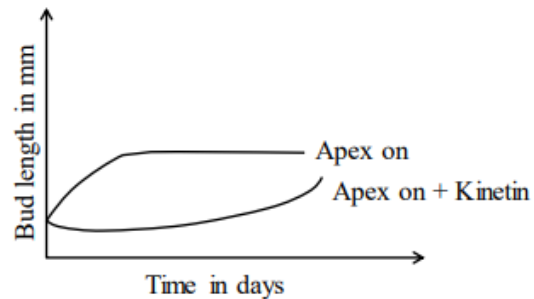


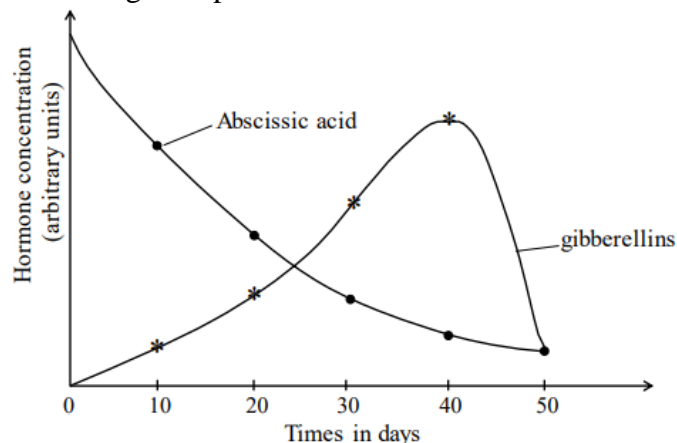
GROWTH AND DEVELOPMENT REVISION QUESTIONS @BTN

1. Which one of the following organisms use external gills for gaseous exchange?
 A. Lung worm. B. Flat worm. C. Toad. D. Fish.
2. Plant stem primary meristems are;
 A. apical meristem, vascular cambium, cork cambium.
 B. epidermis, apical meristem, vascular cambium.
 C. vascular cambium, protoderm and procambium.
 D. ground meristem, protoderm and procambium.
3. The type of growth pattern that occurs in monocotyledonous leaves is;
 A. limited B. unlimited C. allometric D. intermittent
4. In a non endospermous seed with epigeal germination, the region of maximum elongation in a germinating seedling is the;
 A. Shoot apex. B. Root apex. C. Hypocotyl D. Epicotyl.
5. Figure below shows the promotion of lateral bud growth in intact pea shoots following the application of kinetin.



The results of this experiment show that kinetin.

- A. Suppresses apical dominance in intact shoots.
 - B. suppresses bud dormancy.
 - C. promotes apical dominance in intact shoots.
 - D. promotes bud dormancy.
6. Figure below shows the effects of chilling on hormones abscissic acid and gibberellins concentrations in the seeds of sugar maple with time.



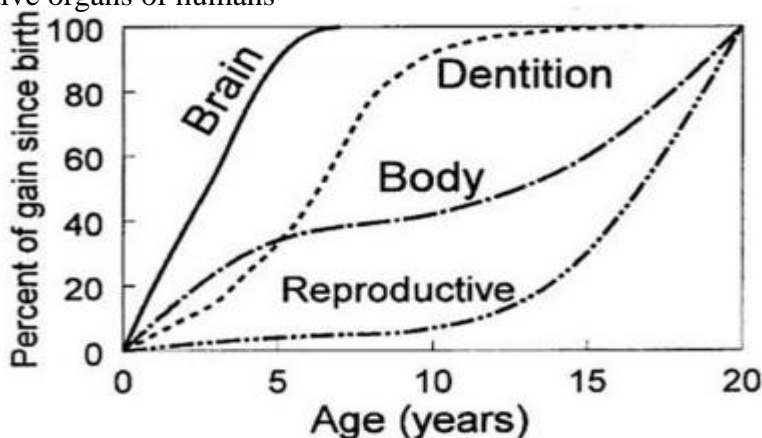
- (a) State three differences observed in the concentration of the named hormones in the seeds of sugar maple.

GROWTH AND DEVELOPMENT REVISION QUESTIONS @BTN

- (b) Explain the variation in gibberellins concentration with time.
- (c) (i) State two structural causes of seed dormancy.
 (ii) State three instances where low temperature treatment has been used to initiate development following seed dormancy.
7. Two sets of seeds (A) dormant seeds and (B) non-dormant seeds were soaked for 24 hours. After this period, investigations were conducted to determine oxygen intake by the seeds. The table below shows the results obtained.

