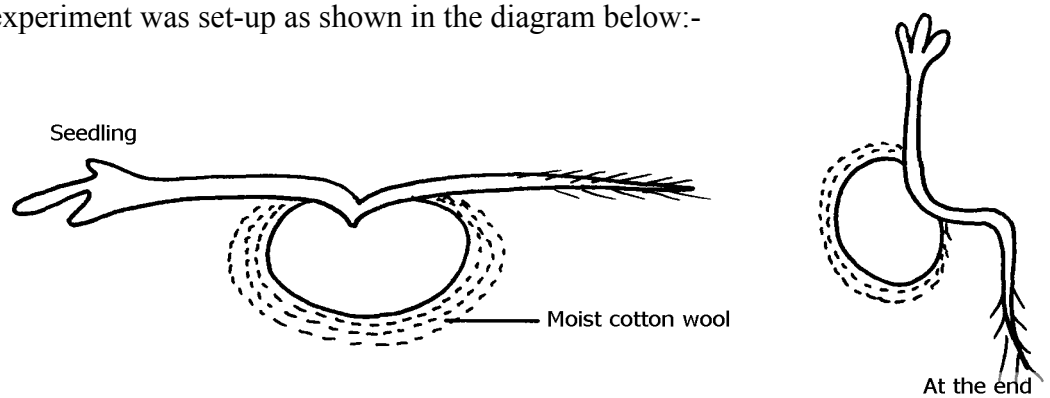


6. The cells shown below were obtained from different parts of a young root tip:

Give the name of the zone from which each cell was obtained A, B and C

7. Differentiate between continuous and discontinuous variations

8. An experiment was set-up as shown in the diagram below:-



(a) Suggest the possible aim of this experiment
(b) Account for the observation at the end of the experiment

9. State the location of **each** of the following plant meristematic tissues:-

(i) Vascular cambium

(ii) Intercalary meristem

10. Define the following terms: a) Growth

b) Development

11. State **two** advantages of metamorphosis in the life insects

12. State **one** disadvantage of exoskeleton in insects.

13. Distinguish between primary growth and secondary growth in a flowering plant

14. What is the role of the following to a germinating seed: (i) Oxygen

(ii) Cotyledons

15. Give **three** applications of plant growth hormones in agriculture

16. State **two** functions of calcium in the human body

17. State the biological importance of ecdysis in arthropods

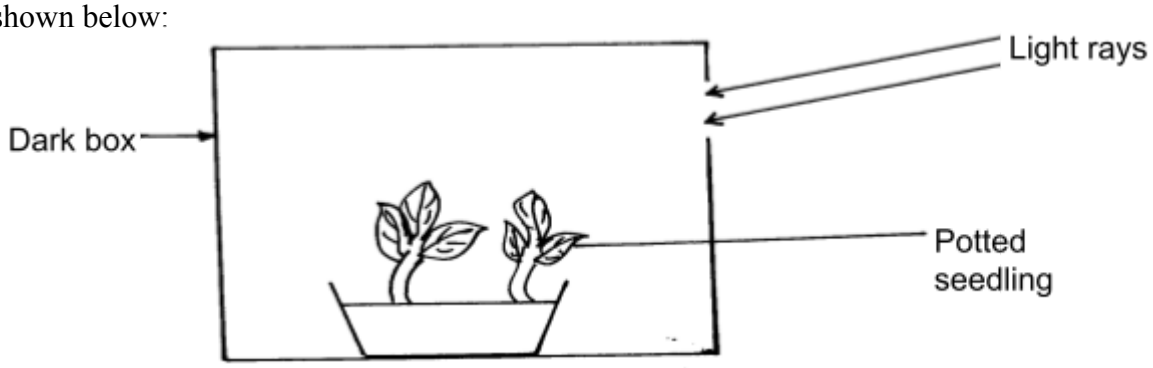
18. The diagram below represents a stage during the process of germination.

(a) (i) Name the type of germination illustrated in the diagram
(ii) Give a reason for your answer in **(a) (i)** above.

(b) Give **two** functions of the part labelled **X**

19. In an experiment young potted seedlings were placed in a dark box with unilateral light source

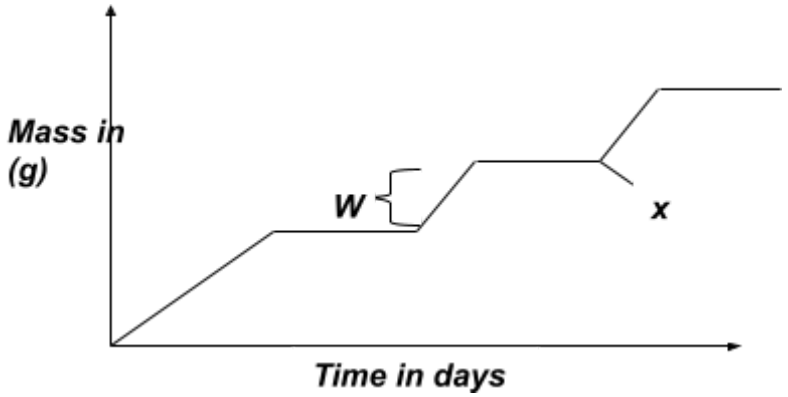
as shown below:



(a) What was the aim of the experiment?

