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1. **CHEMISTRY**
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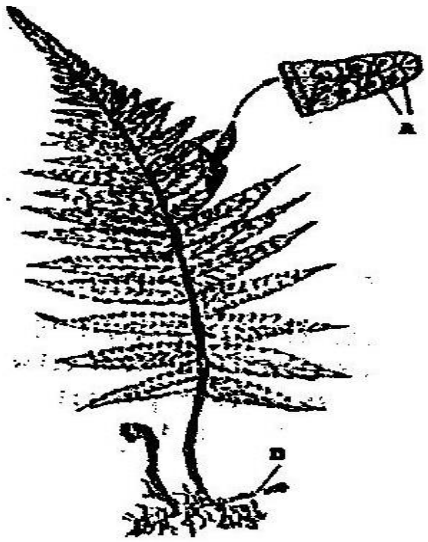
CLASSIFICATION

1. **1995 Q3 P1**

   State two ways in which some fungi are harmful to man (2 marks)

2. **1995 Q6 P1**

   The diagram below represents a fern



   Name

   (a) The parts labelled A and B (2 marks)

   (b) The division to which the plant belongs (1 mark)

3. **1996 Q5 P1**

   An organ is with an exoskeleton, segmented body, two pairs of legs per segment, a pair of eyes and a pair short antennae belongs to the phylum (1 mark)

4. **1996 Q6 P1**

   When are two organisms considered to belong to the same species (2 marks)

5. **1997 Q2 P1**

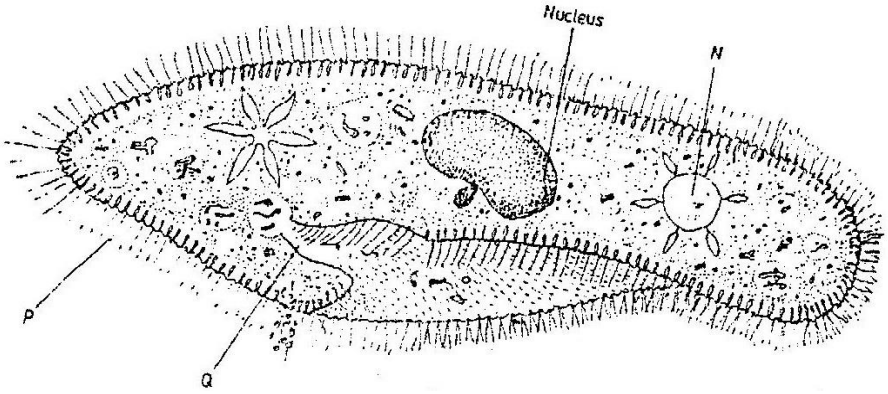
   A student caught an animal which had the following characteristics:

   - Body divide into two parts
   - Simple eyes
   - Eight legs

   The animal belongs to the class?..... (1 mark)

6. 1998 Q16 P1

A student placed a drop of pond water in a cavity slide and observed it under the microscope. The student observed many fast moving organisms, one of which is represented in the diagram below.



(a) (i) Name the phylum to which the organism belongs (1 mark)

(ii) Give a reason for your answer in (a) (i) above (1 mark)

(b) Name the structures labelled N, P and Q. (3 marks)

(c) State two observable features that enable the organism to move fast. (1 mark)

7. 1999 Q10 P1

Below is a list of organisms, which belong to classes Insecta, diplopoda chilopoda and Arachnida: Tick, centipede, praying mantis, tsetse fly, millipede and spider.

Place the organisms in their respective classes in the table below.

Give reason in each case. (6 marks)

Classes	Organisms	Reasons
Insecta		
Diplopoda		
chilopoda		
Arachnida		

8. 2001 Q1 P1

Other than having many features in common, state the other characteristics of a Species (1 mark)

9. 2002 Q1 P1

Beside the abdomen, name the other body part of members of Arachnida. (1 mark)

10. 2003 Q2 P1

Name the phylum whose members possess notochord (1 mark)

11. 2004 Q8 P1

Name the class in the phylum Arthropoda which has the largest number of individuals? (1 mark)

12. 2005 Q5 P1

To which class does an animal with two body parts and four pairs of

legs belong? (1 mark)

13. 2006 Q6 P1

a) State three characteristics of Monera that are not found in other kingdoms. (3 marks)

b) Name the class to which a termite belongs (1 mark)

14. 2007 Q1 P1

(a) What is meant by the term binomial nomenclature (1 mark)

(b) Give two reasons why classification is important (2 marks)

15. 2008 Q25 P1

Giving a reason in each case, name the class to which each of the following organisms belong (4 marks)

Bean plant……..

Reason……

Bat……..

Reason……

16. 2009 Q1 P1

(a) Name the external feature which is common in birds, fish and reptiles (1 mark)

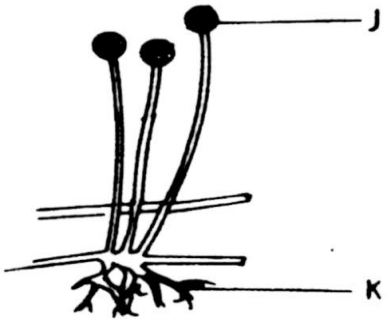
(b) State two characteristics of fungi (2 marks)

17. 2010 Q8 P1

State three external differences between chilopoda and diplopoda. (3 marks)

18. 2010 Q12 P1

The diagram below illustrates the structure of bread mould.



a) Name the part labeled **J** (1 mark)

b) State the function of the structure labeled **K** (2 marks)

19. 2010 Q29 P1

The diagram below represents a female cone.

a) Name the subdivision of the plant from which the cone was obtained. (1 mark)

b) Other than the presence of cone, name **two** other external features that identify plants in the subdivision named in (a) above. (2 marks)

20. 2011 Q3 P1

Give three reasons for classifying organisms. (3 marks)

21. 2011 Q8 P1

State three characteristics of class crustacea (3 marks)

22. 2011 Q9 P1

The diagram below illustrates the organs of some flowering plants

State the classes of plants to which each belong. (2 marks)

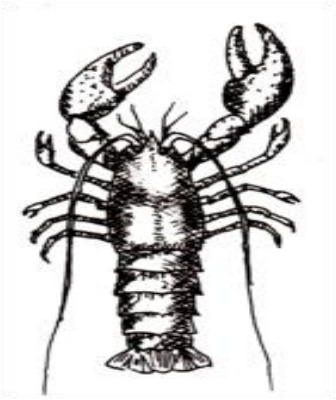
23. 2011 Q12 P1

The diagram below represents a certain organism

State the phylum and class to which it belongs (2 marks)

24. 2012 Q2 P1

The diagram below represents a certain organism collected by a student at the sea shore



(a) Name the class to which the organism belongs (1 mark)
(b) Give three reasons for your answer in (a) above (3 marks)

25. 2013 Q3 P1

(a) State two external features found in the class Mammalia only. (2 marks)
(b) Name the taxonomic unit that comes immediately after a phylum in classification.

(1 mark)

26. 2013 Q8 P1

Construct a step in a dichotomous key using two leaves one with a serrated and the other with a smooth margin. (2 marks)

27. 2013 Q12 P1

(a) A student collected an organism and observed the following features: simple eyes, four pairs of legs and two body parts.

(i) State the class to which the organism belongs. (1 mark)
(ii) Give an example of an organism in this class. (1 mark)

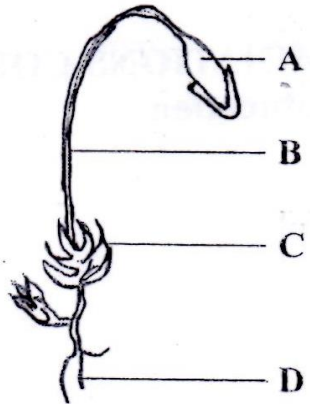
(b) Name the kingdom to which plasmodium belongs. (1 mark)

28. 2013 Q13 P1

State two characteristics of living organisms that are specific to plants. (2 marks)

29. 2013 Q1 P2

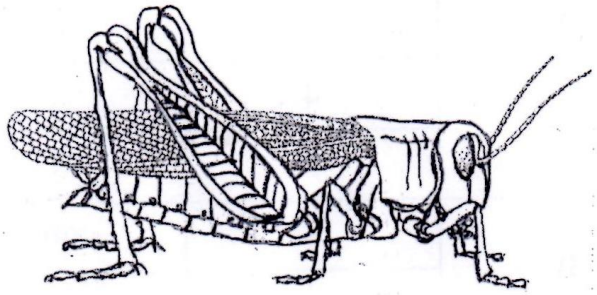
(a) The diagram below represents a plant in the division Bryophta.



i) Name the parts labelled B and D. (2 marks)

ii) State one function for each of the parts labelled A and C.

b) The diagram below represents a member of the kingdom Animalia. (2 marks)



i) Name the phylum to which the organism belongs. (1 mark)

ii) Using observable features in the diagram, give three reasons for the answer in b (i) (3 marks)

30. 2015 Q1 P1

(a) What is meant by the term binomial nomenclature? (2marks)

(b) State two guidelines that should be followed when typing scientific names. (2 marks)

31. 2015 Q16 P1

State four structural differences millipedes and centipedes (4marks)

32. 2016 Q22 P1

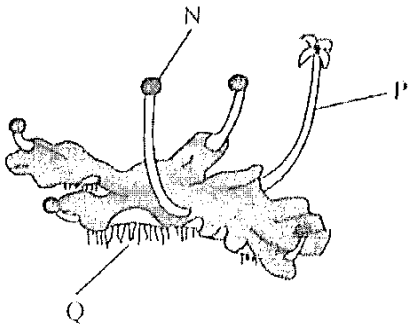
State three characteristics of the class Crustacea (3marks)

33. 2018 Q23 P1

State two characteristics of living things illustrated in the photograph below (2 marks)

34. 2018 Q5 P2

The photograph below represents a plant in a certain division



Ai)Name the division to which the plant belongs (1 mark)

ii)With reference to the photograph, state three observable features of the Division named in a (i) above (3 marks)

b)Name the parts labeled N and P

N (1 mark)

P (1 mark)

c) Explain how the part labeled Q is adapted to its functions (2 marks)

35. 2018 Q2 P1

State two observable features that place a millipede into its class (2 marks)

ECOLOGY

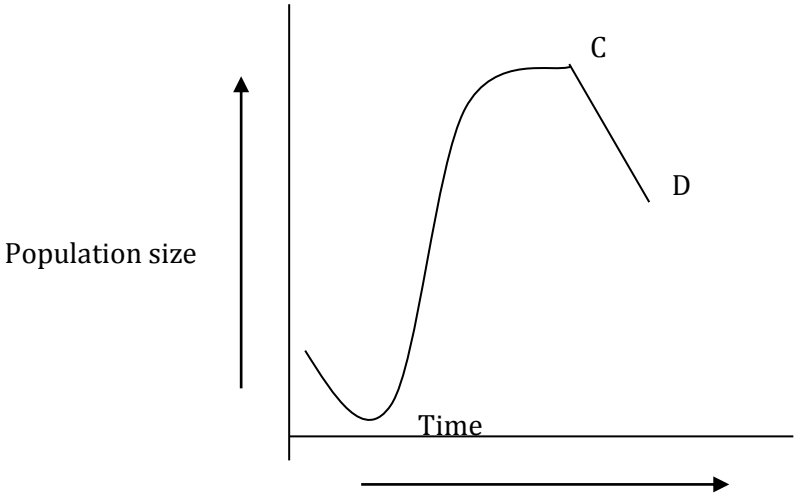
1. **1989 Q4 P1**
   State how excessive use of pesticides may affect soil fertility

2. **1989 Q8 P1**
   The table below shows a list of five human diseases. Complete the table by naming the causative agent of each.

   The first one has been completed for you.

Disease	**Causative agent**
Ringworm	Fungus
Tuberculosis	
Yellow fever	
Bilharzia	
Trypanosomiasis (sleeping sickness)	

3. **1989 Q15 P1**
   The graph below represents a population growth of a certain herbivore in grassland ecosystem over a period of time



   Suggest three factors that could have caused the population change between C and D.

4. 1989 Q17 P1

A biologist carried out a study to investigate the growth of a certain species of herbivorous bony fish and the factors influencing plant and animal life in four small lakes A, B, C, and D. The lakes were located in the same Geographical areas. Two of the lakes A and B were found to contain hard water due to presence of high contents of calcium salts. The mean bodies lengths of 2 year old fish, amount of plant life and investigate biomass in each lake were determined.

The data was as shown in the table below.

Lakes	Mean body length of two year old fish (cm)	Type of water	Amount of plant life (g/m3 of water)	Insects	Snails	Crabs	worms
A	31.2	Hard	1050	11	300	10	180
B	28.6	Hard	950	72	100	9	90
C	18.4	Soft	1.2	97	0	2	20
D	16.3	Soft	0.5	99	0	1	10

(a) Describe the procedure that may have been used to determine the mean body length of the fish.

(b) What were the likely reasons for the difference in the mean body length of the fish living in lakes A and D?

(c) Suggest one reason for the absence of snails in lake C and D.

(d) (i) Name any six abiotic (physical) factors that are likely to influence the plant and animal in life in Lake A.

(ii) Explain how each of the factors named in (d) (i) above may influence the plant and animal life in Lake A.

5. 1990 Q6 P1

Which of the following diseases that affect man are caused by viruses

- Typhoid
- Measles
- Pneumonia
- Dysentery
- Chickenpox
- Cholera
- Herpes simplex
- Poliomyelitis
- Trichomoniasis

6. 1990 Q14 P1

An investigation was carried out between 1964 and 1973 to study the changes of fish population in a certain small lake. Four species of fish A, B, C and D were found to live in this lake. In 1965, a factory was built near the lake and was found to discharge hot water in to lake raising the average temperature from 25^{o}C to 30^{o}C diverted into the lake.
In 1969, discharge of hot water, sewage and industrial waste into the lake was stopped.

The fish populations during the period of investigation are shown in the table below.

FISH SPECIES	1964	1966	1968	1970	1971	1972	1973
A	6102	223	20	106	660	4071	7512
B	208	30	11	22	63	311	405
C	36	100	0	0	0	0	0
D	4521	272	23	27	79	400	617

(a) (i) In which year were the fish population lowest?

(ii) State the factors that might have caused the lowest fish population during the year you have stated in (a) (i) above.

(iii) Explain how each factor you have state in (a) (ii) above could have brought about the changes in fish populations.

(b) (i) What is the difference in the rate of population recovery of species A and D?
(ii) Suggest two biological factors that could have led to this difference.

(c) (i) State a method that might have been used in estimating fish populations in the lake.
(ii) State one disadvantage of the method that you have stated in (c) (i) above.

7. 1991 Q7 P1
State two roles of green plants in a fish aquarium other than providing food for fish.

8. 1991 Q8 P1
State two precautionary measures which should be taken in preventing an outbreak of cholera.

9. 1991 Q10 P1
With reference to leaf structure only. Explain **FIVE** ways by which plants are adapted to living in arid areas.

10. 1992 Q3 P1
Name a water-borne disease and state a control measure for it.

11. 1993 Q3 P1

What is the biological reason for spreading oil on stagnant water in the control of malaria?

12. 1993 Q8 P1

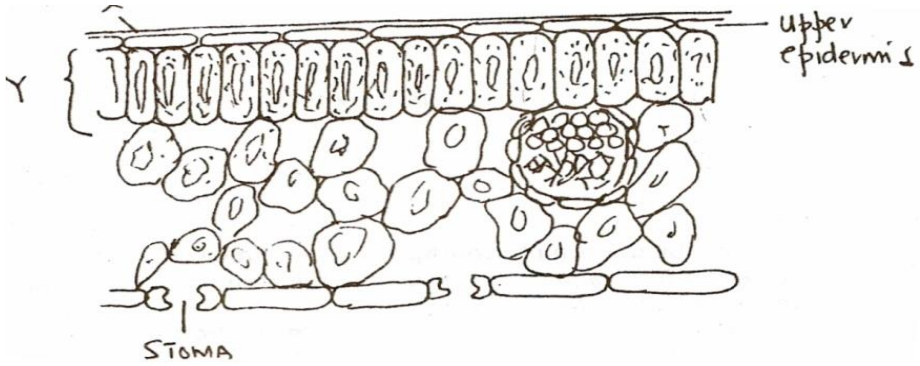
Name the disease caused by each of the following organisms.

(a) Wuchereria bancrofti (Filarial worm)

(b) Phytophthora infestans

13. 1993 Q15 P1

The diagram below represents a section through a leaf of a terrestrial plant.



(a) Explain two ways in which structures labelled X and Y are adapted to their function

(b) State the difference that would be observed between the above section and one obtained from the plant growing in fresh water habitat

14. 1993 Q19 P1

(a) Explain how food as a factor regulates the population of animals in an ecosystem.

(b) Describe the flow of energy from the sun through the different tropic levels in an ecosystem

15. 1994 Q5 P1

Explain why the biomass of primary producers is greater than that of primary consumers in a balanced ecosystem.

16. 1994 Q19 P1

(a) What is pollution?

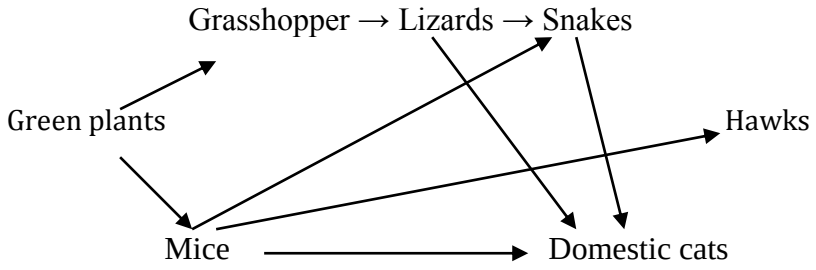
(b) State the cause and the methods of controlling pollution of;-

i. Air

ii. Water

17. 1995 Q13 P1

The chart below shows a feeding relationship in a certain ecosystem



(a) Construct two food chains ending with a tertiary consumer in each case (2 marks)
(b) Which organism has the largest variety of predators in the food web? (1 mark)
(c) Name secondary consumers in food web (2 marks)
(d) Suggest three ways in which the ecosystem would be affected in there was a prolonged drought. (3 marks)

18. 1996 Q15 P1

To estimate the population size of crabs in a certain lagoon, traps were laid at random. 400 crabs were caught, marked and released back into the lagoon. Four days later, traps were laid again and crabs were caught. Out of the 374 crabs, 80 were found to be marked.