OXYGEN INTAKE Mg/hr	DURATION IN HOURS						
	0	10	20	30	40	50	60
Seeds in set A	2	10	8	7	4	3	2
Seeds in set B	3	21	28	37	40	41	42

- a). Plot a graph to represent the information in the table above. (08 marks)
- b) (i) Describe the trend of oxygen intake by seeds in set B. (05 marks)
 (ii) Compare oxygen intake in the two sets of seeds. (05 marks)
- c) (i) Suggest reasons for the initial increase in oxygen intake by both sets of seeds up to the 10th hour. (03 marks)
 (ii) Explain the difference in the trend of oxygen intake in the two sets of seeds after 10 hours. (10 marks)
- d) (i) Give four ways viable seeds utilize absorbed water. (04 marks) (ii) State advantages and disadvantages of seed dormancy. (05 marks)
8. The figure below shows the relative growth rates of the brain, teeth (dentition), whole body and reproductive organs of humans



- (a). Describe the pattern of growth of the reproductive organs.
- (b). Explain the rate of growth of the: (i) Teeth. (ii) Brain. (iii) Whole body.

GROWTH AND DEVELOPMENT REVISION QUESTIONS @BTN

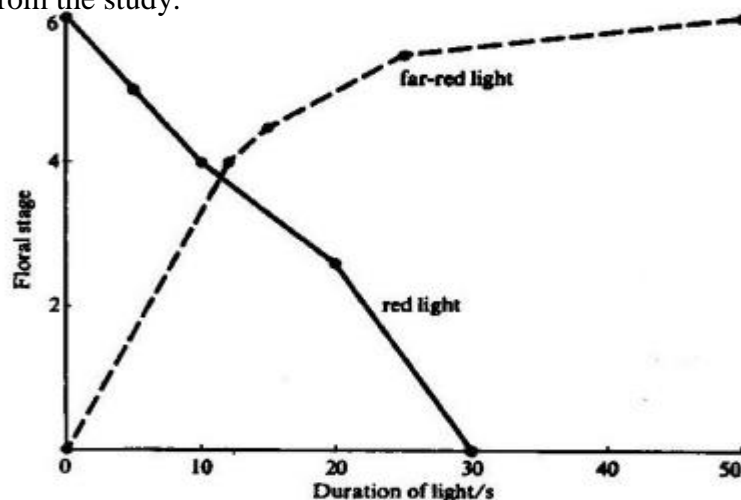
(c). Identify and explain the growth pattern exhibited in the figure.

9. (a) What is meant by photoperiodism?

(b) Explain the effect of photoperiod on: (i) Plant flowering. (ii) Dormancy in plants.

(iii) Breeding behavior in animals

10. A study was carried out to determine the effect of red and far-red light interruptions of long night on the intensity of flowering of a short-day plant. The figure below shows the results obtained from the study.



In another experiment, three species of the genus of a plant and a hybrid between two of them were tested for their vernalisation requirements. The sample plants of each strain were subjected to different periods of time at 4°C before being returned to their original conditions. The number of days which elapsed between the end of cold treatment and the onset of flowering were recorded. The results obtained are shown in the table below;

Weeks at 4°C	Number of days between end of cold treatment and the onset of flowering			
	A	B	C	AXB (Hybrid)
0	*	40	25	75
1	160	38	25	65
2	110	36	25	50
4	90	34	25	40
8	35	32	25	32
16	24	28	25	24

KEY: * = did no flower

Use the above information in the table and figure to answer the questions that follow.

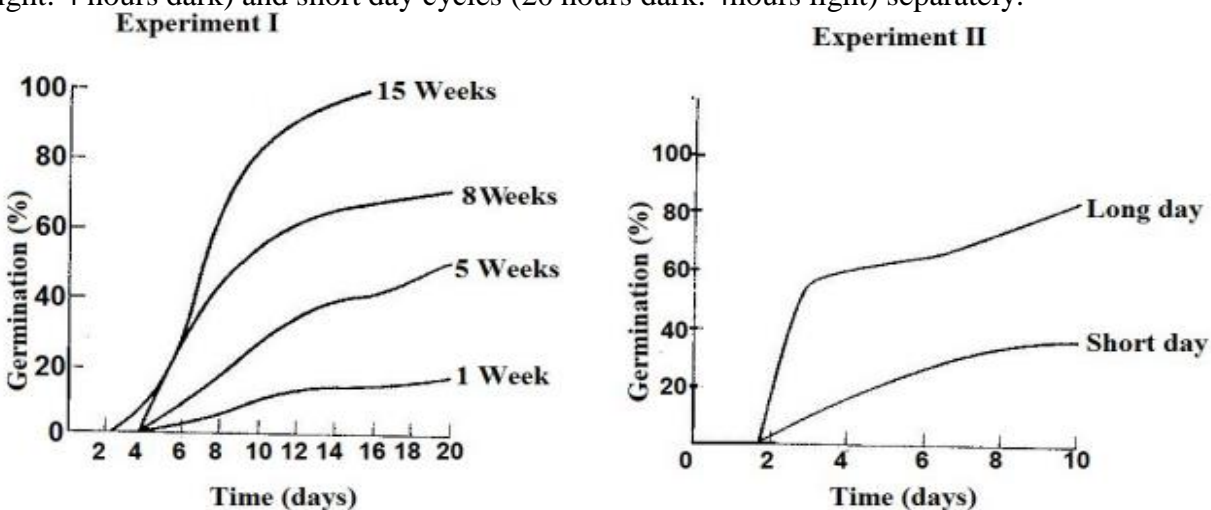
GROWTH AND DEVELOPMENT REVISION QUESTIONS @BTN