(b) State the observations made on the seedlings after 3 days

20. The graph below represents the growth of animals in a certain phylum.



(a) Name the type of growth pattern shown on the graph.

(b) Identify the process represents by **x.**

(c) Name the hormone responsible for the process in B above.

21. (a) State the role of the vascular cambium in plant growth and development.

(b) Explain why monocotyledons plants do not undergo secondary thickening.

22. Explain how placenta is adapted to its functions

23. State the role of the following during germination:

(a) oxygen
(b) enzyme

24. Name the type of responses exhibited by:-

(a) (i) Marine crabs burrowing into the sand to avoid dilution of their body fluids

(ii) Chlamy domonas plant moving towards a region of high light intensity

(b) (i)What type of neuron is drawn above?

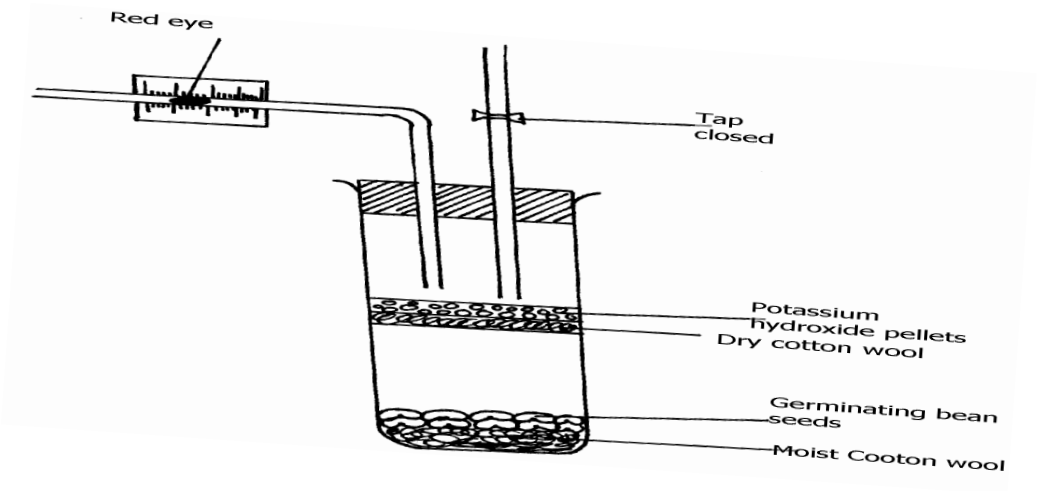
(ii) Using an arrow, show the direction of the nerve impulse

(iii) Name the part labelled **X**

(iv) State the function of part labelled **Y** .

(c) Give **two** differences between reflex action and conditioned reflex action

25. The experiment set – up below was designed to investigate an aspect of germination.



a) Why was potassium hydroxide pellets used in this experiment?

b) What was the role of moist cotton wool in this experiment?

c) i) By means of an arrow, indicate on the diagram the direction in which red dye would move during the experiment.

ii) Give reason for your answer in c(i) above.

d) Other than the factor investigated above, state any other **one** factor necessary for germination process.

26. The following data represents the development in dry mass of germinating seedlings within 18 weeks:

Time in weeks	0	1	2	4	6	10	13	15	16	18
Dry mass in grammes	0.1	2	3.2	10	18	32	44	45	44	38

(a) Using suitable scales plot a graph of dry mass against time

(b) Write reference to the graph, explain the changes in dry mass between:-
(i) Week 0 to 2
(ii) Week 5 to 13