(a) Calculate the population size of the crabs in the lagoon using the formula below

$$N = \frac{n \times M}{m}$$

Where N = Total population of crabs in the lagoon
n = Total number of crabs in the second catch
M = Number of marked crabs during the first
m= Number of marked crabs in the second catch (2 marks)

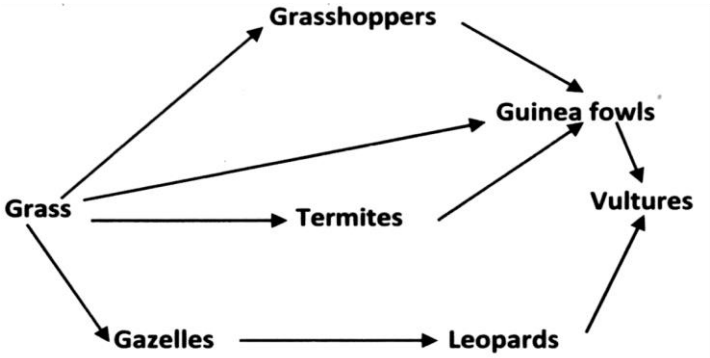
(b) State two assumptions that were made during the investigation (2 marks)
(c) What is the name given to this method of estimating the population size (1 mark)

19. 1997 Q6 P1

Oil can be applied on the stagnant water to control the spread of malaria.
(a) How does this practice control the spread of malaria? (2 marks)
(b) Give a reason why this practice should be discouraged

20. 1997 Q11 P1

The following below represents a feeding relationship in an ecosystem



(a) Write down the food chains in which the guinea fowls are secondary consumers (2 marks)

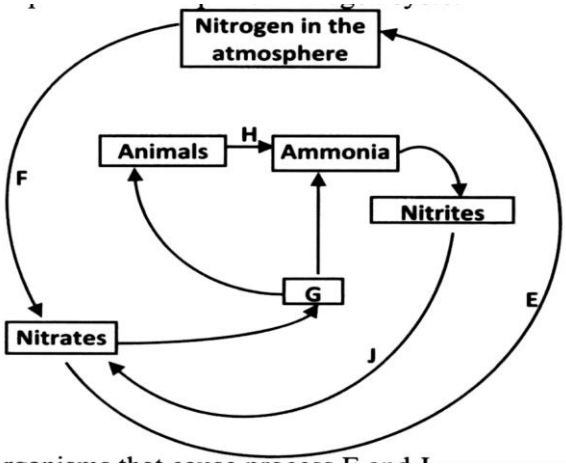
(b) What would be the short term effects on the ecosystem if lions invaded the area? (3 marks)

(c) Name the organism through which energy from the sun enters the food web.

(1 mark)

21. 1997 Q14 P1

The diagram below represents a simplified nitrogen cycle.



(a) Name the organisms that cause process E and J (3 marks)

(b) Name the process represented by F and H. (2 marks)

(c) Name the group of organism represented by G (1 mark)

22. 1997 Q19 P1

(a) What is parasitism? (2 marks)

(b) Describe how the tapeworm is adapted to a parasitic mode of life (18 marks)

23. 1998 Q5 P1

What is the relationship between leguminous plants and bacteria found in their root modules? (1 mark)

24. 1998 Q10 P1

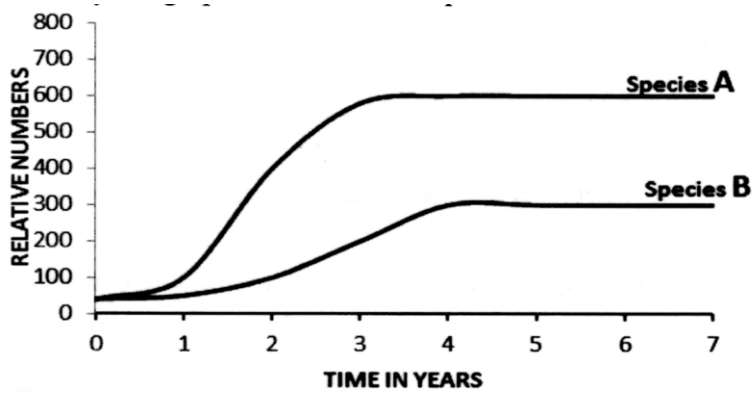
Give two reasons why primary productivity in an aquatic ecosystem decreases with depth. (2 marks)

25. 1998 Q11 P1

State two ways by which the human immuno deficiency (H.I.V) is transmitted other than through sexual intercourse? (2 marks)

26. 1998 Q15 P1

The herbivorous mammalian species were introduced into an ecosystem at the same time and in equal numbers. The graph below represents their populations during the first seven years. Study the graph and answer the questions that follow.



(a) (i) Which species has a better competitive ability? (1 mark)

(ii) Give reason for your answer (1 mark)

(b) Account for the shape of the curve species A between

(i) One year and three years (2 marks)

(ii) Three years and seven years (2 marks)

(c) A natural predator for species A was introduced into the ecosystem. With a reason state how the population of each species would be affected. (2 marks)

27. 1999 Q5 P1

Suggest three reasons why green plants are included in a fish aquarium. (3 marks)

28. 1999 Q13 P1

a) Distinguish between a community and population. (2 marks)

b) Describe how population of grasshoppers in a given area can be estimated.

(6 marks)

29. 1999 Q17 P1

Explain how the various activities of man have caused pollution of air. (20 marks)

30. 2000 Q2 P1

Give a reason why two species in ecosystems cannot occupy the same niche. (1 marks)

31. 2000 Q3 P1

State two ways in which some fungi are beneficial to humans (1 mark)

32. 2000 Q10 P1

Explain how birds of prey are adapted to obtaining their food. (2 marks)

33. 2000 Q17 P1

The numbers of different types of animals supported by a square kilometer in two terrestrial ecosystems are shown in the table below

Type of ecosystem	**Type of animal**	**Number of animals supported per sq. km**
Acacia savannah	**Domestic animals**	
	Cattle	7
	Goat	30
	Sheep	10
	Wild games	
	Thomsons's gazelles	450
	Eland	20
	Wildebeest	60
Bush land	**Domestic animals**	
	Cattle	2
	Goats	15
	Sheep	5
	Wild game	
	Thomson's gazelles	200
	Eland	12
	Wildebeest	10

(a) (i) Which domestic animal is better adapted to both ecosystems? (1 mark)

(ii) Give a reason why the animal named in (a) (i) above is better adapted to the two ecosystems. (1 mark)

(b) Why are cattle and sheep fewer in the bush land than in the savannah? (1 mark)

(c) (i) Name suitable methods that were used to estimate the population of: (2 marks)

- Domestic animals
- Wild animals

(ii) Give a reason why the method named for wild animals in (c) (i) above is Suitable (2 marks)

(d) State three methods which could be used to determine the diet

of wild animals in an ecosystem (3 marks)

(e) Name four biotic factors that could have regulated the animal population in both ecosystems (4 marks)

(f) State four human activities that affect population of animals in game Parks (4 marks)

(g) What is the importance of national park to a nation? (2 marks)

34. 2000 Q19 P1

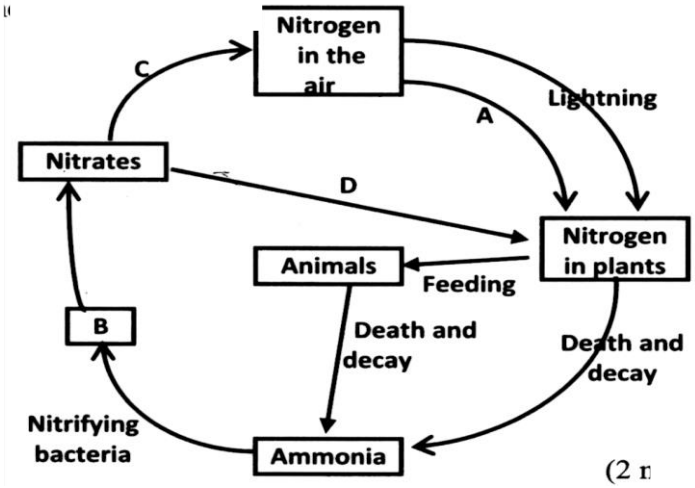
Explain how leaves of mesophytes suited to their functions? (2 marks)

35. 2001 Q2 P1

Why are green plants referred to as primary producers in an ecosystem? (2 marks)

36. 2001 Q13 P1

The diagram below represents the nitrogen cycle



(a) State the process labelled (2 marks)

A……..

D……..

(b) Name the compound represented by B (1 mark)

(c) Name the group of organisms labeled C (1 mark)

(d) (i) name the group of plants which promote process A (1 mark)

(ii) State the part of the plant where process A takes place (1 mark)

(e) How would excess pesticides in the soil interfere with process A (2 marks)

37. 2002 Q2 P1

a) Name the bacteria found in the root nodules of leguminous plant (1 mark)

b) State the association of the bacteria named in (a) above with the leguminous plants. (1 mark)

38. 2002 Q7 P1

Explain why the carrying capacity of wild animals is higher than that for cattle in a given piece of land. (1 mark)

39. 2002 Q15 P1

Ascaris lumbricoides in an example for an endo – parasite

a) The name Ascaris refers to …… (1 mark)

b) State the habitat of the organism (1 mark)

c) State three ways in which the organism is adapted to living in its habitat. (3 marks)

40. 2003 Q4 P1

a) Name the bacteria found in root nodules of leguminous plants. (1 mark)

b) What is the role of the bacteria named in (a) above? (1 mark)

41. 2003 Q10 P1

How are leaves of submerged adapted plants for photosynthesis? (3 marks)

42. 2003 Q11 P1

Name the causative agent of typhoid. (1 mark)

43. 2003 Q16 P1

a) What is meant by:

i) Autecology (1 mark)

ii) Synecology? (1 mark)

b) The number and distribution of stomata on three different leaves are shown in the table below:

Leaf	Number of stomata	
	Upper epidermis	Lower epidermis
A	300	0
B	150	200
C	02	13

Suggest the possible habitat of the plants from which the leaves were obtained (3 marks)

(c) State the modifications found in the stomata of leaf C. (3 marks)

44. 2004 Q3 P1

How is aerechyma tissue adapted to its function (2 marks)

45. 2004 Q19 P1

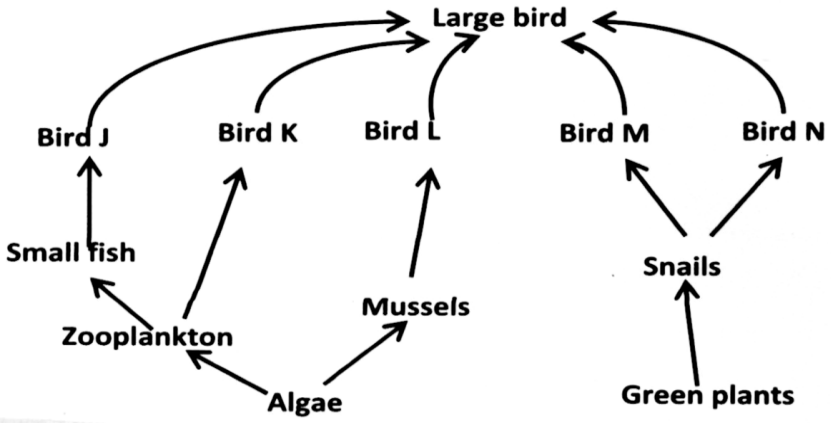
Explain how a biotic factors affect plants (20 marks)

46. 2005 Q10 P1

Name the organism that causes amoebic dysentery. (1 mark)

47. 2005 Q17 P1

After an ecological study of feeding relationships students constructed the food web below.



a) Name the process through which energy from the sun is incorporated into the food web. (1 mark)

b) State the mode of feeding of the birds in the food web (1 mark)

c) Name two ecosystems in which the organisms in the food web live (1 mark)

d) From the information in the food web, construct a food chain with the large bird as a quaternary consumer. (1 mark)

e) What would happen to the organisms in the food web if bird N migrated? (3 marks)

f) Not all the energy from one trophic level is available to the next level. Explain (3 marks)

g) (i) Two organisms which play a role in the ecosystems are not included in the food web. Name them. (2 marks)

(ii) State the role played by the organisms named in g(i) above. (1 mark)

h) i) State three human activities that would affect the ecosystems. (3 marks)

ii) Explain how the activities stated in h(i) above would affect the ecosystems. (3 marks)

48. 2006 Q16 P1

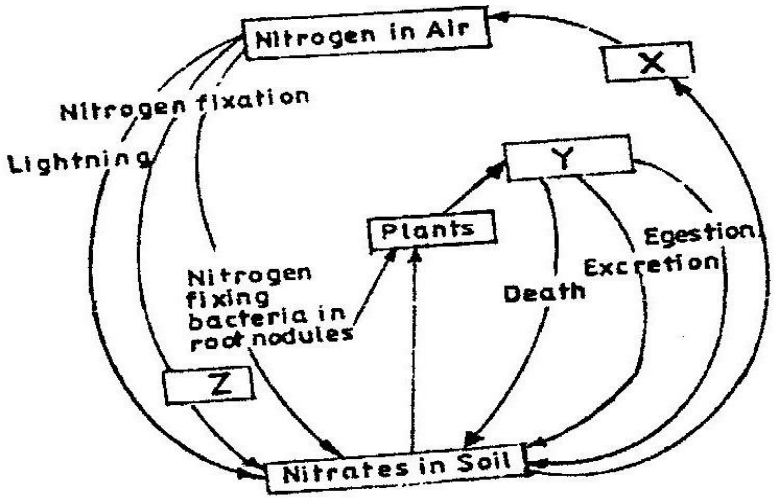
What is the importance of the following in an ecosystem? (2 marks)

a) Decomposers

b) Predation

49. 2006 Q26 P1

The chart below represents a simplified nitrogen cycle.



What is represented by X, Y, and Z? (3 marks)

50. 2006 Q3 P2

a) Distinguish between pyramid of numbers and pyramid of biomass. (2 marks)

b) Give three reasons for loss of energy from one trophic level to another in the food chain. (3 marks)

51. 2007 Q15 P1

(a) Distinguish between population and community (2 marks)

(b) Name a method that could be used to estimate the population size of the following organisms

(i) Fish in a pond (1 mark)

(ii) Black jack in a garden (1mark)

52. 2007 Q16 P1

State two ways in which schritosoma species is adapted to parasitic mode of life (2 marks)

53. 2007 Q26 P1

State one way by which HIV/AIDS is transmitted from mother to child (1 mark)

54. 2007 Q8 P2

Describe causes and methods of controlling water pollution (20 marks)

55. 2008 Q3 P1

(a) Name a disease of the liver whose symptom is jaundice (1 mark)

(b) State the causative agent of:

(i) Cholera (1 mark)
(ii) Candidiasis (1 mark)

56. 2008 Q14 P1
Describe the three characteristics of a population (3 marks)

57. 2008 Q22 P1
State two characteristics of aerenchyma tissue (1 mark)

58. 2008 Q7 P2
Describe the nitrogen cycle (20 marks)

59. 2009 Q2 P1
Name two benefits that a parasite derives from the host (2 marks)

60. 2009 Q9 P1
(a) Name the causative agents of the following diseases in humans (2 marks)
(i) Typhoid
(ii) Amoebic dysentery
(b) Name the disease in humans caused by plasmodium falciparum (1 mark)

61. 2009 Q19 P1
(a) State three effects of dumping untreated sewage into a river (3 marks)
(b) Name one process that is responsible for loss of energy from one trophic level to the next (1 mark)

62. 2009 Q20 P1
Other than using the quadrat, give two methods of estimating population of grass (2 marks)

63. 2009 Q25 P1
State two ways in which aerenchyma tissues in aquatic plants are adapted to their function (2 marks)

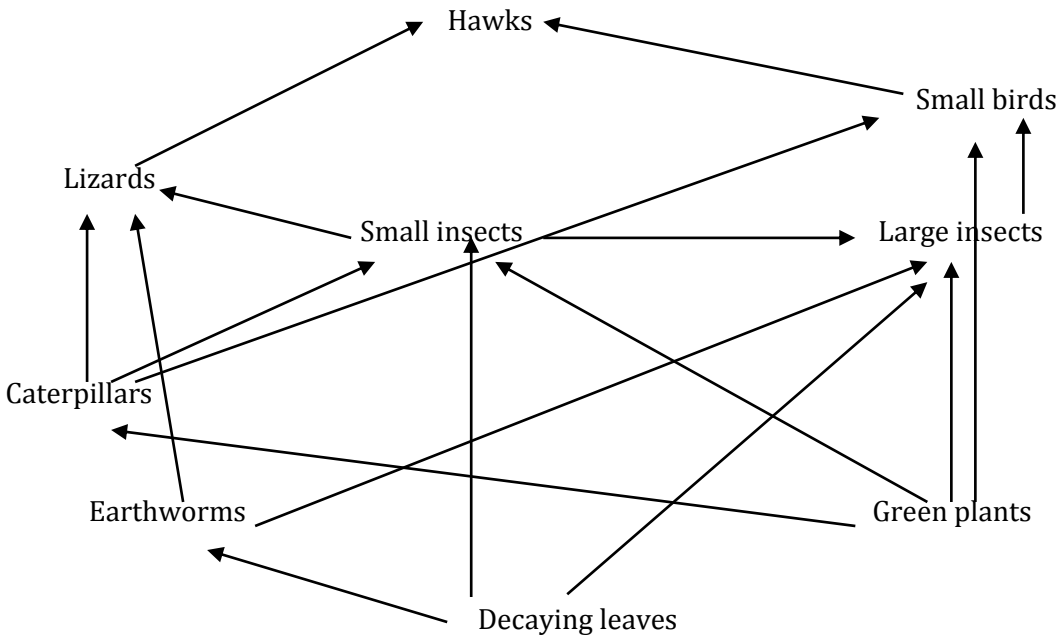
64. 2009 Q3 P2
(a) What is meant by the term biological control (1 mark)
(i) Give an example of biological control (1 mark)

(b) (i) What is eutrophication? (3 marks)
(ii) What are the effects of eutrophication (3 marks)

(c) Name a substance that is responsible for acid rain (1 mark)

65. 2010 Q13 P1
What is meant by the following term?
a) Habitat; (1 mark)
b) Ecosystem (1 mark)

66. 2010 Q3 P2
The diagram below represents a food web in certain ecosystem



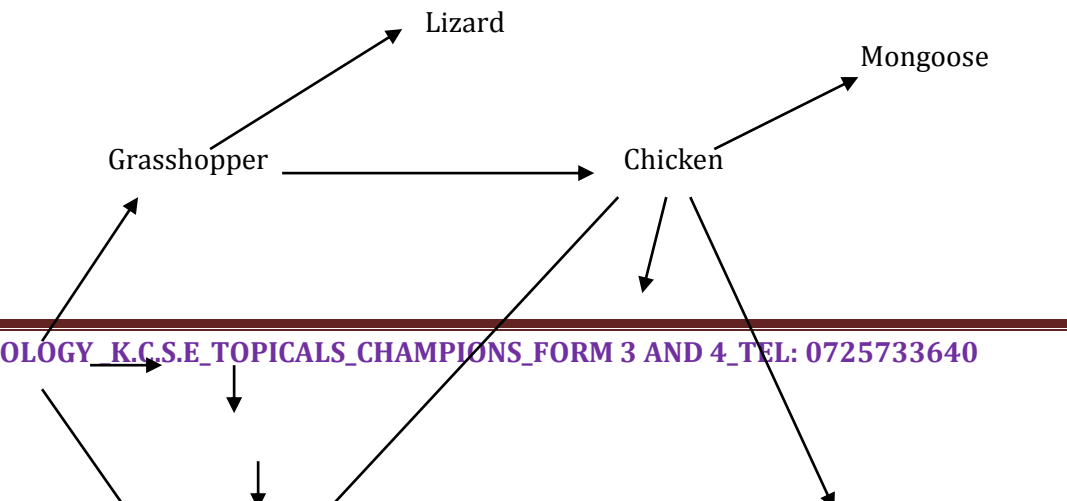
a) Name the trophic level occupied by each of the following:
   i) Caterpillars (1 mark)
   ii) Small insect. (1 mark)

b) From the food web, construct **two** food chains which end with lizards as a tertiary consumer. (2 marks)

c) i) Which organisms have the least biomass in this ecosystem? (1 mark)
   iii) Explain the answer in (c)(i) above.