- (a). Describe the effect of interruption of the night period on the intensity of flowering of each of the following types of light: (i) Red light. (ii) Far-red light
- (b). Give the explanation for the effects described in (a) above. (10marks)
- (c). Explain how red and far-red light interruptions would have affected the intensity of flowering if they had used a long day plant (03marks)
- (d) (i) What was the effect of subjecting the sample plants of each strain to different periods of time at 4 °C. (05marks)
- (ii). Explain the results shown in the table (08marks)
- (e). Predict and explain what would happen if the experiment in the table had been carried out at 1°C. (03marks)
- (f). What is the significance of the two experiments to an agriculturalist? (03marks)

11. Experiments were performed to investigate some of the factors which influence flowering of a short day plant species, and the onset of germination of seeds of the same species.

Experiment I was on the effect of increasing time of dry storage on the germination of the species seeds. All the seeds were kept at 15°C. Each curve represents a germination test on a seed sample stored for the number of weeks indicated.

Experiment II was on the germination of seeds under long-day illumination cycles (20 hours light: 4 hours dark) and short day cycles (20 hours dark: 4hours light) separately.



Experiment III was on the germination of seeds during an eight-day period. Before starting the investigation, some of the seeds and some of the intact fruits were treated as indicated in the table below:

Treatment	Percentage germination by day			
	2	4	6	8
Intact fruits in air.	0	6	10	10
Fruits with pericarp cut.	0	12	28	38

GROWTH AND DEVELOPMENT REVISION QUESTIONS @BTN

Naked seeds in air.	0	14	30	42
Seeds with testa pricked.	14	45	53	53
Seeds in oxygen	40	56	72	78
Pricked seeds in oxygen.	25	62	70	84

(a) Compare the percentage germination of the two seed samples in Experiment II. (03marks)

(b) Explain the effect of:

(i). Varying illumination cycles on seed germination in Experiment II. (10marks)

(ii). Exposing a brief flash of light in the middle of the dark period in Experiment II on flowering of the plant. (04marks)

(c). State what would be the effect of illumination on the flowering when the same treatment of the plant in Experiment II was subjected to:

(i) A long day plant. (02marks) (ii) A day neutral plant. (01mark)

(d). Explain the effect of changing the period of day storage in Experiment I on seed germination. (07 marks)

(e)(i). Describe the effect of different seed treatments on seed germination in Experiment III.

(03marks)

(ii). Account for the observed influence in Experiment III. (04marks)

(d) What are the advantages of spores over seeds in reproduction? (06marks)

12. (a). Describe the process of primary growth in plants. (06 marks).

(b). Describe the role of gibberellins in plant growth. (07 marks).

(c). Explain the meaning and the role of seed dormancy in the lifecycle of a flowering plant. (07 marks).

13. Describe the formation of vascular tissues in a herbaceous dicotyledonous stem. (12 marks).

(b). Write the differences between the xylem vessels and phloem sieve tubes.

(c). Describe secondary growth in vascular tissues in vascular tissues

14. (a). What is the importance of the larval stage in the lifecycle of an organism? (06 marks)

(b). Describe the hormonal control of ecdysis and metamorphosis in insects. (14 marks)

15. a) What is secondary growth? (02 marks)

b) Describe the process of secondary thickening in a woody stem. (18 marks)

16. (a) Distinguish between apical and lateral meristems. (02 marks)