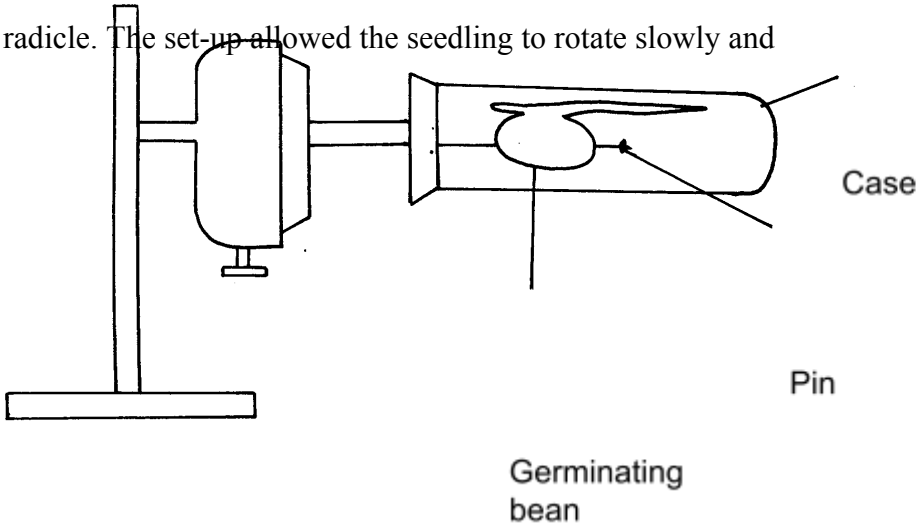
(iii) Week 16 - 18

(c) (i) What is the significance of time zero?

(ii) What difference would be expected from the above results if the experiment started with
the seeds? Give a reason for your answer

(d) (i) Describe how you carry out the experiment to obtain dry mass in the respective weeks
(ii) State **one** advantage of using dry mass instead of fresh weight in estimating growth of an
organism

27. The diagram below represents a set-up that was used to investigate the effect of rotation on the
growth of a bean radicle. The set-up allowed the seedling to rotate slowly and continuously for
seven days



(a) Name the piece of apparatus illustrated

(b) (i) State the observation made on the shape of the radicle after seven days

(ii) Explain the observation in **(b) (i)** above

(c) Suggest a suitable control for this experiment
(d) Give any **four** importance of tropism in plants

28. An experiment was carried out to determine the growth rates of variety of bamboo and a variety of maize in two adjacent plots. The average height and average dry weight of plants from the two

populations were determined over a period of twenty weeks. The data is as shown below:-

a) On the same axes, plot a graph to show the changes in average weight of the bamboo and maize plants over time

(b) (i) Which of the two plants had a higher productivity by the end of the experiment?

(ii) Give a reason for your answer in **(b)(i)** above

(c) Explain the following:

(i) Between weeks 14 and 18 the average height of maize plants remained constant while the average dry weight increased

(ii) Dry weight was used instead of fresh weight in this experiment

(iii) Describe how the average height and average dry weight of plants were determined in this experiment;

(d) Why was it appropriate in this experiment to use both weight and height?

(e) Give a reason why secondary thickening does not occur in bamboo and maize plants

29. (a) What is meant by the term **fertilization** ?

(b) (i) Name the type of cell division that produces gametes

(ii) Where does the type of cell division mentioned above occur in mammals?

(c) What happens to the wall of the uterus;

(i) before the release of an egg ?

(ii) if no fertilization occurs?

(b) How is the placenta adapted to its functions?

30. The relationship between seed fresh mass in the lupin *lupinus* and percentage seed germination,

percentage seedling survival and seedling fresh mass is shown in the table;

Seed fresh Mass mg^{-1}	**Percentage germination**	**Percentage of seedlings surviving 2 leaf stage**	**Mean seedling fresh mass 5 weeks after germination/mg**
Below 16	41.9	84.6	24.3
17-25	90.2	96.8	44.2

26-35	95.6	98.8	60.7
36-45	97.5	100.0	86.4
Above 45	100.0	100.0	106.4

a) How was percentage germination in column two of the table calculated?

b) Why was seed fresh mass preferred to seed dry mass to take measurements of the seed weight

in the experiment

c) i) Explain why the measurements of mean seedling fresh mass (5) weeks after germinated

may not have been an accurate measurement of growth that had occurred

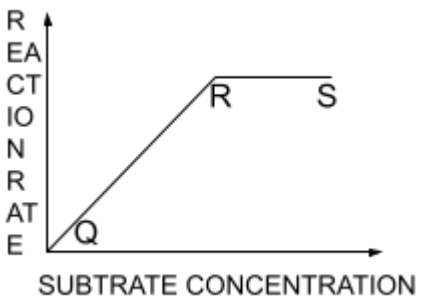
ii) How could more meaningful and accurate measurement been obtained in **c(i)** above?