67. 2011 Q5 P1

The figure below illustrates a food web in a certain ecosystem.



Human

Grass Termites

Weaver bird

Hawk Vulture

Sheep Hyena

From the food web:

a) Draw the shortest food chain; (1 mark)

b) Identify the organisms with the highest

i) number of predators; (1 mark)

ii) biomass (1 mark)

68. 2011 Q6 P1

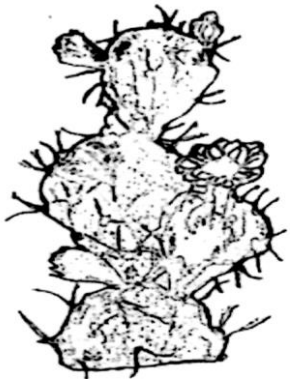
What is meant by the following terms?

a) Ecology (1 mark)

b) Carrying capacity (1 mark)

69. 2011 Q14 P1

The diagram below represents a certain plant.



(a) What is the likely habitat for the plant (1mark)

(b) Give two reasons for your answer in (a) above (2marks)

70. 2012 Q5 P1

The table below shows results of a study of three plants C, D and E growing in different habitats

feature	**Plant C**	**Plant D**	**Plant E**
number of stomata on upper surface of leaf per square area	4	20	6
number of stomata on lower surface of leaf per square area	6	0	8
Thickness of leaf cuticle (mm)	0.4	0.1	0.2

Surface area of roots (cm^2)	2000	1000	1200

a) Which one of the plants C, D and E grows in an area of relatively low water availability? (1mark)

b) Explain your answer in (i) above (1mark)

71. 2012 Q21 P1

Name the process through which free atmospheric nitrogen is converted into nitrates. (1mark)

72. 2012 Q6 P2

The data provided below represent populations of a predator and its prey over a fifty years period.

TIME IN YEARS	**POPULATION IN RELATIVE NUMBERS**	
	POPULATION OF P	**POPULATION OF Q**
5	24500	17000
10	30000	20500
15	33500	26000
20	33500	30000
25	31000	33000
30	27000	32000
35	25000	30000
40	29000	27500
45	32500	28000
50	34000	28500

(a) (i) Using the same axes, draw graphs of the relative populations of **P** and **Q** against time. (7 marks)

(ii) With a reason, identify the curve that represents the prey. (2 marks)

(iii) Account for the two populations between 25 and 32 years. (2 marks)

(iv) Which years were the two populations equal? (2 marks)

(v) Apart from predation, state **three** biotic factors that may have led to the decline of the prey population. (3 marks)

(b) Describe the hazards of air pollution by Sulphur(IV)Oxide. (9 marks)

73. 2014 Q6 P2

An experiment was done to determine the uptake of nitrogen from the soil by broad bean seedlings. The experiment was done with one set of seedlings M grown in the atmosphere enriched with carbon (IV) oxide and another,

set up of seedlings N grown in the normal atmosphere.

The amount of nitrogen in each seedling was measured in milligrams at intervals of ten days. The table below shows the results obtained.

Amount of nitrogen in milligrams

SET M	0	25	70	125	160	395	635	860	895	915
SET N	0	15	35	50	65	105	120	125	135	140
TIME (DAYS)	15	25	35	45	55	65	75	85	95	105

(a) Using the same axis draw line graphs of nitrogen uptake by the two (**M** and **N**) sets of broad bean seedlings against time. (8 marks)

(b) Determine the rate of uptake of nitrogen in Set **M** between 65 and 85 days.
(2 marks)

(c) i) What is the relationship between carbon (IV) oxide concentration in the air and nitrogen uptake?
(ii) Account for the relationship in (c) (i) above (3 marks)

(d) i) What would happen to the concentration of nitrogen in the seedlings in set **M,** if after 75 days the seedlings are transferred to a normal atmosphere (1 mark)

ii) Explain your answer in (d) (i) above (2 marks)

(e) State **three** ways in which nitrogen fixation occurs (3 marks)

74. 2015 Q8 P1

a) Name the organism that:
i) Causes malaria (1 mark)
ii) Transmists malaria (1 mark)

b) State two control measueres for malaria (2 marks)

75. 2015 Q12 P1

a) What is meant by each of the following:

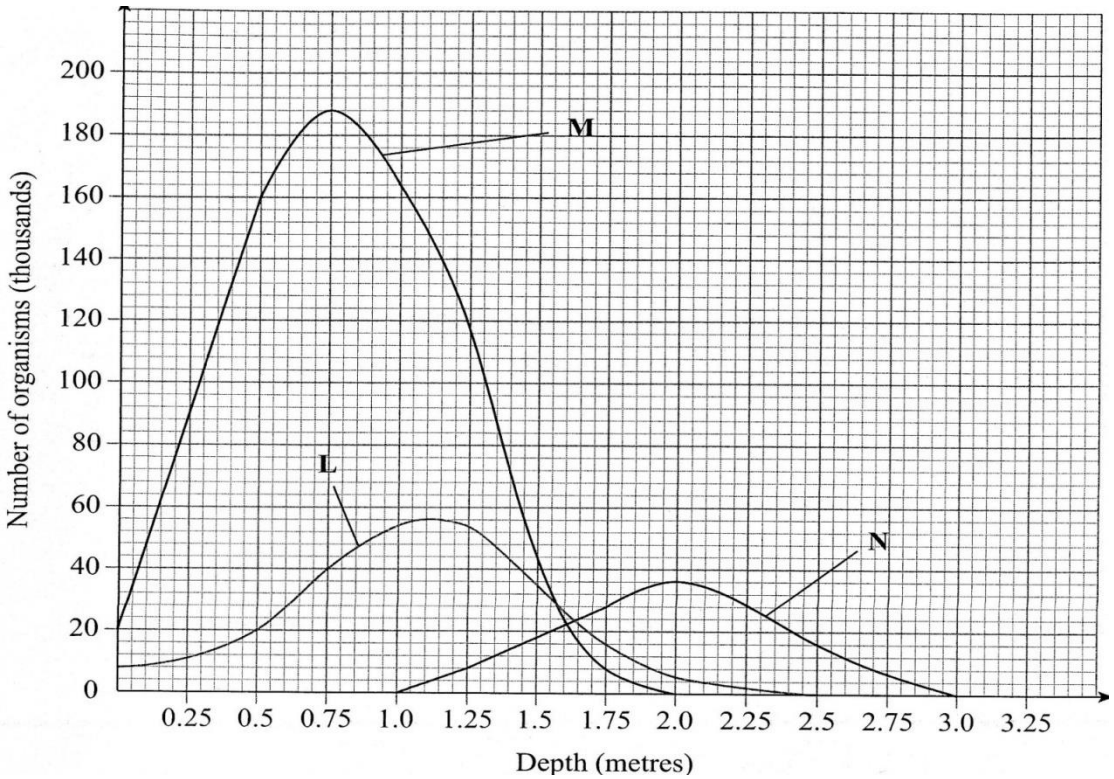
i. Pyramid of biomass? (1 mark)

ii. Pyramid of numbers? (1 mark)

b) During an ecological visit to the savanna grassland, students were able to see lions, antelopes, vultures and pastoralists grazing their cattle. Construct a food chain with four counmder levels to illustrate the energy flow in the ecosystem. (2 marks)

76. 2015 Q6 P2

The graph below shows the relative numbers of three main species of organisms in a pond



a) Giving a reason for your answer, which of the species is a

(i)Producer? (1 mark)

Reason (1mark)

(ii)Secondary consumer? (1mark)

Reason (1 mark)

b) Staste the depths at which each of the populations labeled L, M and N is at its optimum.

L (1 mark)

M (1 mark)

N (1 mark)

c) (i) Which method may have been used to determine the population of organisms labeled N in the pond? (1 mark)

(ii) Give a reason for your answer in (c) (i) above (1 mark)

(iii)State the assumptions made when using the method in (c) (i) above (4 marks)

d) State two reasons why primary productivity in the pond decreases with depth. (2 marks)

e) Explain the ecological importance of fungi to plants (2 marks)

f) Why is flooding likely to lead to a cholera outbreak? (3marks)

77. 2016 Q11 P1

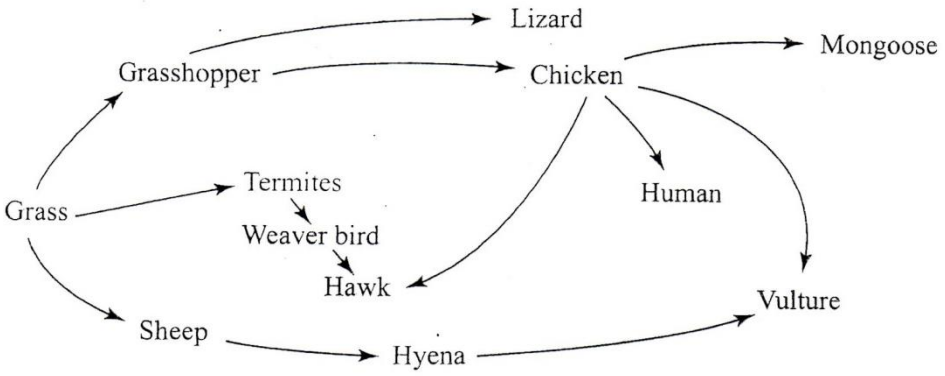
Name two benefits that a parasite derives from its host. (2 marks)

78. 2016 Q12 P1

Other than using a quadrat give two methods that can be used to estimate the population of grass (2 marks)

79. 2016 Q21 P1

The figure below illustrates a food web in a certain ecosystem



From the food web

a)Draw the shortest food chain (1 mark)

b) Identify the organism with the highest

i)Number of predators (1 mark)

ii)Biomass (1 mark)

80. 2018 Q13 P1

State two limitations of using a quadrate to estimate the population of organisms (2 marks)

REPRODUCTION IN PLANTS

1. 1990 Q5 P1

Fill in the blank spaces in statement below.

After fertilization of an ovule……develops in to a testa and……..develops into endosperm.

2. 1991 Q12 P1

(a) State the type of sexual reproduction in each of the following organisms.

(i) Hydra

(ii) Moss (funari)

(b)State two advantages of sexual reproduction to the survival of a species.

(c)State two ways in which man has utilized vegetative reproduction in plants for his own benefits.

3. 1992 Q8 P1

Name two mechanisms that prevent self-pollination in flowers that have both male and female parts

4. 1995 Q16 P1

Describe how insect pollinated flowers are adapted to pollination (11 marks)

5. 1996 Q9 P1

State three characteristics that ensure cross – pollination takes place in flowering plants (3 marks)

6. 1996 Q22 P1

Describe how new plants arise by asexual reproduction (20 marks)

7. 1998 Q8 P1

A flower was found to have the following characteristics:

Inconspicuous petals

Long feathery stigma

Small, light pollen grains

(a)What is the likely agent of pollination of the flower (1 mark)

(b)What is the significance of the long feathery stigma in the flower? (1 mark)

8. 1999 Q8 P1

State two disadvantages of self-pollination. (2 marks)

9. 2001 Q4 P1

Name the parts of the flower that are responsible the production of gametes (2 marks)

10. 2001 Q18 P1

(a) Describe the process of fertilization in a flowering plant (15 marks)

(b) State the changes that take place in a flower after fertilization (5 marks)

11. 2002 Q17 P1

a) What structures are produced by sisal for vegetative propagation?

b) Give a reason for grafting in plants

c) State four advantages of vegetation propagation.

12. 2003 Q3 P1

How do the male gamete nuclei reach the ovule after pollen grains land on the stigma? (1 mark)

13. 2003 Q19 P1

Describe how fruits and seeds are suited to their modes of dispersal. (20 marks)

14. 2004 Q11 P1

Fruit formation without fertilization is called…….. (1 mark)

15. 2004 Q15 P1

a) Give the differences between the following structures in wind and insect pollinated flowers. (3 marks)

i) Anther
ii) Pollen grains
iii) Stigma (1 mark)

b) What is the importance of cross pollination? (1 mark)

c) Explain how a seed is formed after an ovule is fertilized (4 marks)

16. 2005 Q15 P1

a) What is meant by the terms

(i) Epigymous flower (1mark)
(ii) Staminate flower? (1 mark)

b) How are the male parts of wild pollinated flowers adapted to their function?

(4 marks)

17. 2006 Q2 P1

Name the part of the flower that develops into

a) Seed
b) Fruit (1mark)

18. 2006 Q19 P1

a) Explain how the following prevent self pollination. (1mark)

(i) Protoadry
(ii) Self – sterility.

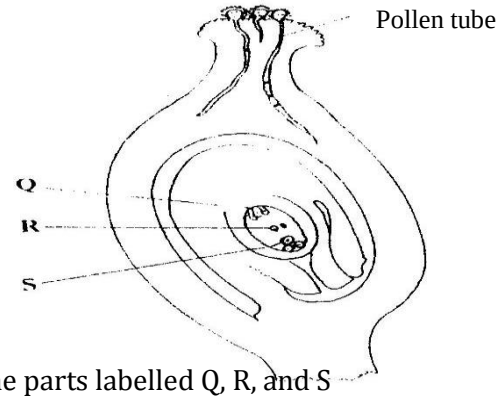
b) Give three advantages of cross pollination. (3marks)

19. 2007 Q3 P2

(a)What is meant by the following terms

(i) Protandry (1 mark)
(ii) Self sterility? (1 mark)

(b)The diagram below shows a stage during fertilization in a plant



(i) Name the parts labelled Q, R, and S (3 marks)
(ii) State two functions of the pollen tube (2 marks)

(c) On the diagram label the micropyle (1 mark)

20. 2008 Q8 P1

The diagram below shows a stage in mitosis in a plant cell

(a) Name the stage of mitosis (1mark)
(b) Give two reasons for your answer in (a) above (2 marks)
(c) Name the part of the plant from which the cell used in preparation was obtained (1 mark)

21. 2008 Q28 (b) P1

Distinguish between protandry and protogyny (2 marks)

22. 2009 Q7 P2

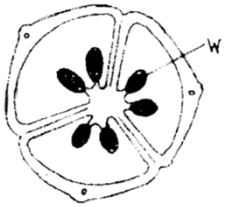
How are flowers adapted to wind and insect pollination? (20 marks)

23. 2010 Q7 P2

Describe the process of fertilization in flowering plants. (20 marks)

24. 2011 Q23 P1

The diagram below represents a transverse section of an ovary from a certain flower.



(a) (i) Name the structure labelled W. (1 mark)
(ii) Name the type of placentation illustrated in this diagram. (1 mark)

(b) Give an example of a plant whose flowers have the type of placentation

Named in (a)(ii) above. (1 mark)

25. 2011 Q5(a) P1

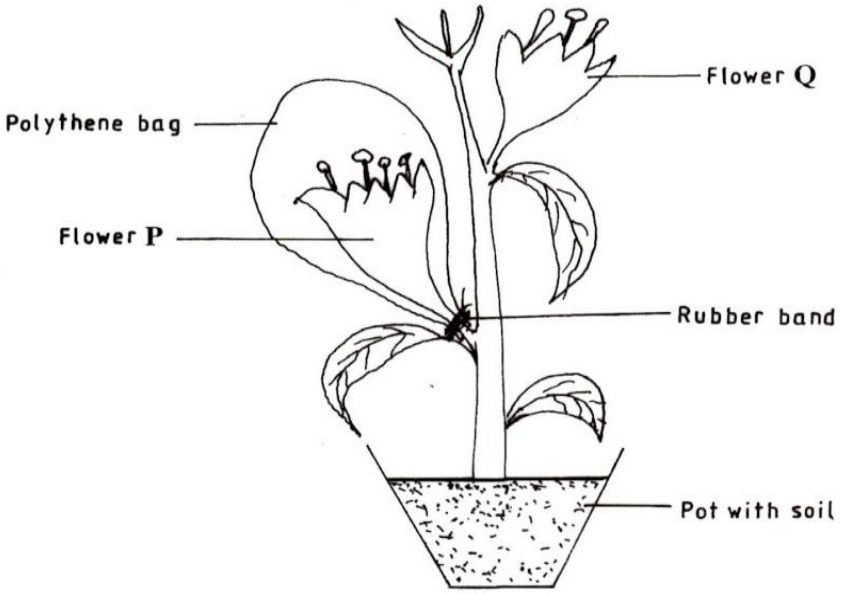
The diagram below represents a flower

(i) On the diagram, name two structures where meiosis occurs. (2 marks)

(ii) How is the flower adapted to prevent self-pollination? (2 marks)

26. 2012 Q16 P1

The diagram below represents an experimental set-up used by students to investigate a certain process.