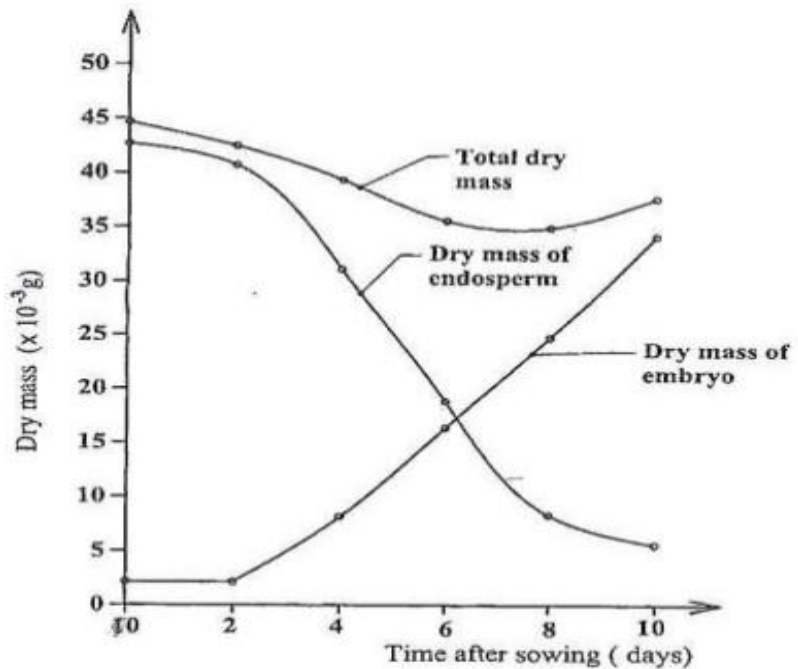
(b) How do each of the following tissues bring about growth in higher plants?

(i) Apical meristem. (04 marks)

(ii) Vascular cambium. (04 marks)

GROWTH AND DEVELOPMENT REVISION QUESTIONS @BTN

17. A study was conducted on the germination and early growth of sorghum. The grains were soaked in cotton wool in a green-house and at two; day intervals, samples were taken and separated into two components, of endosperm and embryo (seedling), which were then oven dried and weighed. Figure below shows the variation of total dry mass, dry mass of endosperm and embryo. Use the information to answer the questions that follow.



(a). Explaining the variation with time of;

(i) dry mass of endosperm. (10 marks)

(ii) dry mass of embryo. (07 marks)

(iii) Total dry mass. (08 marks)

(b). Outline the reasons for;

(i). over drying the seeds during the experiment. (01 marks)

(ii). Separating the seed into two components of endosperm from embryo. (01 mark)

(iii). Sowing seeds in a greenhouse. (01 marks)

(c). State the method that was used to measure growth and its limitations (04 marks)

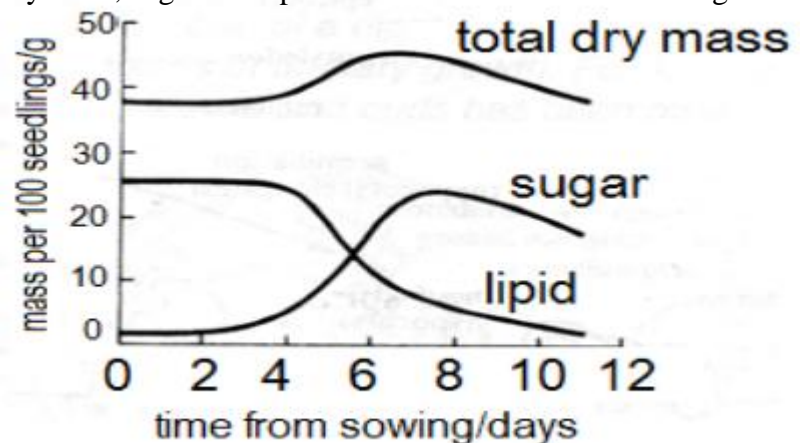
(d)(i). Outline two internal factors in the seeds that would affect the results above. (02 marks)

(d)(ii). What precautions could have been taken to ensure reliable results. (02 marks)

(e). State the conclusion that can be drawn from the graph after 8 hours (01 marks)

(f). Explain what would happen if the experiment continued for another 10 days (04 marks).

18. Figure below shows changes in dry mass, sugar and lipids content in Castor seeds during germination in the dark.



a). Explain the relationship between the sugar and lipid content in the first seven days?

(03 marks)

(b). The respiratory quotient (RQ) of the seedling was measured at day 5 and the embryo was found to have an RQ of about 1.0 while the RQ of the storage centers was about 0.4 to 0.5. Suggest a possible reason for this difference.

(03 marks)

(c). If the testa of the seed is not removed, its RQ is about 4.0, but it is around 1.5 if the testa is removed. Account for these observations.

(04 marks)

19. (a). Explain the following observations.

i. Dormancy of seeds of some lettuce varieties is broken by light after water uptake.

ii. Many light- independent seeds are small.

iii. Lettuce seed do not germinate under canopy grounds.

iv. Many seeds start to sprout in fleshy ploughed soils.

v. Trying to germinate seeds in space is difficult.

b. The graph in the figure below shows the effects of chilling on the concentrations of two different hormones in the seeds of sugar maple. Study it carefully and answer the questions that follow.