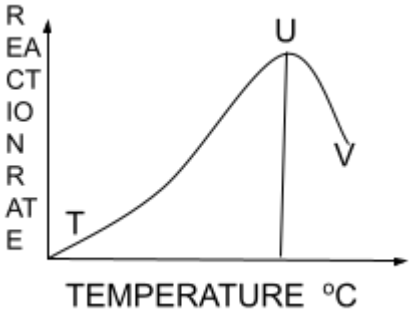
d) With reference to the figures in the taste indicate the relationship between seed fresh mass

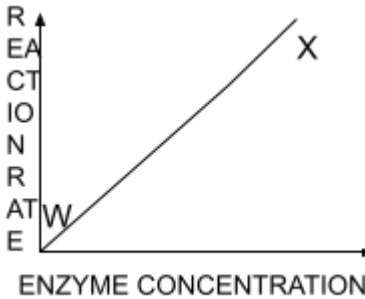
and percentage seed germination, percentage seedling survival and seedling fresh mass

e) Suggest an explanation why seedling produced from large seeds grow more rapidly than the

seedling produced from small seeds







31. The diagram below illustrate enzyme controlled reaction

a) State the relationship between rate of reaction and enzyme concentration

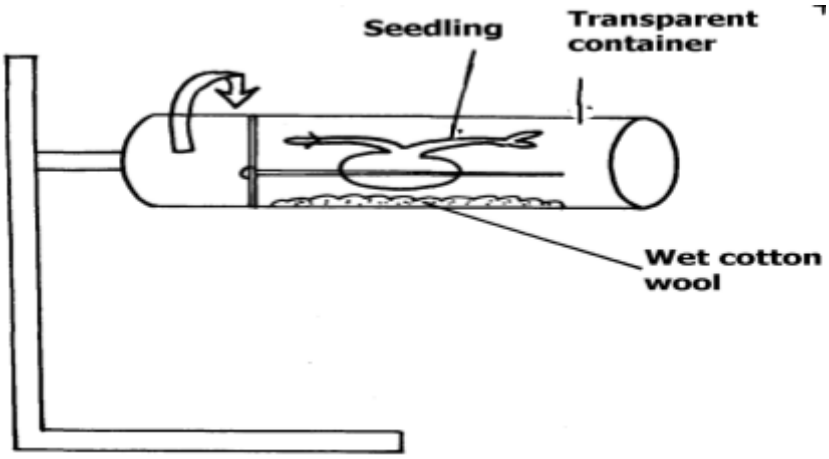
b) Account for the rate of reactions between; i) **Q** and **R**

ii) **R** and **S**

iii) **U** and **V**

c) Name **one** other factor that affects enzyme action, not illustrated above

32. Carefully study the figure below and answer the questions that follow:-



The seedling with straight radicle and plumule was attached to a machine horizontally as shown

above. The machine rotates making one revolution in 15minutes.

(a) Draw how the seedling would look like after one week

(b) Explain your drawing in **(a)** above

(c) Name the machine used in the experiment above

(d) What would happen if the seedling was put horizontally outside the machine

(e) Name the stimuli investigated and type(s) of response expected in the experiment

33. (a) Give the form in which each of the following substances ate transport in mammalian blood:

(i) Carbon (IV) oxide

(ii) Oxygen

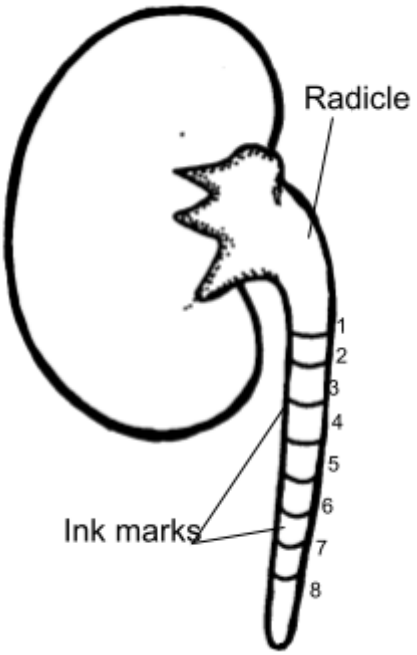
(b) Give **two** functions of pleural membrane

(c) Explain why formation of carboxyhaemoglobin in the blood of a mammal results in death

(d) Other than stomata, name **two** other gaseous exchange surfaces in plants

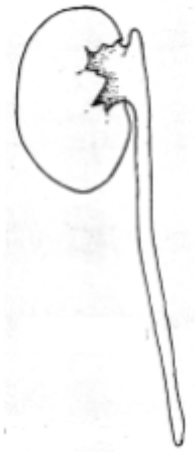
34. In an experiment the radicle of a seedling was marked equidistant using Indian ink as shown

in the diagram below:



(a) What was the aim of the experiment?

(b) On the diagram below mark on the radicle to show the appearance of the marks after 3days



(c) State **three** characteristics of cells found just behind the root cap of a radicle

(d) Give **two** factors inside a seed that causes seed dormancy