Flower Q produced seeds while P did not. Account for the results. (3 marks)

27. 2013 Q17 P1

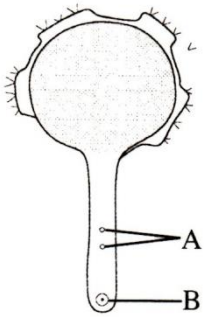
Name three mechanisms that ensure cross pollination takes place in flowering plants. (3 marks)

28. 2013 Q17 P1

Name the flower part that produces gametes. (1 mark)

29. 2014 Q4 P1

The diagram below illustrates a growing pollen tube



a) Name the part labeled **B** (1 mark)

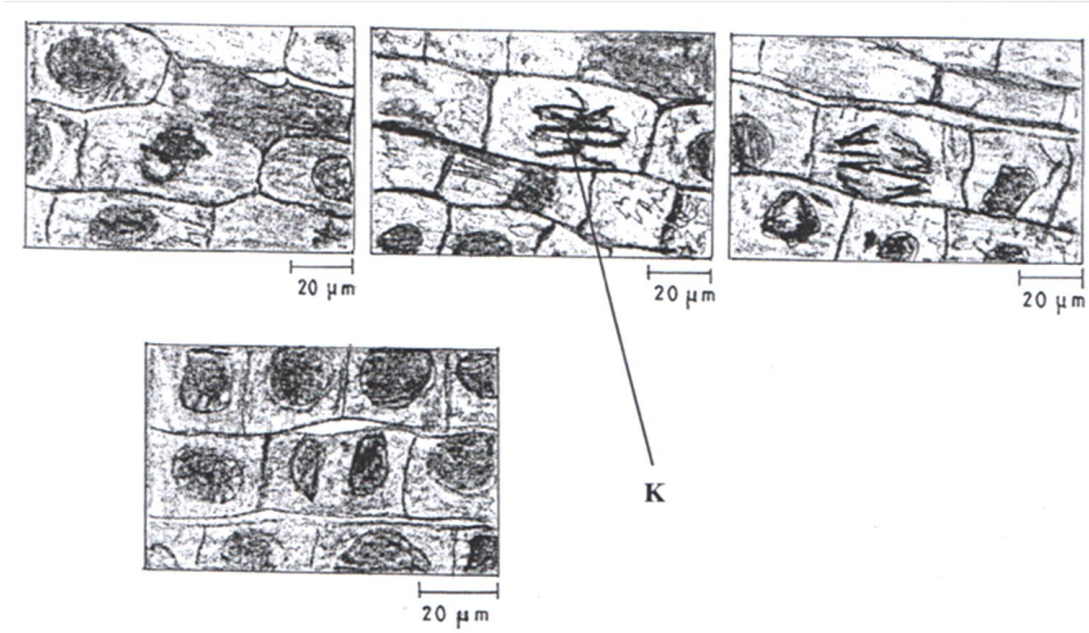
b) Explain the role of the parts labeled **A**. (2 marks)

30. 2014 Q1a P2

State **four** characteristics of fruits dispersed by animals. (4 marks)

31. 2015 Q15 P1

The photomicrographs below shows the various stages of cell division in a certain plant.



(a) (i) Name the type opf cell division illustrated (1mark)

(ii) Give a reason for your answer in (a) (i) above (1mark)

(b) (i) Name the stage of cell division labeled K. (1mark)

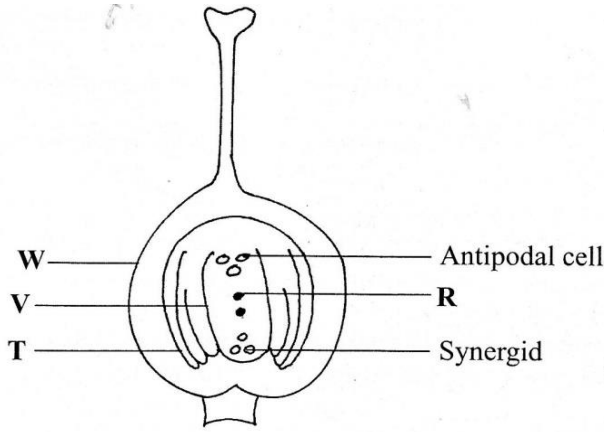
(ii) Give a reason for your answer in (b) (i) above (1 mark)

33. 2015 Q7 P2

Explain the various ways in which seeds and fruits are adapted to dispersal (20 marks)

32. 2015 Q3 P2

The diagram below illustrates the structure of the female part of a flower



a) Name the part labeled W (1 mark)

b) Describe what happens when the pollen tube enters the structure labeled V (5 marks)

c) What do the structures labeled R and T develop into after fertilization? (2 marks)

34. 2016 Q7 P1

Explain how the following prevent self pollination

i)Protandry (1 mark)

ii)Self sterility (1 mark)

35. 2018 Q7 P2

a)Describe the mode of reproduction in a named fungus (5 marks)

36. 2018 Q3 P3

You are provided with a specimen labeled H. With the aid of a hand lens, examine the external features of the specimen.

a i)What part of a plant is specimen H? (1mk)

ii)Give two reasons for your answer in (a) (i) above (2mks)

b) Open up specimen H Longitudinally

Use a hand lens to observe the internal structures of specimen H.

i)Draw and label the internal cut surface and associated structures of specimen H. (5 mks)

ii)Explain how you would determine the magnification of the drawing made in (b) (i) above (2mks)

iii)State the mode of dispersal for seeds of specimen H. (1mk)

iv)Explain how seeds of specimen H are dispersed through the mode stated in (b) (iii) above (3 mks)

REPRODUCTION IN ANIMALS

1. **1989 Q5 P1**

   The table below shows two mammalian hormones. For each hormone, state the site of production and its function in the body.

Hormone	**Site of production**	**function**
Oestrogen		
Aldosterone		

2. **1989 Q10 P1**

   At what stage of mitosis do chromosomes replicate to form daughter chromatids?

3. **1990 Q8 P1**

   State the differences between the composition of maternal blood entering the placenta and maternal blood leaving the placenta.

4. **1991 Q3 P1**

   After four months of pregnancy, the ovaries of a woman can be removed without terminating pregnancy. However, during the first four months of pregnancy, the ovaries must remain intact if pregnancy is to be maintained. Explain these observations.

5. **1993 Q11 P1**

   The diagram below represents some stages in mitosis

(a) Name the stages represented by the diagrams labeled A,B and C
(b) State the significance of mitosis to an organism.
(c) Name two regions in higher plants where cells actively undergo mitosis

6. 1995 Q16(b) P1

Describe the role or each of the following hormones in the human menstrual cycle
(i) Oestrogen
(ii) Progesterone
(iii) Luteinising hormone (9 marks)

7. 1996 Q12 P1

Give a reason why it is necessary for frogs to lay many eggs (1 mark)

8. 1997 Q17 P1

Figures 1 and 2 below represent reproductive organ of plants and an animal respectively.

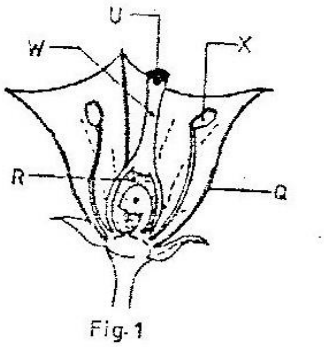


Fig. 1

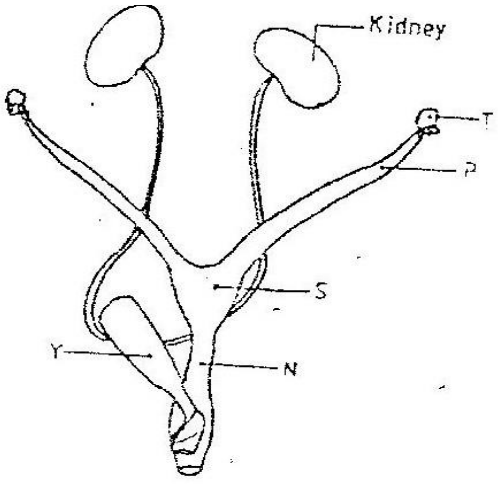


fig 2

(a)Which letters in figures 1 and 2 represents the organs that produce female gametes? (2 marks)

(b) What is the function of the structure labeled S? (1 mark)

(c) Name the structure labeled W (1 mark)

(d)Which letters in figures 1 and 2 represents the structures where fertilization takes Place (2 marks)

(e)Which letter in figure 1 represents the structure where male gametes are produced? (1 mark)

9. 1998 Q13 P1

(a) List four differences between meiosis and mitosis (4 marks)

(b) Which sex chromosomes are found in human? (2 marks)

(i) Sperm cell?

(ii) Ova?

10. 1999 Q3 P1

Explain why sexual reproduction is important in organisms (2 marks)

11. 2000 Q16 P1

(a) What is the significance of sexual reproduction? (1 mark)

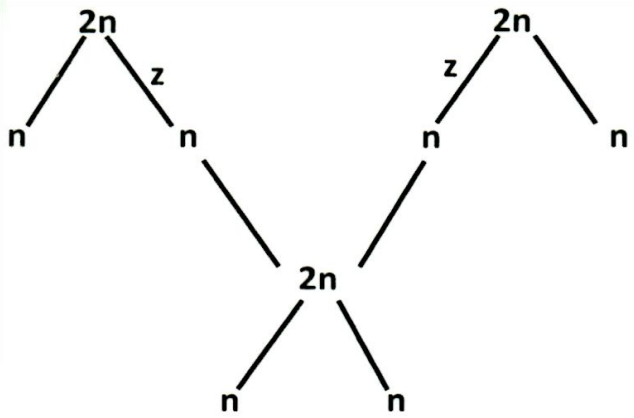
(b) State three advantages of asexual reproduction (3 marks)

12. 2000 Q18 P1

Describe the role of hormones in the human menstrual cycle (20 marks)

13. 2002 Q13 P1

The chart below shows the number of chromosomes before and after cell division and fertilization in a mammal.



a) What type of cell division takes place at Z

b) Where in the body of a female does process Z occur

c) On the chart, indicate the position of parents and gametes

d) Name the process that leads to addition or loss of one or more chromosomes.

e) State three benefits of polyploidy in plants to a farmer

14. 2004 Q5 P1

During which phase of meiosis does crossing over occur. (2 marks)

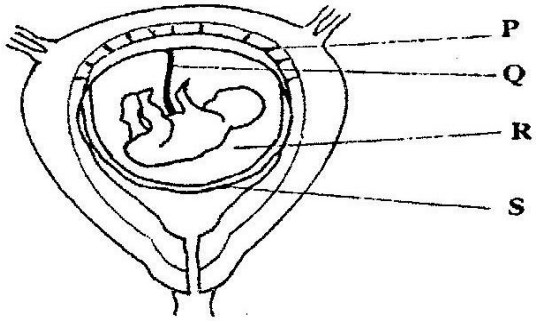
15. 2006 Q9 P1

a) State two processes which occur during anaphase of mitosis. (2marks)

b) What is significance of meiosis? (2marks)

16. 2006 Q5 P2

The diagram below represents human foetus in a uterus.



a) Name the part labelled S. (1mark)

b) i)Name the types of blood vessels found in the structure labeled Q. (2marks)

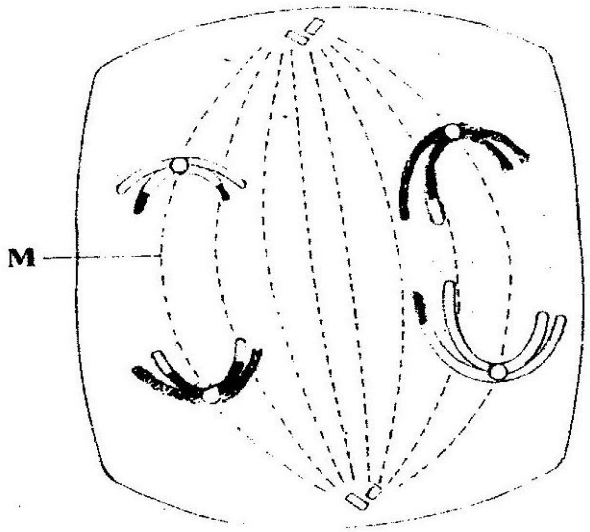
ii) State the differences in composition of blood found in the vessels named in (b)(i) above. (2 marks)

c) Name two features that enable the structure labeled P carry out its function. (2marks)

d) State the role of the part labeled R (1mark)

17. 2007 Q17 P1

The diagram below represents a stage during cell division



(a) (i) Identify the stage of cell division (1 mark)

(ii) Give three reasons for your answer in (a) (i) above (2 marks)

(b) Name the structures labeled M (1 mark)

18. 2007 Q18 P1

State two disadvantages of sexual reproduction in animals (2 marks)

19. 2008 Q28 P1

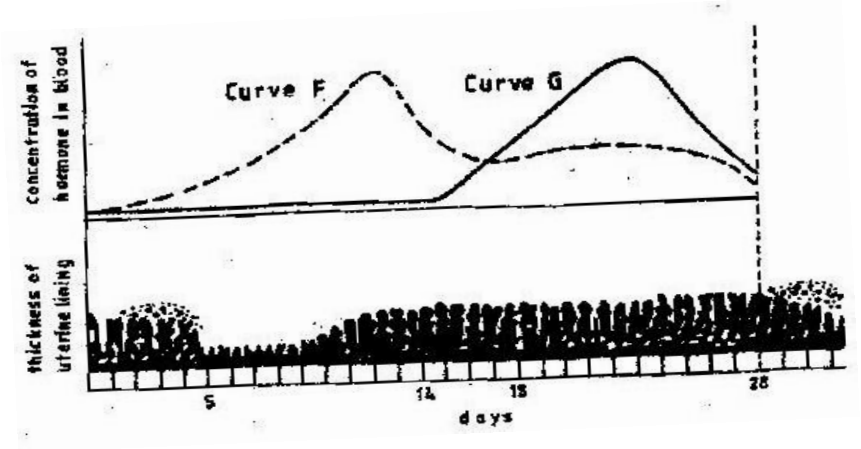
State he mode of asexual reproduction in yeast (1 mark)

20. 2008 Q18 P1

State afunction of amniotic fluid. (1 mark)

21. 2008 Q1 P2

The figure shows changes that take place during menstrual cycle in human



(a) Name the hormone whose concentrations are represented by curves F and G (2 marks)

(b) State the effects of the hormones named in (a) above on the lining of the uterus (2 marks)

(c) (i) Name the hormone which is released by the pituitary gland in high concentration on the 14th day of the menstrual cycle (1 mark)

(ii) State two functions of the hormone named in (c) (I) above (2 marks)

(d) State the fertile period during the menstrual cycle (1 mark)

22. 2009 Q8 P1

(a) Pregnancies continues if the ovary of an expectant mother is removed after 4 months explain (2 marks)

(b) What is the role of the testes in the mammalian reproductive systems? (2 marks)

23. 2010 Q20 P1

State **two** advantages of internal fertilization in humans. (2 marks)

24. 2010 Q22 P1

What is the function of the following structure in the human reproductive organ?

a) Fallopian tubes. (1 mark)
b) Epididymis. (1 mark)
c) Scrotal sac (1 mark)

25. 2011 Q26 P1

Name the gamete cells that are produced by the ovaries (1 mark)

26. 2011 Q4 (b) P1

(i) Name two reproductive hormones secreted by the pituitary gland in women (2marks)

(ii) State one function of each of the hormones named in (b) (i) above (2marks)

27. 2012 Q15 P1

What name is given to a group of hormones that controls the development of secondary sexual characteristics in a human male? (1 mark)

27. 2012 Q17 P1

Name two substances that leave the foetal blood through the placenta. (2 marks)

28. 2012 Q25 P1

State the role of the following hormones in the life cycle of insects: (2 marks)

Ecdsone hormone;

Juvenile hormone

29. 2013 Q18 P1

How is the human sperm cell structurally specialized? (2 marks)

30. 2014 Q3 P1

State two functions of the placenta in mammals (2 marks)

31. 2014 Q18 P1

Explain why

(a)Mammalian testes are located to hang outside the body (2 marks)

(b) Four months after fertilization, ovaries can be removed from a human female, without terminating pregnancy. (2 marks)

32. 2014 Q25 P1

State **two** roles of luteinising hormones in human reproduction. (2 marks)

33. 2014 Q1b P2

State **two** roles of each of the following hormones in menstruation:

(i) Luteinising hormone (2 marks)

(ii) Oestrogen. (2 marks)

34. 2015 Q13 P1

State three differences between the end products of mitosis and meiosis. (3marks)

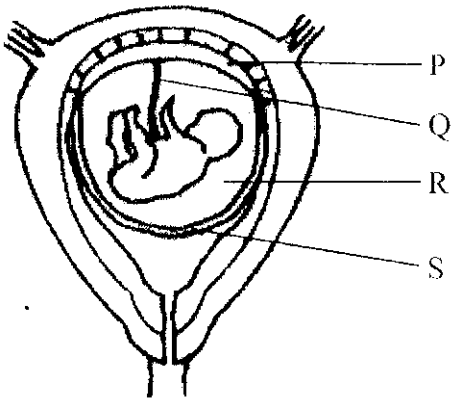
34. 2016 Q10 P1

a) Name two structures of gaseous exchange in aquatic plants (2 marks)

b) What is the effect of contraction of the diaphragm muscles during breathing in mammals (3marks)

34. 2016 Q1 P2

The diagram below represents a human foetus in a uterus



a) Name the part labeled S. (1marks)

b) i)Name the types of blood vessels found in the structure labeled Q. (2 marks)

ii) State the difference in composition of blood found in the vessels named in (b) (i) above (2marks)

c) Name two features that enable the structure labeled P to carry out its function.(2 marks)

d) State the role of the part labeled R. (1mark)

35. 2018 Q7 P2

b) Describe the role of hormones in the human menstrual cycle (15 marks)

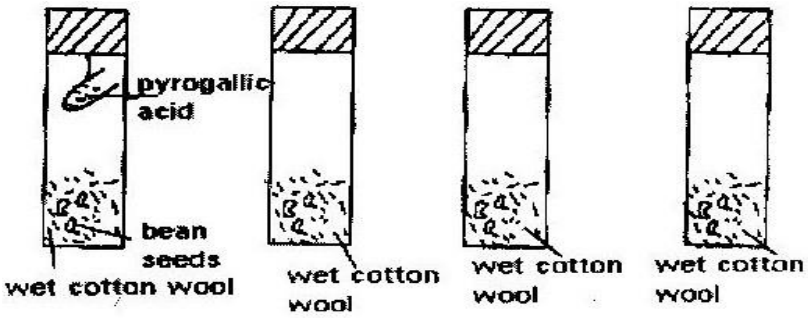
GROWTH AND DEVELOPMENT

1. 1989 Q9 P1

Explain why several auxillary buds sprout when a terminal bud in a young tree is removed.