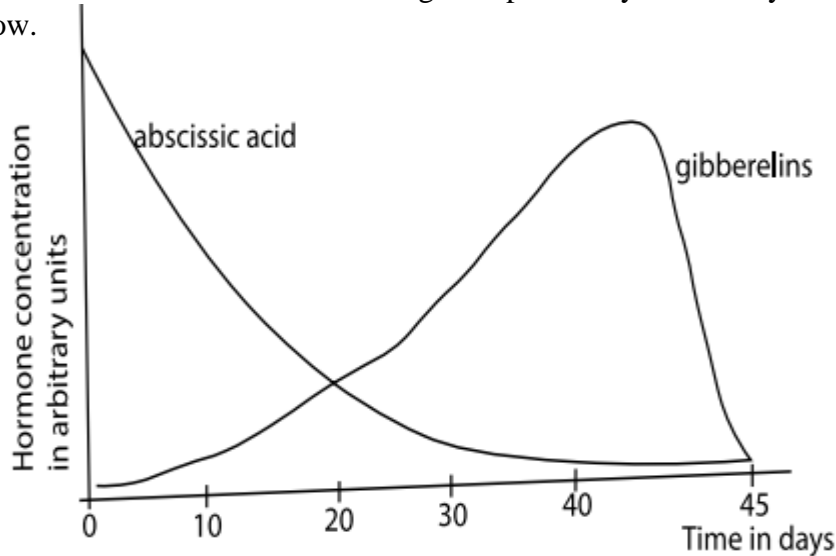


Figure 4: Hormone concentration varying with time

(i). State the differences observed in the concentration of the two hormones in the seeds of sugar maple.

(ii). Explain the variation in the concentrations of gibberellins for the first 40 days.

(iii). Of what advantage is the difference in the concentration of the two hormones in the seeds of sugar maple to a farmer in the temperate regions?

GROWTH AND DEVELOPMENT REVISION QUESTIONS @BTN

(iv). Apart from seed germination, give two other instances where low temperature treatment has been used to initiate development following dormancy.

20. Figure 1 and 2 show growth patterns of organs in humans and the mean growth rate in the different sexes respectively. Figure 1 represents the size attained by the human body organs from birth, expressed as a percentage of the post-natal growth. Figure 2 represents the mean growth rate changes in centimeters per year, in boys and girls, from birth to maturity. Study the figures and answer the questions that follow.

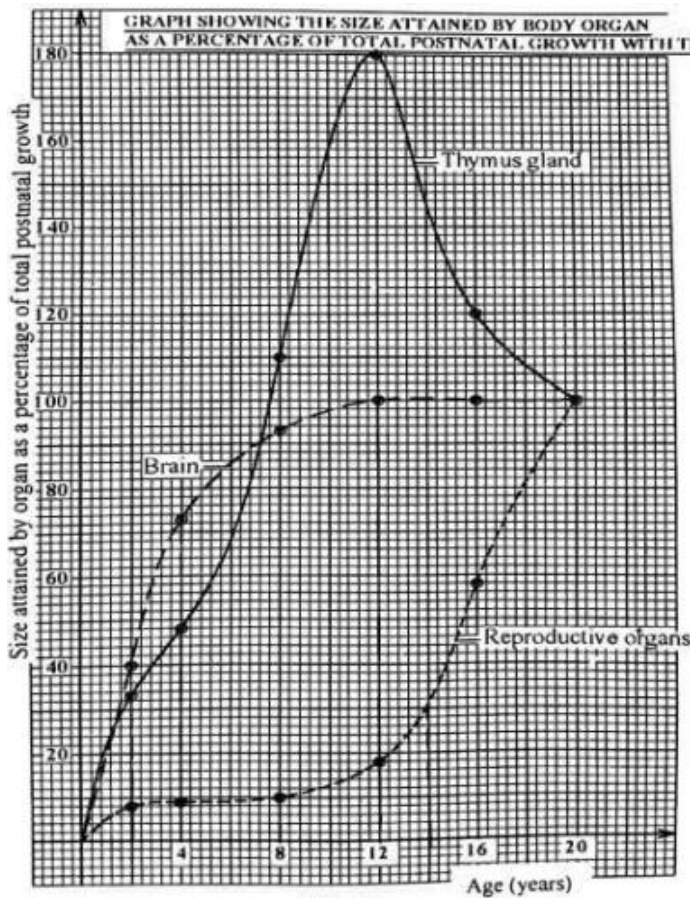


Fig. 1

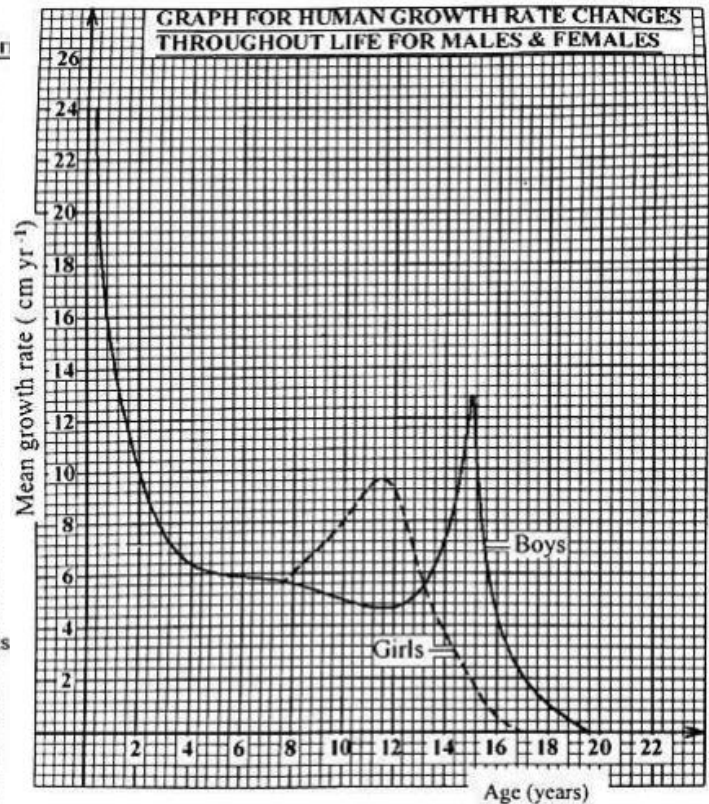


Fig. 2

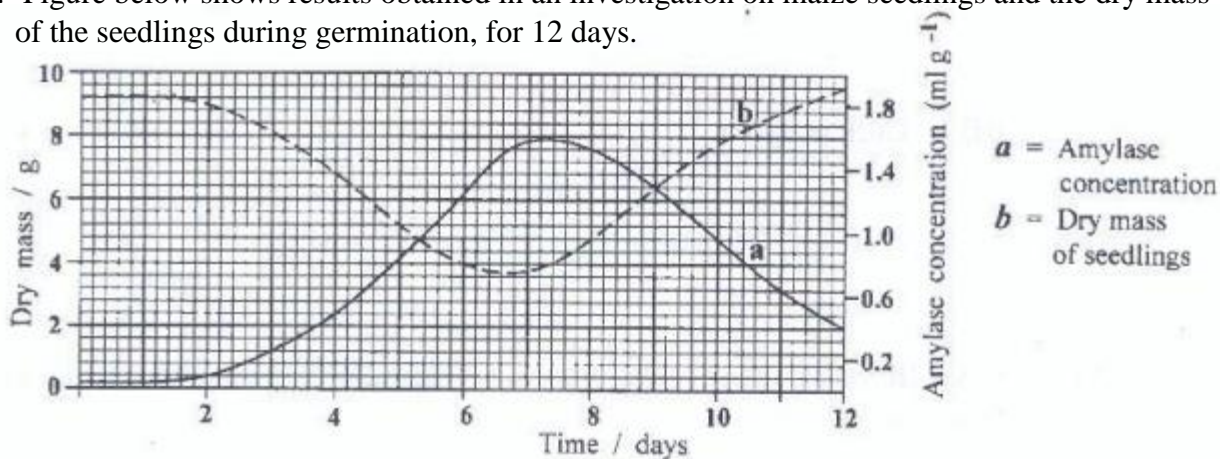
- (a). Describe the growth pattern shown by the; (i). Thymus gland. (04 marks).
(ii). Brain (04 marks). (iii). Reproductive organs (04 marks).
- (b). Explain the growth pattern shown by; (i). Thymus gland (06 marks). (ii) Brain (04 marks)
(iii) Reproductive organs. (02 marks).
- (c). Compare the mean growth rate in boys and girls (08 marks).
- (d). Explain the relationship between the size attained by reproductive organs and the mean growth rate between 11-20 years (08 marks)

GROWTH AND DEVELOPMENT REVISION QUESTIONS @BTN

19. The data in the table below was obtained from an experiment on the germination of barley grains. The average weights of the seedlings were obtained at different stages of germination and recorded for 20 days.