2. 1990 Q11 P1

In an experiment, a group of students set up four glass jars as shown in the diagram below. Jar A, B and C were maintained at 25 for 7 days, while jar D was maintained at 0 for the same period of time.



(a) What was this set up supposed to investigate?

(b) Why was pyrogallic acid included in glass jar A

(c) Explain why glass jar C and D were included in the experiment?

(d) What result would you expect in glass jar A and B at the end of the experiment?

(e) State two artificial ways of breaking seed dormancy.

3. 1990 Q16 P1

(a) Describe the secondary thickening in flowering plants.

(b) Describe one method, which can be used to measure the average growth rate of a single leaf plant.

4. 1992 Q15 P1

Removal of the apical bud from the shrub is a practice that results in the development of the lateral buds which later form the branches.

(a) Give reasons for the development of the lateral branches after the removal of the Apical bud

(b)Suggest one application of this practice?

(c) What is the importance of this practice?

5. 1993 Q16 P1

In an experiment some germination seeds were placed in a large airtight flask left for four days.

(a) Suggest the expected changes in the composition of gases in the flask on the fifth Day.

(b) Give your reasons for your answer in (a) above.

(c) Name two factors that cause dominancy in seeds

6. 1993 Q17 P1

In an experiment, maize grains were soaked in different concentrations of solutions X for 24 hours. In the control experiment the seeds were soaked in distilled water for the same time. The seeds were placed on moist cotton wool in different Petri dishes. They germinated and grew for ten days. After which the percent germination was determined.

The average lengths of shoots and roots were also determined. The results were as shown in the tables A and B below.

Concentration of days Solution X(%)	**% germination**	**Growth of seedlings after 10 (average length in mm)**	
		Shoots	**roots**
80	33	3	8
60	52	5	9
40	95	7	17
20	87	16	38
10	92	28	40
Distilled water	75	18	64

Table B

Concentration of days Solution X(%)	**% germination**	**Growth of seedlings after 10 (average length in mm)**

		Shoots	roots
80	0	0	0
60	0	0	0
40	12	3	4
20	42	4	5
10	90	12	42
Distilled water	95	29	63

(a) What was the effect of solution X on
   i. Germination of the maize grains
   ii. Growth maize seedlings

(b) Compare the growth of seedlings whose grains were previously soaked in 80% of Solution Y

c) Explain how percent germination in this experiment was determined.

d) From the results in tables A and B what other conclusions can be drawn about solution X and Y?

e) Other than moisture and solution X and Y what other conditions were necessary for germination of the maize grains?

f) State two ways in which indoleacetic acid (IAA) influences growth in plants.

7. 1994 Q7P1

Account for loss in dry weight of cotyledons in a germinating bean seed.

8. 1994 Q10 P1

What is the effect of gibberellins on shoots of plants?

9. 1994 Q 18 P1

In an experiment to investigate the effect of heat on germination of seeds, eleven bags each containing 50 bean seeds was placed in a water bath maintained at 90%. After 2 minutes, a bag was removed and the seeds contained were planted. The number that germinated was recorded.

The procedure used for the beans was repeated for Acacia seeds.
The results obtained were as shown in the table below.

Number of seeds that germinated

Time (min)	Beans seeds	Acacia seeds
0	50	0
2	50	0
4	46	1
6	35	2
8	10	28
10	1	36
12	0	41

14	0	44
16	0	47
18	0	48
20	0	50

(a) Using a suitable scale and on the same axes draw graphs of time in hot water against number of seeds that germinated for each plant. Use the horizontal axis for the seeds that germinated.

(b) (i) After how many minutes would you expect 50% of acacia seeds exposed to the hot to germinate?

(ii) What was the minimum number of minutes after exposure of beans to hot water was there no germination?

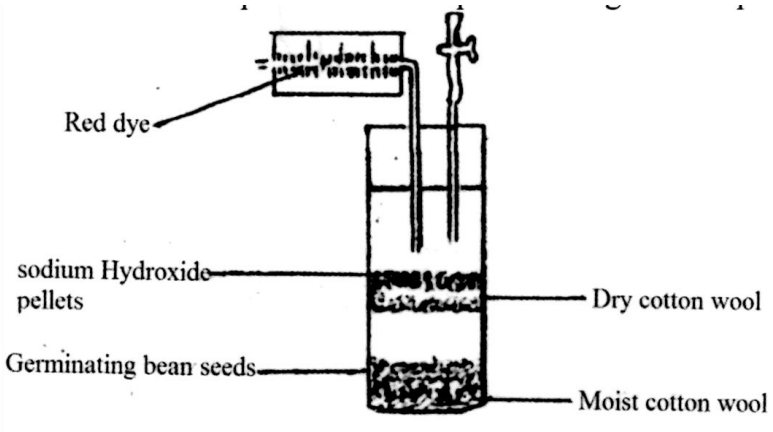
(c) From the graphs, which one of the two types of seeds was more sensitive to heat influence on germination? Give reasons for your answer.

(d) Explain why the ability for the
(i) Beans seeds to germinate declined with time of exposure to heat
(ii) Acacia seeds to germinate improved with time of exposure to heat.

(e) What results would be expected if the temperature of water was maintained at
$100^{o}C$……
$5^{o}C$……

10. 1995 Q12 P1

The diagram below show an experiment set up to investigate aspect germination

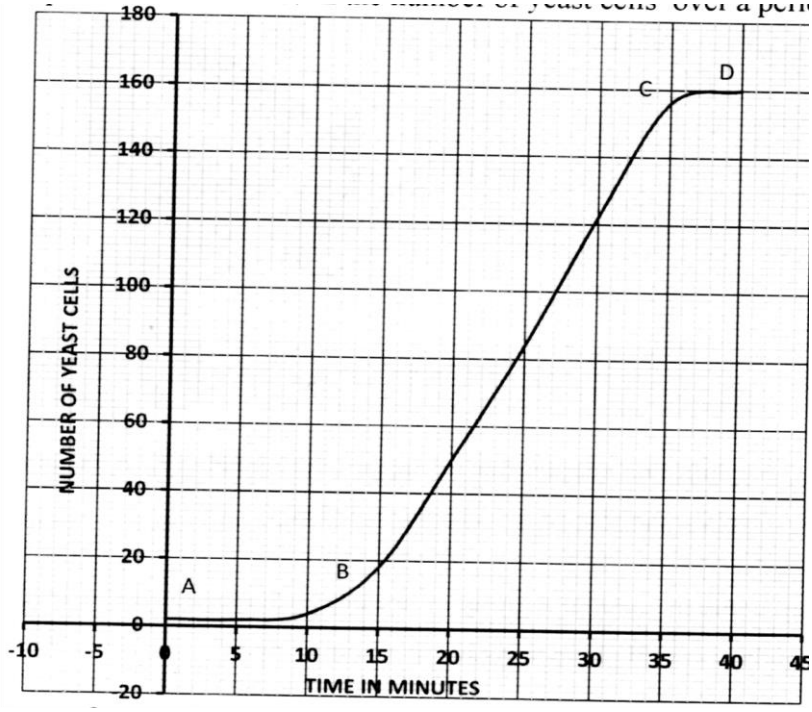


(a) Why is sodium hydroxide pellets used in this experiment? (1 mark)
(b) Why is moist cotton wool used in this experiment? (1 mark)

(c) (i) By means of an arrow indicate on the diagram the direction in which the red dye would move during the experiment. (1 mark)
(ii) Give reasons for your answer in (c) (i) above (3 marks)

11. 1995 Q15 P1

The graph below represents the increase in the number of yeast cells over a period of 48 minute



(a) Name the type of curve shown (1 mark)

(b) Determine the number of yeast cells after 26 minutes (1 mark)

(c) Work out the rate of cell division between 24 and 28 minutes (2 marks)

(d) After how long was the population of yeast cells 128? (1 mark)

(e) Name the phase of the curve labelled

(i) A to B

(ii) B to C

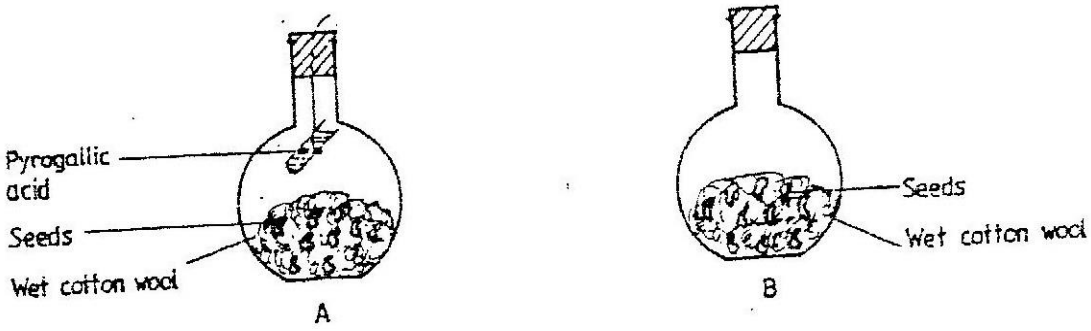
(f) Give reasons for the shape of the graph between points C and D (3marks)

(g) State five factors, which would cause human population growth to assume the shape of the graph curve between points B and C

(5 marks)

12. 1996 Q10 P1

A student set up an experiment as shown in the diagrams below

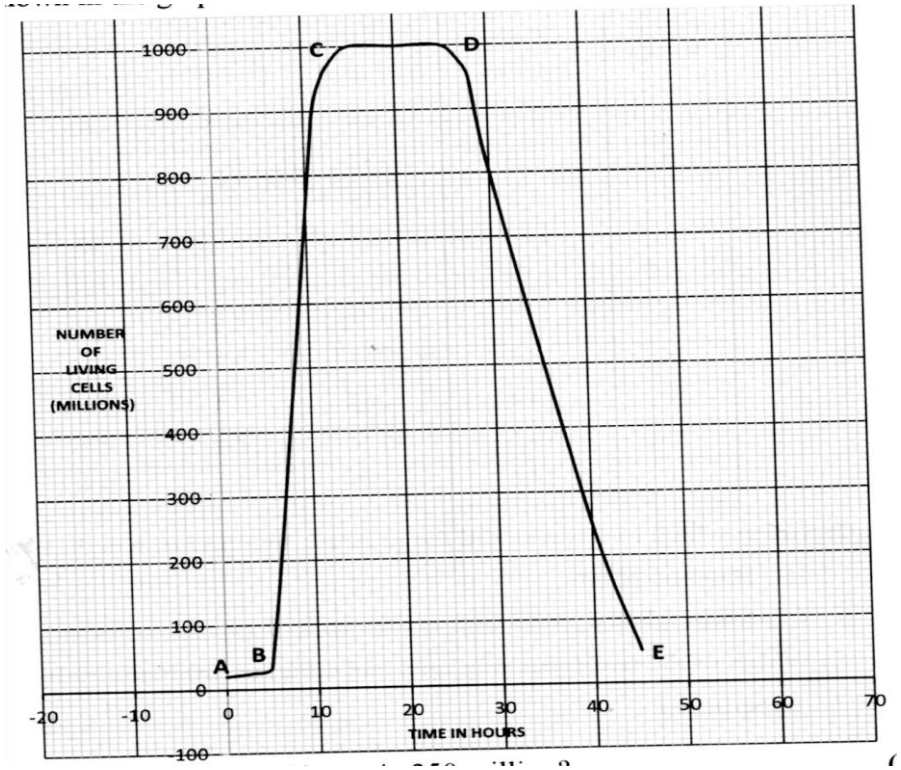


The set up was at room temperature for a week

(a) What was the aim of the experiment? (1 mark)
(b) What would be the expected results at the end of the experiment (2 marks)

13. 1996 Q20 P1

A culture of bacteria was incubated in nutrient agar at 35^0C. Samples were taken at intervals in order to estimate the number of bacteria in the population. The data obtained is shown in the graph below.



(a) When was the pollution of bacteria 350 million (2 marks)
(b) Account for the shape of the graph between
(i) A and B (6 marks)
(ii) B and C
(iii) C and D

(c) Give three reasons for the shape of the curve between D and E (3 marks)

(d) (i) Suggest what would happen to the population of the bacteria if the temperature was lowered to 0^0 after incubating for 12 hours. (1 mark)

(ii) Give a reason for your answer in (d) (i) above (1 mark)

(e) Give three reasons why it is important to control human population growth rate in Kenya? (3 marks)

14. 1997 Q18 P1

An experiment was carried out to determine the growth rates of bamboo

and a variety of maize plants 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 in the table below.

	Bamboo		**Maize**	
Age in weeks	**Average height (Metres)**	**Average weight (Grams)**	**Average height (Metres)**	**Average weight (Grams)**
2	1.3	52	0.3	20
4	4.0	182	0.5	29
6	8.2	445	0.8	57
8	12.1	682	1.2	78
10	13.9	801	1.7	172
12	14.1	957	1.9	420
14	14.3	1025	2.1	704
16	14.4	1062	2.1	895
18	14.6	1127	2.1	926
20	14.6	1229	2.1	908

(a) Between which two weeks did the greatest increase in weight occur in
(i) Bamboo plants (2 marks)
(ii) Maize plants

(b) (i) Which of the two types of plants had a higher productivity by the end of the Experiment (2 marks)
(ii) Give a reason for your answer in (b) (i) above (1 mark)

(c) Between weeks 14 and 18, the average height of the maize plants remained constant while average dry weight increased.
Explain this observation (2 marks)

(d) Suggest how the change in the average dry weight bamboo and maize Plants would have been at week 22 if the experiment was continued. (2 marks)

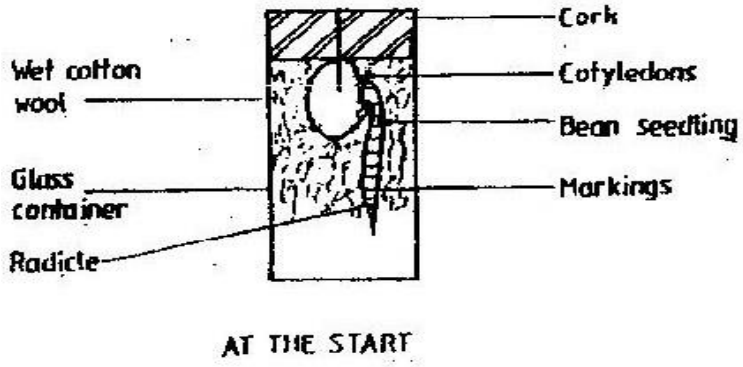
(e) Why was it appropriate for this experiment to use
(i) Dry weight instead of fresh weight
(ii) Weight and height (4 marks)

(f) Describe how the average height and weight of the plants were determined in this experiment. (4 marks)

(g) Give a reason why secondary thickening does not occur in bamboo and maize plants (2 marks)

15. 1999 Q12

A student set up an experiment as shown in the diagram below.



AT THE START

a) i) What is being investigated in the experiment? (1 mark)

ii) On the diagram below indicate the expected results after three days. (1 mark)

iii) Why was it necessary to have wet cotton wool in the container? (1 mark)

b) What is the role of the following to a germinating seed

i) Oxygen (1 mark)

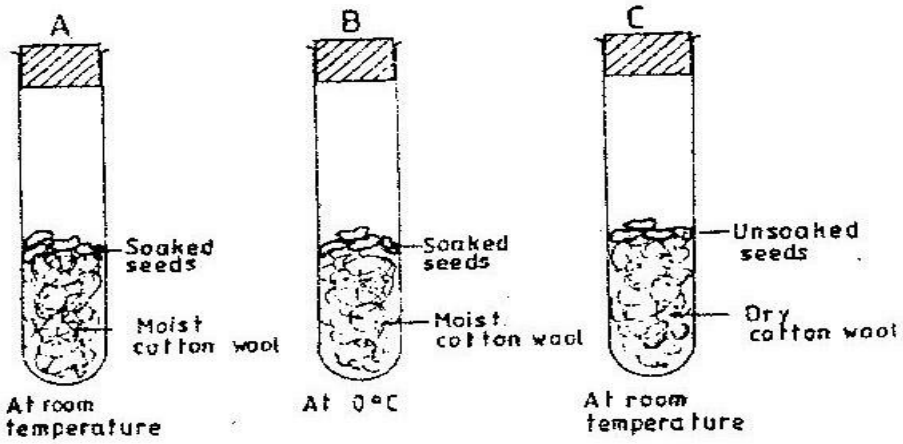
ii) Cotyledons. (1 mark)

16. 2000 Q9 P1

State two advantages of metamorphosis to the life of insects. (2 marks)

17. 2001 Q15 P1

The diagram below represents a set up to investigate the conditions necessary for seed germination.



The set up was left for 7 days

(a) What conditions were being investigated in the experiment? (2 marks)

(b) State three reasons for soaking seeds in set ups A and B (3 marks)

(c) What were the expected results after seven days? (3 marks)

18. 2002 Q4 P1

During germination and early growth, the day weight of the endosperm decreases while that of the embryo increases. Explain. (2 marks)

19. 2002 Q19 P1

Describe the role of hormones in the growth and development of plants. (20 marks)

20. 2003 Q15(c) P1

State four applications of plant hormones in agriculture. (2 marks)

21. 2004 Q17 P1

During germination and growth of a cereal, the dry weight of endosperm, the embryo and total dry weight were determined at two – day intervals.
The results are shown in the table below.

Time after planting (days)	Dry weight of endosperm	Dry weight of embryo (mg)	Total dry weight (mg)
0	43	2	45
2	40	2	42
4	33	7	40
6	20	17	37
8	10	25	35
10	6	33	39

a) Using the same axes, draw graphs of dry weigh of endosperm, embryo and the total dry weight against time (7 marks)

b) What is the total dry weight on day 5?

c) Account for:

i) Decrease in dry weight of endosperm from day 0 to 10 (2 marks)

ii) Increase in dry weight of embryo from day 0 day 10 (2 marks)

iii) Decrease in total dry weight from day 0 to day 8 (2 marks)

iv) Increase in total dry weight after day 8 (1 mark)

(d) Accounting for dormancy.

i) Within a seed

ii) Outside the seed

e) Give two characteristics of meristematic cells (2 marks)

22. 2005 Q8 P1

Name three factors in seeds that cause dormancy. (3 marks)

23. 2006 Q14 P1

a) Distinguish between epigeal and hypogeal germination. (1 mark)

b) Why is oxygen necessary in the germination of seeds? (2 marks)

24. 2006 Q6 P2

An experiment was carried out to investigate the effect of hormones on growth of lateral buds of three pea plants

The shoots were treated as follows:

Shoot A – Apical bud was removed.

Shoot B – Apical bud was removed and gibberellic acid placed on the cut shoot.

Shoot C – Apical bud was left intact.