Seedlings	Time in days								
	0.0	2.5	5.0	7.5	10.0	12.5	15.0	17.5	20.0
Mass of embryo (g)	1.2	1.2	1.5	2.8	4.2	6.0	7.4	10.0	13.8
Mass of endosperm (g)	11.4	11.2	10.4	8.6	7.4	5.3	4.8	4.7	4.6
Total mass of grain (g)	12.9	12.8	12.6	11.8	11.8	11.5	12.4	14.9	16

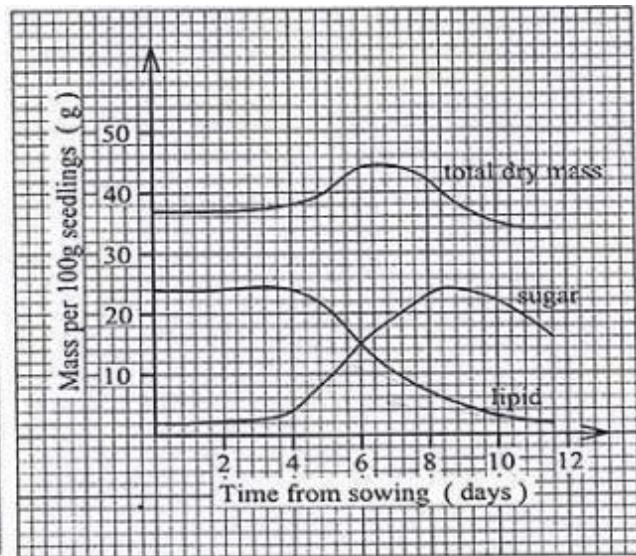
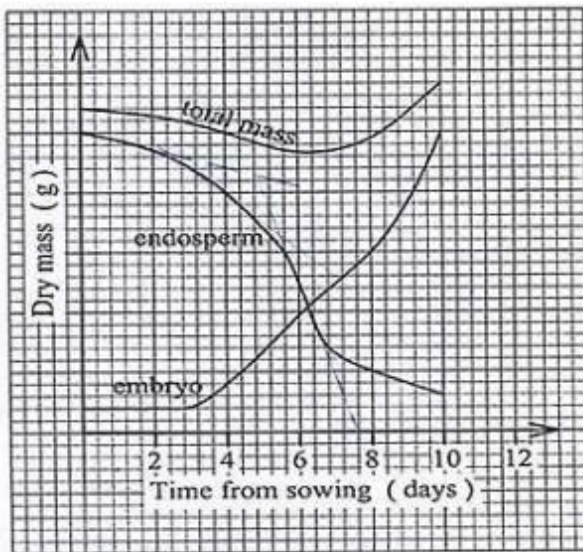
- (a) Using the same axes, plot suitable graphs to show the information provided in the table (04 marks)
- (b) Explain the variation in the graphs of the embryo and endosperm (14 marks).
- (c)(i). Give an advantage and disadvantage of using dry weight in the experiment above.
- (ii). Why do the total masses of the embryo and endosperm not equal to the total mass of the grain?
- (c) Explain the sequence of events that lead to formation of the final products that are used in germination and state the use of each of these final products in the growth of the seedling.
- (d) (i). Some grains may not germinate even when all other conditions have been satisfied. What are the advantages and disadvantages of such a phenomenon?
- (ii). Why do seeds fail to germinate properly when they are still fresh?
20. Figure below shows results obtained in an investigation on maize seedlings and the dry mass of the seedlings during germination, for 12 days.



- (a) (i). Describe the relationship between the change in concentration of amylase and the dry mass of the seedlings in the first 2 days. (01 mark)
- (ii) Explain the relationship described in (a)(i) above (02 marks)
- (b) Explain the change;
- (i) In dry mass of the seedlings during the 7th day. (03 marks)
- (ii) In amylase concentration after the 2nd day. (04 marks)

GROWTH AND DEVELOPMENT REVISION QUESTIONS @BTN

21. Figure below shows the relative changes in the dry mass of the endosperm and embryo during germination of maize in a well-illuminated environment. Figure 2 shows changes in content of lipids and sugar in castor oil seeds during germination in the dark.



- (a). Explain the changes in each of the following, during germination of maize.
- Dry mass of endosperm. (07 marks)
 - Dry mass of embryo (06 marks)
 - Total dry mass (05 marks)
- (b). Explain the changes in each of the following during germination of castor oil seeds.
- Lipid content (06 marks)
 - Sugar content (04 marks)
 - Total dry mass (02 marks)
- (c). When the respiratory quotient (RQ) of the castor oil seedling was measured on the fifth day, the embryo was found to have an RQ of about 1.0, while the cotyledons had an RQ of about 0.4 to 0.5. Suggest an explanation for these results. (04 marks)
- (d). Suggest differences in changes of lipids, sugar and total dry mass of castor oil seedlings if they were introduced to a well-illuminated environment on the sixth day. Explain each difference suggested. (06 marks)
22. (a). Describe the process of primary growth in cotyledonous plants (16 marks)
- (b). How is the structure of the phloem related to its function? (04 marks)
23. (a). Discuss why some seeds are not able to germinate immediately they are dispersed from their parent plants when optimum conditions of germination are provided (06 marks)
- (b). Explain the importance of seed dormancy in plants (08 marks)

GROWTH AND DEVELOPMENT REVISION QUESTIONS @BTN

(c).Explain why dormancy is more common in weeds and annual plants than in tropical trees. (06 marks)

24. (a).Distinguish between growth and development (02 marks)

(b).Giving examples, describe the different patterns of growth (06 marks)

(c).Describe secondary growth in a dicotyledonous plant (12 marks)

25. (a)Explain what is meant by the following terms and give relevant examples of each case;

(i). Hemimetabolous (03 marks)

(ii).Holometabolous (03 marks)

(b).Outline the hormonal control of ecdysis and metamorphosis in insects. (14 marks)

26. (a).Explain how organisms have overcome the challenges of being multicellular. (12 marks)

(b).Explain the relevances of animal movement from one place to another. (08 marks)

27. (a).Distinguish between primary growth and secondary growth in plants (06 marks)

(b).Explain the ecological significance of tropic responses in plants (10 marks)

(c).Explain why shoots of grass plants continue to grow after being cut at their tips (04 marks)

28 (a).Describe the different forms of dormancy in plants and animals (10 marks)

(b).What are the main causes of seed dormancy and how they can be overcome? (04 marks)

(c). Explain the biological significance of the various modalities of dormancy in plants and animals. (06 marks).

29 .(a).State and explain the conditions required for germination to occur (06 marks)

(b).Explain the events that take place during the process of germination (12 marks)

(c).Describe the various types of seed dormancy exhibited by seed producing plants (02 marks).

30 . (a).Outline the features of the larval stage (03 marks)

(b).Explain the roles of the larval stage in growth and development of organisms (05 marks)

(c).Account for the allometric growth pattern exhibited by the major different organs of a human being.

31 (a).Briefly describe the various stages of vertebrate development (06 marks)

(b).State the developmental fates of the primary germ cell layers in vertebrates (03 marks)

(c)(i).What role do hereditary factors play in the growth and development of organisms? (04 marks)

(c)(ii).Describe the formation of vascular tissues in a herbaceous dicotyledonous stem. (06 marks)

32 . (a).State the advantages of complete metamorphosis over incomplete metamorphosis (03 marks)

GROWTH AND DEVELOPMENT REVISION QUESTIONS @BTN

- (b).Account for the physiological changes that occur during pregnancy up to lactation (10 marks)
- 33 . (a).Outline the environmental and physiological factors behind development of dormancy in seeds (10 marks)
- (b).State the various ways in which dormancy due to hard seed coat can be broken (05 marks)
- (c).Explain the importance of an after-ripening period (05 marks)
- 34 . (a).Distinguish between longevity and dormancy of seeds (03 marks)
- (b).Briefly describe the different parameters used in the measurement of plant growth highlighting the limitations of each (17 marks)
- 35 . (a).Explain the various factors affecting growth in living organisms (14 marks)
- (b).Outline the roles of water as a requirement for seed germination (06 marks)
- 36 .(a).Outline different ways moulting hormone and juvenile hormones exert their effects (07 marks)
- (b). Describe how insect larvae are adapted to successful life (03 marks)
- (c). State the common features exhibited by the larval forms of both amphibians and insects (10 marks)
- 37 . (a).Explain the absence of the yolk sac in the development of the human foetus yet it is an important structure in development of birds. (04 marks)
- (b).Outline some of the; (i). reproductive adaptations of birds to a terrestrial life (04 marks)
- (ii).differences between the physiological effects of red and far-red light in plants (06 marks)
- (c).Explain the role of temperature in plant growth (06 marks)
- 38 .(a).What is meant by annual rings? (02 marks)
- (b).State the characteristics of secondary xylem and phloem (10 marks)
- (c)(i).Describe the secondary growth changes undergone by phellogen in plants (07 marks)
- 39 . (a).Explain the effect of photoperiod on metamorphosis in a named arthropod or amphibian (04 marks)
- (b).Outline particular set of conditions that must be satisfied before seeds begin growth (05 marks)
- (c)(i).State the various significances of larval forms in living organisms (07 marks)
- (ii)What are the different stages in the secondary thickening of a dicot stem? (04 marks)
- 40 . (a)Describe how food ingestion stimulates larval development into an adult grasshopper (12 marks)
- (b).Explain the significance of neuro-secretion in man. (08 marks)

GROWTH AND DEVELOPMENT REVISION QUESTIONS @BTN

- 41 (a).Describe the structural and physiological characteristics of cells of meristematic tissue. (03 marks)
- (b).Distinguish between apical and lateral meristems. (03 marks)
- 42 (a).Describe the role of the apical meristem in growth of Dicotyledonous plants. (08 marks)
- (b).Explain how the hormonal control of growth is achieved in plants. (12 marks)
- (c) Describe the structural adaptations of vascular tissue for support. (14 marks)

END