The length of the branches developing from lateral buds were determined at regular intervals.

The results obtained are as shown in the table below.

Time in days	**Length of branches in millimeters**		
	Shoot A	**Shoot B**	**Shoot C**
0	3	3	3
2	10	12	3
4	28	48	8
6	50	9	14
8	80	120	20
10	118	152	26

a) Using the same axes, draw graphs to show the lengths of branches against time. (8 marks)

b) i) What was the length of the branch in shoot B on the 7th day? (1 mark)

ii) What would be the expected length of the branch developing from shoot A on the 11th day? (1 mark)

c) Account for the results Obtained in the experiment (6 marks)

d) Why was shoot C included in the Experiment? (1 mark)

e) What is the importance of gibberellic acid in agriculture? (1 mark)

f) State two physiological processes that are brought about by the application of gibberellic acid on plants. (2 marks)

25. 2007 Q19 P1

(a) State two environmental conditions that can cause seed dormancy (2 marks)

(b) Name the part of a bean that elongates to bring about epigeal germination (1 mark)

26. 2007 Q6 P2

In the experiment to determine the effect of ringing on the concentration of sugar in phloem a ring of bark from the stem of a tree was cut and removed. The amount of sugar in grammes per $16cm^3$ piece of bark above the ring was measured over a 24 hour period. Sugar was also measured in the bark of a similar stem of a tree which was not ringed. The results are shown in the table below.

Time of the day	**Amount of sugar in grammes per $16cm^3$ piece of bark**	
	Normal stem	**Ringed stem**
06 45	0.78	0.78
09.45	0.80	0.91
12.45	0.81	0.01
15 45	0.80	1.04
18.45	0.77	1.00
21 45	0.73	0.95
00 45	0.65	0.88

(a) Using the same axes, plot a graph of the amount of sugar against time (6 marks)

(b) At what time was the amount of sugar highest in the

(i) Ringed stem (1 mark)

(ii) Normal stem? (1 mark)

(c) How much sugar would be in the ringed stem if it was measured at 0345 hours? (1 mark)

(d) Give reasons why there was sugar in the stems of both trees at 0645 hours (2 marks)

(e) Account for the shape of the graph for the tree with ringed stem between:

(i) 0645 hours and 1545 hours (3 marks)
(ii) 1545 hours and 0045 hours (2 marks)

(f) Name the structures in phloem that are involved in the translocation of sugars (2 marks)

(g) Other than sugars name two compounds that are translocated in phloem (2 marks)

27. 2008 Q17 P1

Account for the following phases of a sigmoid curve of a growth of an organism

(a) Lag phase (1 mark)
(b) Plateau phase (1 mark)

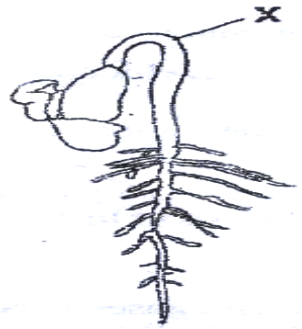
28. 2008 Q21 P1

(a) What is seed dormancy (1 mark)
(b) Name a growth inhibitor in seeds (1 mark)

29. 2009 Q4 P1

(a) The state during which a seed cannot germinate even when conditions for germination are suitable is called…….. (1 mark)

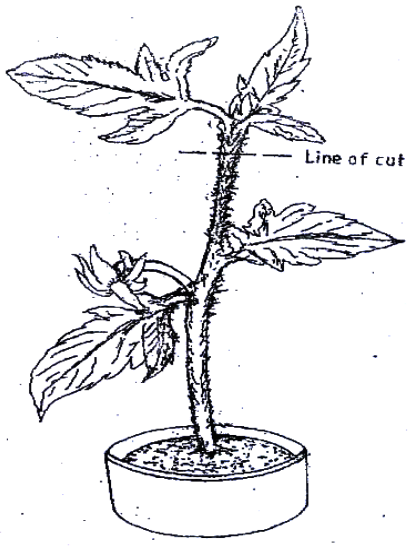
(b) The diagram below represents a stage during germination of a seed



(i) Name the type of germination illustrated in the diagram (1mark)
(ii) State the role of the part labelled x during germination of the seed (2 marks)

30. 2009 Q11 P1

In an experiment the shoot tip of a young tomato plant was decapitated as shown in the diagram below



(a) State the expected results after 2 weeks (1 mark)
(b) Give a reason for your answer in (a) above (2 marks)

31. 2010 Q25 P1

State **three** factors that contribute to the deceleration phase in the population curve of an organism (3 marks)

32. 2010 Q30 P1

What is meant by the apical dominance? (3 marks)

33. 2011 Q29 P1

State four reasons why water is significant in seed germination (4 marks)

34. 2011 Q6a P2

An experiment was carried out to investigate the population of a certain micro-organism. Two Petri-dishes were used. Into the Petri – dish labeled M, 60cm^3 of a culture medium was placed while 30cm^3 of the same culture medium was placed in Petri-dish labeled N. Equal numbers of the micro-organisms were introduced in both Petri-dishes. The set-ups were then incubated at 35^{0}C. The number of micro-organisms in each Petri-dish was determined at irregular intervals for a period of 60hours. The results were as shown in the table below.

Relative number of micro-organisms	**M**	40	40	180	280	1200	1720	1600	1840	1560	600
	N	40	40	120	200	680	560	560	600	600	400
Time in hours		0	5	10	15	23	30	35	42	45	60

(i) On the same axis, draw the graphs of relative number of micro-organisms

against time on the grid provided. (7 marks)

(ii) After how many hours was the difference between the two populations greatest? (1 mark)

(iii) Work out the difference between the two populations at 50 hours. (2 marks)

(iv) With a reason state the effect on the population of micro-organisms in Petri – dish M if the temperature was raised at 60^0C after 20 hours. (2 marks)

35. 2012 Q20 P1

State three aspects that can be used to estimate growth in seedlings. (3 marks)

36. 2012 Q25 P1

State the role of the following hormones in the life cycle of insects:

Ecdsone hormone; ……

Juvenile hormone…… (2 marks)

37. 2013 Q19 P1

State three factors in seeds that cause dormancy. (3 marks)

38. 2013 Q27 P1

(a) State two differences between complete and incomplete metamorphosis. (2 marks)

(b) State the importance of moulting to an insect. (1 mark)

39. 2013 Q6 P2

A scientist carried out an investigation to find out the population growth of mice under laboratory conditions. Twenty young mice were placed in a cage. The results obtained from the investigation were as shown in the table below.

Time in months	0	2	4	6	8	10	12	16	18
Number if mice	20	20	65	115	310	455	450	145	160

a) On the grid provided, draw a graph of the number of mice against time.

b) account for the changes in mice population between

i) 0 to 2 months (2 marks)
ii) 2 to 6 months (2 marks)
iii) 6 to 10 months (2 marks)
iv) 10 to 12 months (2 marks)

c) i) Between which two months was the population change greatest? (1 mark)

ii) Calculate the rate of population change over the period in

(c) (i) above. (2 marks)

d) What change in population would be expected if the investigation was continued to the 19th month? (1 mark)

e) To obtain the observed results state two variables that was kept constant during the investigation. (2 marks)

40. 2014 Q2 P1

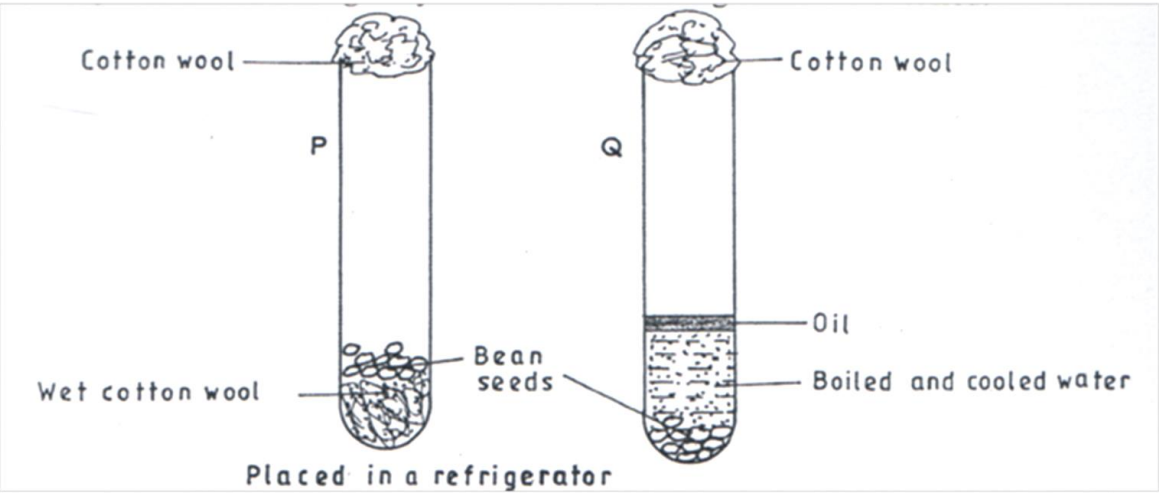
What is meant by the term seed dormancy? (1 mark)

41. 2014 Q6 P1

State **three** roles of auxins in a plant stem . (3 marks)

42. 2015 Q18 P1

The diagram below shows an experimental set-up to investigate the conditions necessary for germination. Test tube P was placed in a refrigerator while Q was left at room temperature. The set-ups were observed regularly for two weeks but no germination occurred.



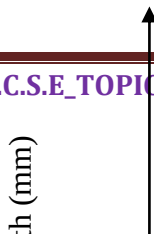
Explain the observations in P and Q.

P (2marks)

Q (3marks)

43. 2015 Q19 P1

a) Using the axes provided below, sketch a curve to illustrate the growth pattern observed in the phylum arthropoda. (2 marks)



b) Explain the growth pattern observed in arthropods (3marks)

44. 2016 Q15 P1

a)What is seed dormancy? (1mark)

b)Name a growth inhibitor in seeds (1mark)

45. 2016 Q20 P1

State three factors that contribute to the deceleration phase in the population curve of an organism (3 marks)

46. 2018 Q14 P1

The diagram below illustrates a germinating seedling

a)Name the type of germination illustrated in the diagram (1 mark)

b) Describe how the type of germination named in (a) above is brought about (3 marks)

GENETICS

1. 1989 Q13 P1

In an experiment, a variety of garden peas having a smooth seed coat was crossed with a variety with a wrinkled seed coat. All the seeds obtained in the

f generation had a smooth seed coat. The f generation was selfed. The total number of F_2 generation was 7324.

(a) Using appropriate letter symbols. Work out the genotype of the f_1 generation
(b) From the information above, work out the following for the F_2 generation

2. 1990 Q2 P1

The figure below is a structural diagram of a portion from anucleic acid stand.

-----S – P – S – P – S – P – S -----
C G U C

(a) Giving a reason, name the nucleic acid to which the portion belongs
(b) Write down the sequence of bases of a complementary strand to that show above

3. 1990 Q12 P1

A garden pea plant having green round seeds was crossed with another garden pea plant having yellow wrinkled seeds. The seeds produced in the F_1 generation were all green and round

(a) State the dominant traits in these plants
(b) If D and d represents genes that determine seed colour, while T and T represents genes that determines seed texture;

(i) Give the genotype of each parent plant
(ii) Give a reason for your answer (b) (i) above
(iii) Work out the genotypes of the F_1 generation.

(iv) In the table below, work out the progeny between the F_1 generation and a plant having yellow wrinkled seeds

F1/plant	DT	Dt	DT	dt
dt	DdTt	Ddtt	ddtt	ddTt
dt	DdTt	Ddtt	ddtt	ddTt
dt	DdTt	Ddtt	Ddtt	ddTt
dt	DdTt	Ddtt	ddtt	ddTt

(i) What was the phenotypic ratio of the progeny in (b) (iv) above?

4. 1991 Q13 P1

In a certain birds species, the spotted pattern of feathers is controlled by a dominant gene B, and the plain pattern by a recessive gene b. Red colour of the legs is controlled by a dominant gene R and brown colour by a recessive gene r
If a homozygous spotted red legged bird was crossed with a plain feathered brown legged bird, what are:-

(a) (i) The parental genotype?
(ii) The gametes produced by these parents
(iii) The genotypes and phenotypes of F_1 generation.

(b) Using a punnet square, work out the cross between two F_1 individuals and show the phenotype ration of the F_2 generation.

5. 1992 Q14 P1

(a)Write the base sequence of messenger RNA (mRNA) that would be coded from the DNA strands shown below.

C – A – T – G – A – G – T

(b) What is mutation?
(c) Name two types of chromosomal mutation
(d) State two factors that may cause mutation
(e) What is the significance of chlasma formation during melotic cell division

6. 1993 Q12 P1

In a certain plant species, some individual plants may have only white, red or pink flowers. In an experiment a plant with white flowers was crossed with red flowers.
The parent plants were pure lines. All the plants from F_1 generation were pink.
Using letter R to represent the gene for the red colour and letter W for white colour.

(a) Work out the genotype of F_1 generation.

(b) If the plants from F1 generation were selfed, what would be the phenotypic ratio of the F_2 generation?.

(c) What is the genetic explanation for the absence of plants with red and white in the flowers F_1 generation?

7. 1994 Q11 P1

State two structural differences between ribonucleic acid (RNA) and Deoxyribonucleic (DNA).

8. 1996 Q1 P1

State the function of Deoxyribonucleic acid (DNA) molecule (1 mark)

9. 1996 Q18 P1

In an experiment black mice were crossed and the offspring were back and brown. The gene for black colour is dominant over that of brown colour.
Using letter B to represent the gene for black colour and b to represent the gene for brown colour

(a) Work out the genotypes of the F_1 generation (4 marks)
(b) What is the phenotype ration of the spring (1 mark)

10. 1997 Q16 P1

In a breeding experiment, plants with red flowers were crossed. The produced 123 plants with red flowers and 41 with white flowers

(a) Identify the recessive character
Give a reason (2 marks)
(b) What was the genotype of the parent plants that gave rise to the plants with a red and white flowers? (1 mark)
(c) if the white flowers were selfed, what would be the genotypes of their offspring
(1 mark)

11. 1998 Q12 P1

In a family with four children, three were found to have normal skin pigmentation while one was an albino.
Using letter A to represent gene for normal skin pigmentation and a to represent the gene for albinism,

(a) What are the genotypes of the parents? (1 mark)
(b) Work out the genotype of
(i) Normal pigmentation (2 marks)
(ii) The albino child

(c)What is the probability that the fifth child will be an albino? (1 mark)

12. 1999 Q7 P1

An investigation plants with red flowers were crossed with plants with white flowers.
All the plants in the F_1 generation had pink flowers.

a) Give a reason for the appearance of pink flowers in the F_1 generation.
b) If the plants the F_1 generation were selfed, state the phenotypic ratio of the F_2 generation. (3 marks)

14. 2000 Q12 P1

The chart below represents the result of successive crosses, staring with red- flowered plants and white flowed plants and in which both plants are pure breeding.

Parental genotypes: Red flowers **x** white flowers

First final generation

Selfed

Second final generation
3 red flowers: 1 white flower
3: 1

(a) What were parental genotypes? Use letter R to represent the gene for red colour and r for white colour (1 mark)

(b) (i) What was the colour of the flowers in the first filial generation? (1 mark)
(ii) Give a reason for your answer in b (i) above (1 mark)

(c) If 480 red flowered plants were obtained in the second filial generation, How many F_2 plants and white flowers? Show your working. (2 marks)

15. 2001 Q9 P1

Name three types of chromosomal mutations (3 marks)

16. 2001 Q14 P1

Tallness in pea plants is due to a dominant gene. Two tall pea plants were crossed and their F_1 generation were in the ratio of 3 tall: 1 short. Using letter T to represents the gene for tallness and t for shortness give the

(a)(i) Genotype of the parents (1 mark)
(ii) Gamete of the parents (1 mark)
(iii) Genotype ratio of the F1 generation (1 mark)
(b) What is meant by the term testcross in genetic studies? (1 mark)

17. 2002 Q5 P1

State two characters that researchers select in breeding programme. (2 marks)

18. 2002 Q11 P1

Give an example of a sex – linked trait in humans on:
Y- CHROMOSOME.
X- CHROMOSOME. (2 marks)

19. 2003 Q12 P1

a) What is meant by the term sex – linkage? (1 marks)
b) Name two sex – linked traits in humans. (2 marks)

c) In Drosophila Melanogaster, the inheritance of eye colour is sex – linked.
The gene of red eye is dominant. A cross was made between a homozygous red – eyed female and a white – eyed male. Work out the phenotypic ration of F_1 generation. (Use R to represent the gene for red eyes). (5 marks)

20. 2004 Q12 P1

Across between a red flowered plant and white flowered produced plants with pink flowers.

Using letter R to represent the gene for red colour, and W for white colour

a) What were the parental genotypes (1 mark)

b) Workout a cross between F_1 plants (4 marks)

c) Give the i) Phenotypic ratio of F_2 plants (1 mark)

ii) Genotypic ratio of F_2 plants (1 mark)

d) Name a characteristic in humans, which is controlled by multiple genes (1 mark)

21. 2005 Q12 P1

In a garden with plants of same species, 705 plants had red flowers while 224 had white flowers.

a) Work out the ratio of red to white flowered plants (1 mark)

b) (i) Using letter R to represent the dominant gene, work out a cross between F_1 offspring and a white flowered plant. (4 marks)

(ii) What is the genotypic ratio from the cross in b(i) above? (1 mark)

c) What is meant by the term allele? (1 mark)

22. 2006 Q2 P2

a) Name two disorders in human caused by gene mutation. (2 marks)

b) Describe the following chromosomal mutations. (2 marks)

a. Inversion

b. Translocation.

c) In mice the allele for black fur is dominant to the allele for brown fur. What percentage offspring would have brown fur form across between heterozygous black mice? Show your working.
Use letter B to represent the allele for black colour. (4marks)

23. 2007 Q20 P1

(a) What is meant by the term allele? (1 mark)

(b) Explain how the following occur during gene mutation:

(i) Deletion (1 mark)

(ii) Inversion (1 mark)

(c) What is a test- cross? (1 mark)

24. 2007 Q5 P2

In maize the gene for purple colour is dominant to the gene for white colour. A pure breeding maize plant with purple grains was crossed with a heterozygous plant.

(a) (i) Using letter G to represent the gene for purple colour, work out the genotype ratio of the offspring (5 marks)

(ii) State the phenotype of the offspring (1 mark)

(b) What is genetic engineering? (1 mark)

(c) What is meant by hybrid vigour? (1 mark)

25. 2008 Q6 P1

(a) What is meant by non- disjunction? (1 mark)

(b) Give two examples of continuous variation in humans (2 marks)

26. 2008 Q2 P2

A pea plant with round seeds was crossed with a pea plant that had Wrinkled seeds the gene for round seeds is dominant over that for wrinkled seeds

Using letter R to represent the dominant gene state:

(a) The genotype of parents if plant with round seed was heterozygous (2 marks)

(b) The gametes produced by the round and wrinkled seed parents (2 marks)

(c) The genotype and phenotype of F_1 generation. Show your working (3 marks)

(d) What is a test – cross? (1 mark)

27. 2009 Q5 P1

(a) What is meant by the following terms?

(i) Hybrid vigour (1 mark)

(ii) Polyploidy? (1 mark)

(b) State two causes of chromosomal mutations (2 marks)

28. 2009 Q1 P2

When the offspring of purple and white flowered pea plants were crossed, the produced purple and white flowered plants in the ration of 3:1

Using letter H represent the gene for purple colour

(a) State the genotype of:

(i) parents: (2 marks)

(ii) F_1 generation (1 mark)

(b) Work out the cross between plants in the F_1 generation (4 marks)

(c) Account for the colour of the flowers in the plants of the F_1 generation (1 mark)

29. 2010 Q10 P1

State two advantages of hybrid vigour. (2 marks)

30. 2010 Q27 P1

a) What is meant by the term non-disjunction? (1 mark)
b) Give an example of a genetic disorder caused by:
i) Non-disjuction; (1 mark)
ii) Gene mutation (1 mark)

31. 2010 Q5 P2

When pure breeding black guinea pigs were crossed with pure breeding white guinea pigs, the offsring had a coat with black and white patches.

a) Using letter G to represent the gene for black coat colour and letter H for white coat colour, work out the genotypic ratio of F_2. (5 marks)
b) State the phenotypic ratio of F_2. (1 mark)

c) i) Name the term used when two alleles in heterozygous state are fully expressed phenotyically in an organism. (1 mark)

ii) Give an example of a trait in human beings where the condition whose term is named in (c) (i) above expresses itself. (1 mark)

32. 2011 Q24 P1

(a) Differentiate between the following terms:
(i) dominant gene and recessive gene (1 mark)
(ii) Continous variation and discontinuous variation (1 mark)

(b) What would be the expected results from a test cross? (2 marks)

33. 2011 Q2 (a, b, c) P2

In humans, hairy ears is controlled by a gene on the Y chromosome.

(a)Using letter Y^H to represent the chromosome carrying the gene for hairy ears, work out a cross between a hairy eared man and wife. (4 marks)

(b) (i) What is the probability of the girls having hairy ears? (1 mark)
(ii) Give a reason for your answer in b (i) above (1 mark)

(c)Name two disorders in humans that are determined by sex-linked genes. (2 marks)

34. 2012 Q8 P1

What is the probability of a couple with blood group AB getting a child with blood group AB? (2 marks)

35. 2012 Q1 P2

In a certain plant species which is normally green, a recessive gene for colour (n) causes the plants to be white in colour. Such plants die at an early age. In the heterozygous state, the plants are pale green in colour but grow to maturity.

(a) Give a reason for the early death of the plants with the homozygous

recessive gene.

(2 marks)

(b) If a normal green plant was crossed with the pale green plant, what would be the genotype of the first filial generation (F_1 generation)? Show your working. (4 marks)

(c) If heterozygous plants were self-pollinated and the resulting seeds planted, work out the proportion of their offspring that would grow to maturity. (2 marks)

36. 2013 Q26 P1

(a) What is meant by the term sex linked genes? (1 mark)

(b) Name two sex linked traits in human beings. (2 marks)

37. 2013 Q4 P2

In an investigation, a variety of pea plants grown from seeds with smooth coats were crossed with plants grown form seeds with wrinkled coats. All the seeds obtained in the first filial (F) generation had smooth seed coats.

a) Using the letter R to represent the gene for smooth seed coat, work out the genotype of the F_1 generation .show your working. (3 marks)

b) If the F_1 generation was selfed, determine the phenotypic ratio of the second filial (F_2) generation. Show your working. (3 marks)

c) If the total number of seeds in the F_2 generation was 14 640, calculate the number of seeds with wrinkled coats. Show your working.

(2 marks)

38. 2014 Q8 P1

Differentiate between phenotype and genotype as used in genetics (1 mark)

39. 2014 Q14 P1

State **three** structural differences between DNA and RNA (3 marks)

RNA

DNA

40. 2014 Q4 P2

(a) How is sex determined in man? (4 marks)

(b) (i) Differentiate between sickle cell anaemia and sickle cell trait (2 marks)

(ii) Explain why people with sickle cell trait have an adaptive survival advantage over normal individuals in malaria endemic regions. (2 marks)

41. 2015 Q4 P2

Colour blindness is a sex linked trait controlled by a recessive gene b. If a mother is a carrier and the father is normal, what is the chance that their son will be colour blind? Show your working. (4 marks)

42. 2015 Q3 P2

a) What is meant by the term genetics? (1 mark)
b) State two examples of discontinuous variation (2 marks)

c) A female which sickle cell trait marries a normal man. The allele for sickle cell is Hbs and the normal allele is HbA. Determine the probability that their first born will have the sickle cell trait. Show your working. (5 marks)

43. 2016 Q30 P1

State two advantages of hybrid vigour (2 marks)

44. 2016 Q2 P2

a) i) How is sex determined in man? (2 mark)

ii) Explain why people with sickle cell trait have an adaption survival advantage over normal individuals in malaria endemic regions. (2 marks)

45. 2018 Q18 P1

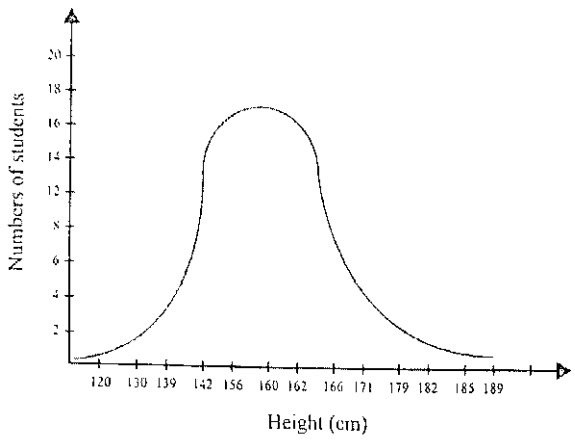
A tall, light skinned lady with pimples on her face has long hair and limps

a) List two features which the lady has that are due to inheritance (2 marks)

b) Explain why most recessive genes are expressed phenotypically in male offspring humans (3 marks)

46. 2018 Q2 P2

Below is a graphical representation fstudents height in a classroom



a)Name the type of curve illustrated (1 mark)

bi)State the type of variation represented by the curve (1 mark)

ii) State two meiotic processes that lead to variation among organisms (2 marks)

iii) Explain the role of variation in organisms (2 marks)

c) Explain the need for genetic counseling in present day health facilities' (2 marks)

EVOLUTION

1. 1989 Q7 P1

State the difference between Lamarckian and Darwinian theories of evolution.

2. 1991 Q17 P1

(a) What is meant by natural selection

(b) Describe the natural selection brings about adaptation of a species to its Environment

3. 1992 Q5 P1

Two populations of the same species of birds were separated over a long period of time by an ocean. Both populations initially fed on insects only. Later it was observed that one population fed entirely on fruits and seeds, although insects were available.

Name this type of evolutionary change.

4. 1992 Q18 P1

Explain how the process of evolution may result to the formation of a new species.

5. 1995 Q8 P1

Explain why Larmacks theory of evolution is not accepted by biologists today (2 marks)

6. 1996 Q11 P1

Give a reason why it is only mutation in genes of gametes that can influence evolution

(1 mark)

7. 1997 Q9 P1

State three pieces of evidence that support the theory of evolution (2 marks)

8. 1998 Q19 P1

Discuss the various evidences, which show that evolution has taken place. (20 marks)

9. 1999 Q4 P1

State two advantages of natural selection to organisms (2 marks)

10 2000 Q7 P1

Give reason why each of the following is important in the study of evolution:

a) Fossils records (2 marks)

b) Comparative anatomy. (2 marks)

11. 2002 Q14 P1

a) What is organic evolution? (2 marks)

b) State two ways in which Home sapiens differs from Homo habilis (2 marks)

c) Distinguish between divergent and convergent evolution giving example in each case. (4 marks)

12. 2003 Q6 P1

Distinguish between analogous and homologous structures. (2 marks)

13. 2004 Q14 P1

a) What is the difference between Darwinian and Lamarckian theories of evolution? (2 marks)

b) What is meant by the following terms? Give an example in each case.

i) Homologous structures

ii) Example

iii) Vestigial structure (6 marks)

14. 2005 Q4 P1

What is meant by

a) Organic evolution (1 mark)

b) Continental drift? (1 mark)

15. 2006 Q15 P1

Explain continental drift as an evidence of evolution. (3 marks)

16. 2007 Q21 P1

(a) What is adaptive radiation (2 marks)

(b) Give a reason why organisms become resistant to drugs (1 mark)

17. 2008 Q7 P1

(a) What is fossil (1 mark)

(b) How does convergent evolution occur (3 marks)

18. 2009 Q10 P1

(a) (i) What is meant by vestigial structures? (1 mark)

(ii) Give an example of a vestigial structure in human (1 mark)

(b) Explain why certain drugs become ineffective in curing a disease after many years of use. (2 marks)

19. 2010 Q24 P1

a) State **two** ideas proposed by Lamark in his theory of evolution. (2 marks)

b) Why is Larmark's theory not acceptable? (1 mark)

20. 2011 Q21 P1

a) What is meant by convergent evolution? (1 mark)
b) State two limitations of follows as an evidence of evolution (2 marks)

21. 2011 Q2d P2

Explain how comparative embryology is an evidence for organic evolution. (2 marks)

22. 2012 Q22 P1

State the importance of divergent evolution to organisms (2 marks)

23. 2012 Q26 P1

(a) State the theories of evolution proposed by the following scientists. (2 marks)
Charles Darwing
Jean – Baptiste de Lamarck…

(b) State the evidence of evolution based on (2 marks)
(i) Cell organelles…
(ii) Fossils…

24. 2012 Q20 P1

Explain the theory of evolution by natural selection. (2 marks)

25. 2013 Q21 P1

(a) Explain the role of continental drift in evolution. (3 marks)
(b) What is meant by the term organic evolution? (1 mark)

26. 2014 Q 22 P1

(a) Name **two** vestigial structures in human beings. (2 marks)
(b) Why are some bacterial able to resist the effect of antibiotics? (2 marks)

27. 2015 Q2 P1

During a lesson, students observed the structure of bat, cat and human forelimbs to determine their evolutionary relationship.

(a) State the name given to the structure of the limbs observed by the students. (1 mark)

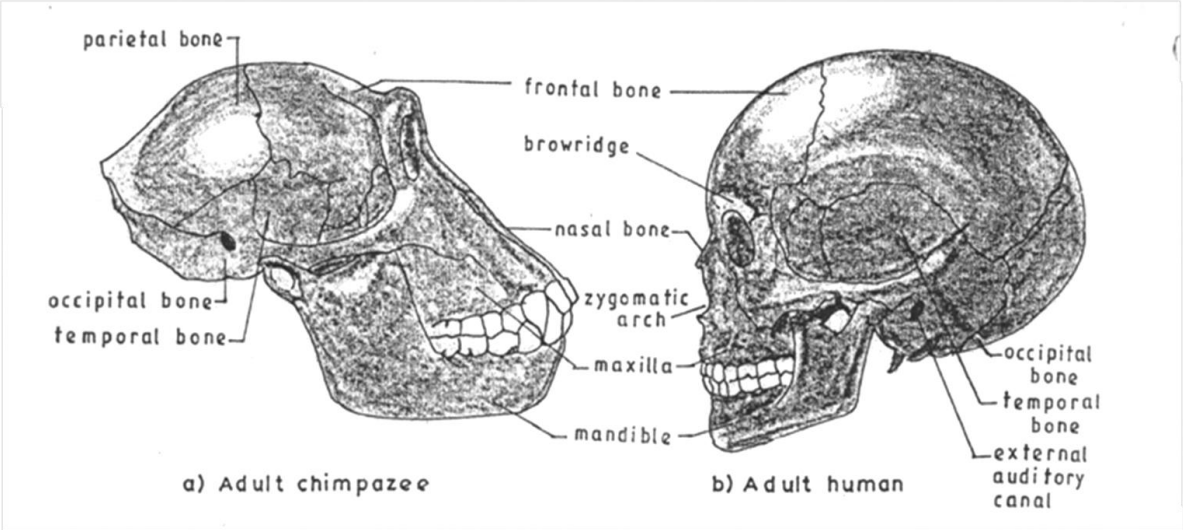
(b) Name the type of evolution illustrated by the structure of the limbs observed (1mark)

(c) What evidence of evolution is illustrated by the limbs? (1mark)

(d) State the significance of the type of evolution illustrated by the limbs (1mark)

28. 2015 Q10 P1

The diagram below illustrates the skulls of adult human and chimpanzee



a) State one difference between the two skulls in the following structures (3marks)

	Structure	Chimpanzee skull	Human skull
i	Parietal bones		
ii	Mandible		
iii	Browridge		

b) State the significance of the evolution observed on the parietal bone in the chimpanzee and human skulls. (1mark)

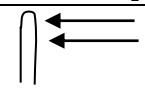
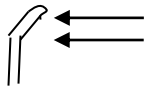
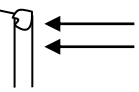
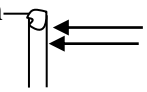
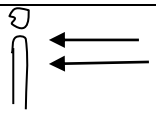
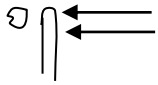
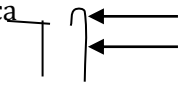
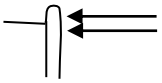
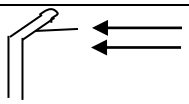
29. 2016 Q6 P1

Explain continental drift as evidence of evolution (3marks)

RESPONSE AND CO-ORDINATION IN PLANTS

1. 1991 Q11 P1

In the experiment was set up to investigate the affect of unilateral light on the growth of oat coleoptiles. The diagram in the table represents the experimental set ups at the start, and the result at the end of the experiment,

Setup	Start of experiment	
A		
B	Aluminium Foil cap. 	Aluminium Foil cap. 
C		
D	Plate of mica 	
E		

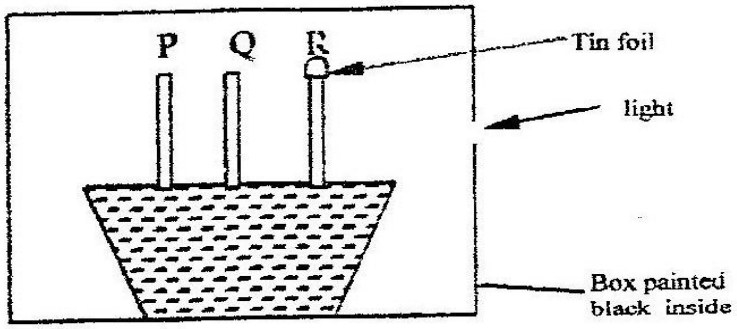
a) Account for the results in the experiment set up A
b) Explain the purpose of experiment set ups B and C
c) Explain the results in the experiment set ups D and E

2. 1994 Q9 P1

Name the type of response exhibited by
(a) Leaves of <u>mimose pudica</u> when they fold after being touched.
(b) Euglena when it swims towards the source of light

3. 1995 Q14 P1

The diagram below represents growing seedlings which were subjected to unilateral light at the beginning of an experiment



(a) (i) State the results of P,Q and R after 5 days? (5 marks)
(ii) Account for your answer in (a) (i) above (3 marks)

(b) If the tin foil were removed from the tip of the seedling R, what results would be observed after 2 days? (1 mark)

(c) State the expected results after 3 days if the box were removed (1 mark)

4. 1996 Q16 P1

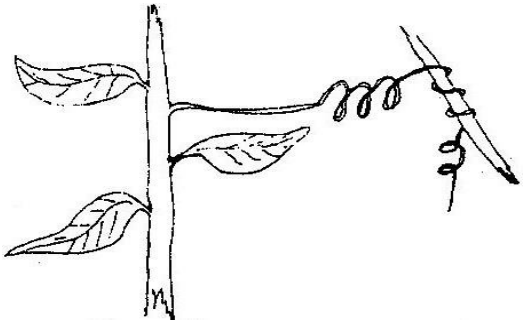
A shoot of seedling exposed to light on one side bends towards the source of light as it grows

(a) Name the response exhibited by the shoot of the seedling (1 mark)

(b) Explain how the bending towards the source of light occurs (3 marks)

5. 2003 Q15 P1

A response exhibited by a certain plant tendril is illustrated below.



a) i) Name the type of response (1 mark)

ii) Explain how the response named in (a)(i) above occurs (2 marks)

b) What is the importance of tactic responses to microscopic plants? (2 marks)

6. 2006 Q20 P1

a) What name is given to response to contact with surface exhibited by tendrils and climbing stems in plants? (1 mark)

b) State three biological importance of tropisms plants. (3 marks)

7. 2007 Q23 P1

(a) Name the hormone that is responsible for apical dominance (1 mark)

(b) What is thigmotropism? (1 mark)

8. 2010 Q26 P1

State **one** survival value for each of the following in plants:

a) Thigmotropism in stems; (1 mark)

b) Geotropism in roots. (1 mark)

9. 2011 Q28 P1

(a) What is a tropic response

(b) state two ways by which auxins regulate growth in seedlings. (2 marks)

10. 2013 Q22 P1

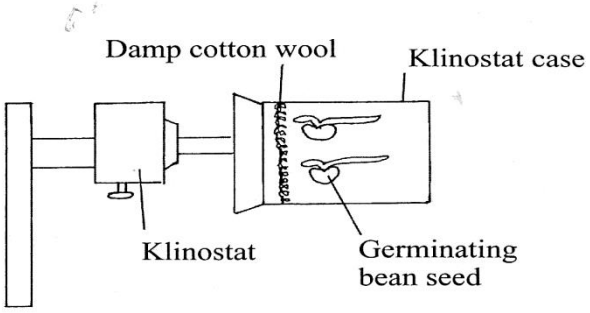
The diagram below illustrates a response by a certain plant.

(a) Name the type of response. (1 mark)

(b) Explain how the response illustrated above occurs. (3 marks)

11. 2015 Q5 P2

In an experiment to investigate a plant response, the set up shown in the diagram below was used.



a) Name the type of response that was being investigated (1 mark)

b) If the klinostat was not rotating:

i) State the observations that would be made on the seedlings after three days (2 marks)

ii) Explain the observations in (b) (i) above (3 marks)

c) If the experiment was repeated with the klinostat rotating

i. State the observation that was made on the seedlings after three days; (1 mark)

ii. Give a reason for the observation made on the seedlings (1 mark)

RESPONSE AND CO-ORDINATION IN ANIMALS

1. 1989 Q2 P1

State one structural and one functional difference between motor and sensory neurons.

2. 1990 Q15 P1

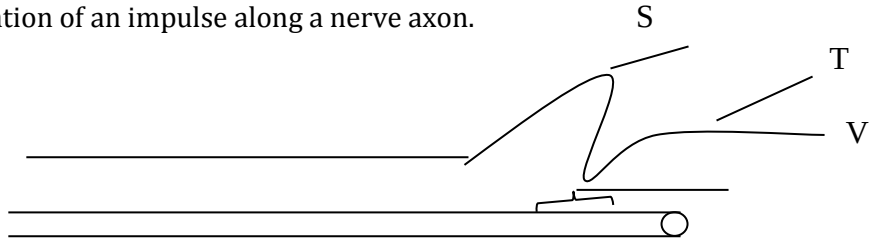
(a) How are the structures of the human eye adapted to their function?

	Adaptation	**Function**
Conjunctiva	.....	.....
Cornea	.....	.....
Aqueous/Vitreous	.....	.....
Iris	.....	.....
Ciliary muscle/body	.....	.....
Suspensory ligaments	.....	.....
Lens	.....	.....
Cones	.....	.....
Retina	.....	.....
Rods	.....	.....
Fovea centrails	.....	.....
Choroids	.....	.....
Sclera/Scleroids	.....	.....
Optic nerve	.....	.....
External eye muscle	.....	.....

(b) State three defects of the eye and explain how each can be corrected**.**

3. 1991 Q6 P1

The diagram below represents the changes in membranes potential during the propagation of an impulse along a nerve axon.



(a) Name the parts of the carve labelled S and T

(b) What is the distribution of ions across the nerve membrane at the region labeled V.

4. 1992 Q 13(c) P1

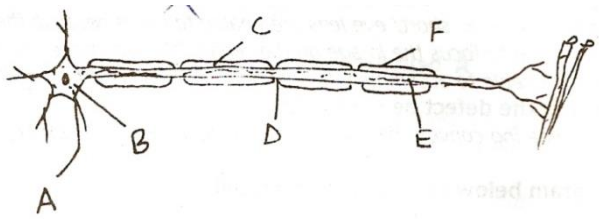
Give three differences between nervous and hormonal communication

5. 1994 Q9 P1

Name the type of response exhibited by sperms when they swim towards the ovum.

6. 1994 Q15 P1

(a) The diagram below show a motor neuron



In the spaces provided below, give the letters that represents parts of the motor neuron described.

i)The body that carries impulse from the cell body…….
ii) The structure that respond to acetylcholine…….
iii) The structure that contains the nucleus of the neurone…….
iv) One of the cells that form the myelin sheath…….

(b) What is the functional difference between motor and sensory neuron

7. 1994 Q16 P1

A person met a leopard as he walked a long a forest path. His adrenal glands Secreted adrenaline to prepare him to run away. Explain how the following body sytems responded.

(a) Circulatory system
(b) Respiratory

8. 1997 Q5 P1

In an accident a victim suffered brain injury. Consequently he had loss of memory. Which part of the brain was damaged? (1 mark)

9. 1997 Q12 P1

A person was able to read a book clearly at arm's length but at normal reading distance.

i. State the defect the person suffered from? (1 mark)
ii. Why was he unable to read book clearly at normal distance (1 mark)
iii. How can the defect be corrected?

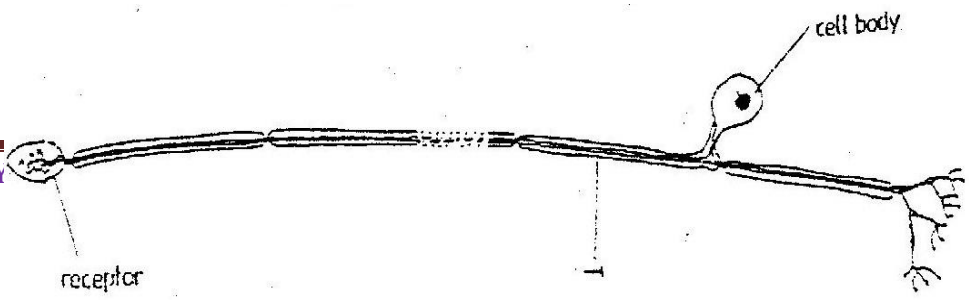
10. 1998 Q6 P1

In an experiment it was found that when maggots are exposed to light they move to dark areas.

(a) Name the type of response exhibited by the maggots (1 mark)
(b)Name the advantages of the response to the maggots (2 marks)

11. 1998 Q17 P1

The diagram below represents a nerve cell.

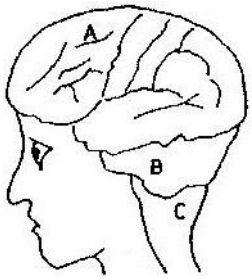


(a) (i) Identify the nerve cell. (1 mark)
(ii) Give a reason your answer in (a) (i) above (1 mark)

(b) Name the structure labelled T (1 mark)
(c) Using an arrow indicate on the diagram the direction of movement of an impulse in the cell. (1 mark)

12. 1999 Q9 P1

The diagram below shows surface view of a human brain.



(a) Name the parts labeled B and C. (2 marks)
(b) State three functions of the part labelled A (2 marks)
(c) State what would happen if the part labeled B was damaged. (1 mark)

13. 2000 Q1 P1

What is the function of the following cell in the retina of human eye?
(a) Cones
(b) rods (2 marks)

14. 2001 Q17 P1

(a) State the functions of the following parts of the mammalian ear;
(i) Tympanic membrane (2 marks)
(ii) Eustachian tube (1 mark)

(iii) Ear ossicles

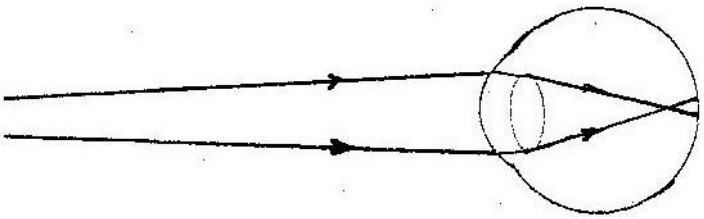
(b) Describe how semicircular canals perform their functions (2 marks)

15. 2003 Q18 P1

Describe the functions of the various parts of the human eye. (1 mark)

16. 2004 Q6 P1

The diagram below shows the position of an image formed in a defective eye.



a) Name the defect:

b) Explain how the defect named in (a) above can be corrected (2 marks)

17. 2005 Q1 P1

Apart from hearing, state another function of the human ear. (1 mark)

18. 2005 Q19 P1

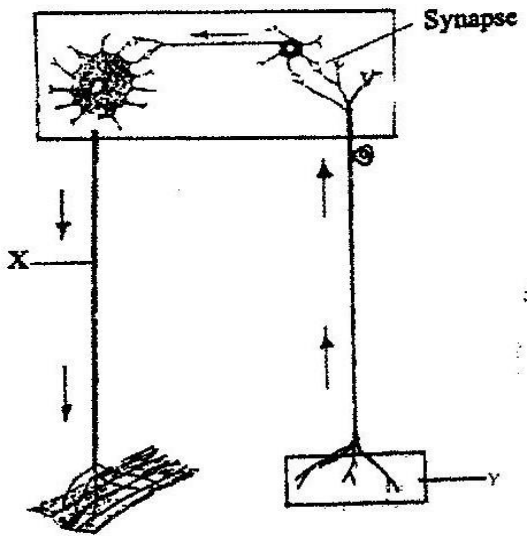
How is the human eye adapted to its function? (20 marks)

19. 2006 Q10 P1

State the important of tactic response among some members of kingdom protoctista. (1 mark)

20. 2006 Q21 P1

The diagram below represents a reflex are in human.



a) Name the parts labelled X and Y (2 marks)

b) Name the substance that is responsible for the transmission of

an impulse across the synapse. (1 mark)

21. 2006 Q22 P1

a) State the function of ciliary muscles in the human eye. (1 mark)

b) State two functional differences between the rods and cones in the human eye. (2 marks)

22. 2006 Q23 P1

State the function of each of the following parts of human ear. (4 marks)

a) Ear ossicles

b) Cochlea

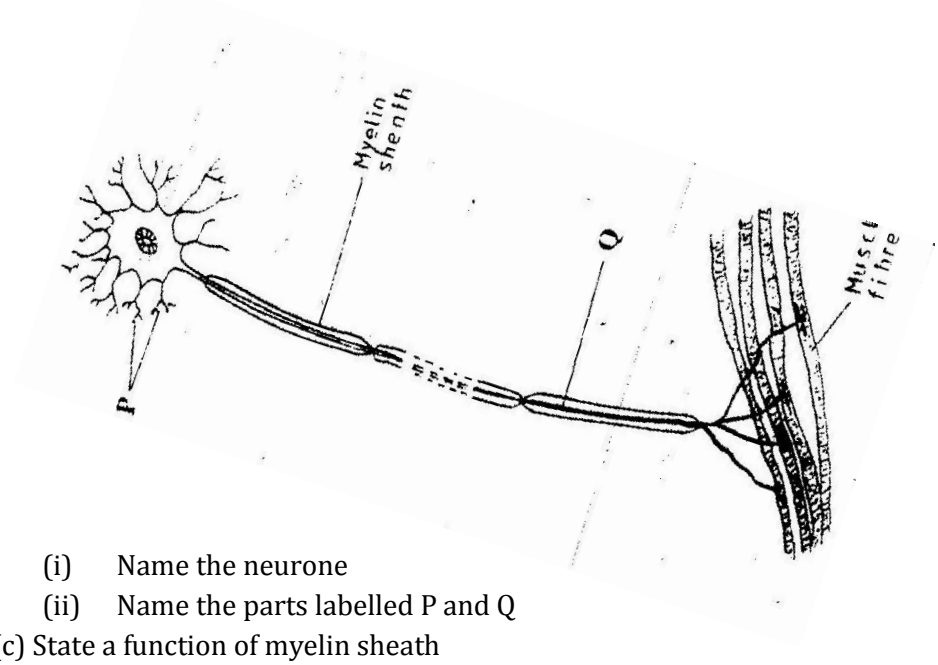
c) Semi circular canals

d) Eustachian tube.

23. 2007 Q22 P1

(a) Where in the human body are relay neurons found (1 mark)

(b) The diagram below represents a neurone (1 mark)



(i) Name the neurone (1 mark)

(ii) Name the parts labelled P and Q (2 marks)

(c) State a function of myelin sheath (1 mark)

24. 2007 Q7 P2

Describe the structure and functions of the various parts of the human ear (20 marks)

25. 2008 Q13 P1

(a) Name the part of retina where image is formed (1 mark)
(b) State two characteristics of the image formed on the retina (2 marks)

26. 2009 Q4 P2

(a) (i) Explain the changes that take place in the pupil and iris of a human eye when a person moves from a dark room to a room with bright light (3 marks)

(ii) What is the significance of the changes explained in (a) above (1 mark)

(b) How does the human eye obtain nutrients? (3 marks)

(c) Explain why images that form on the blind spot are not perceived (2 marks)

27. 2010 Q6 P1

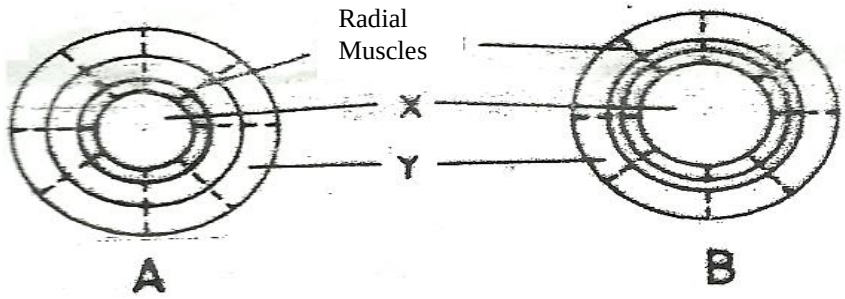
State one function for each of the following:

a) Cerebellum (1 mark)

b) Medulla oblongata (1 mark)

28. 2010 Q4 P2

The diagram below shows how the iris and pupil of a human eye appear under different conditions.



a) Name the structures labeled **X** and **Y** (2 marks)

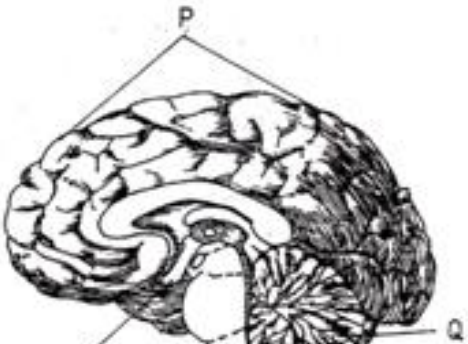
b) i) State the condition that leads to the change in appearance shown in the diagram labeled **B** (2 marks)

ii) Describe the change that lead to the appearance of the iris and pupil as shown in the diagram labeled **B.** (4 marks)

iiii) What is the significance of the change described in (b) (ii) above? (1 mark)

29. 2011 Q4(a) P2

(a) The diagram below represents a section of the human brain.



Pituitary
gland

(i)Name the structures labeled P and R (2 marks)
(ii)State two functions of the part labeled Q.

(b) (i) Name two reproductive hormones secreted by the pituitary gland in women (2 marks)

(ii) State one function of each of the hormones named in (b) (i) above (2 marks)

30. 2011 Q8b P2

Describe how accommodation in the human eye is brought about when focusing on a near object. (7 marks)

31. 2012 Q9 P1

State the importance of negative phototaxis to termites. (1 mark)

32. 2012 Q10 P1

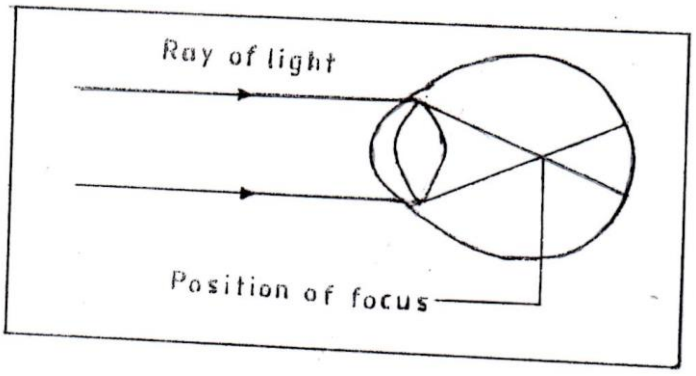
What is meant by the term irritability? (1 mark)

33. 2012 Q7 P2

Using a relevant example in each case, describe simple and conditional reflex actions. (20 marks)

34. 2013 Q23 P1

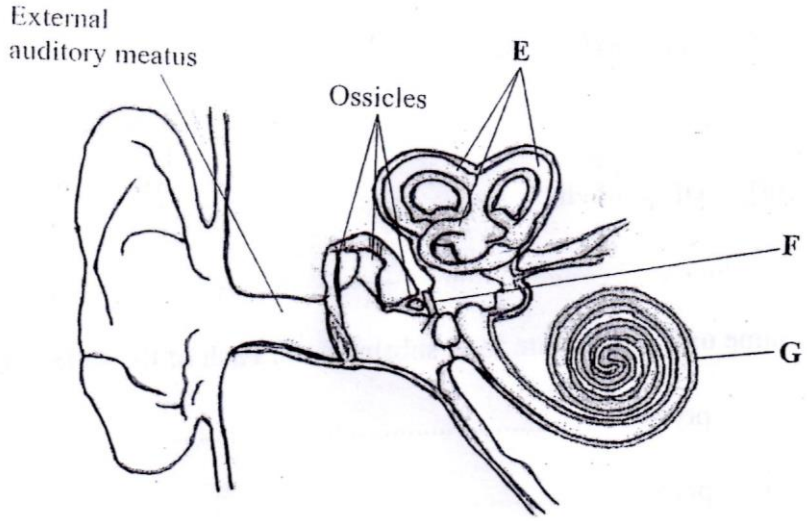
The diagram below illustrates a defect in the eye.



Explain how the defect illustrated above can be corrected. (2 marks)

35. 2013 Q2 P2

The diagram below represents the human ear.



a) Name the labelled **E**, **F**, and **G**. (3 marks)

b) How is each of the following adapted to its function?
i) External auditory meatus; (2 marks)
ii) Ear ossicles (2 marks)

c) Name one defect of the human ear. (1 mark)

36. 2014 Q11 P1

State **three** differences between tactic and tropic responses (3 marks)

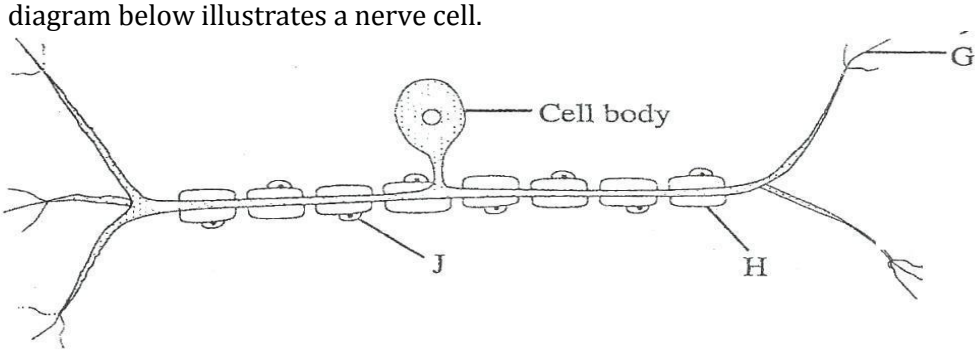
Tactic Responses **Tropic Responses**

37. 2014 Q13 P1

State **one** function of each of the following parts of a mammalian eye;
(a)Eye lashes (1 mark)
(b)Lachrymal glands (1 mark)

38. 2014 Q16 P1

The diagram below illustrates a nerve cell.



(a)Name the type of nerve cell illustrated. (1 mark)

(b)Give a reason for your answer in (a) above (1 mark)

(c)Identify he part labeled **J** (1 mark)

(d)State **one** function of each of the parts labeled **G** and **H**.

(i) **G** (1 mark)

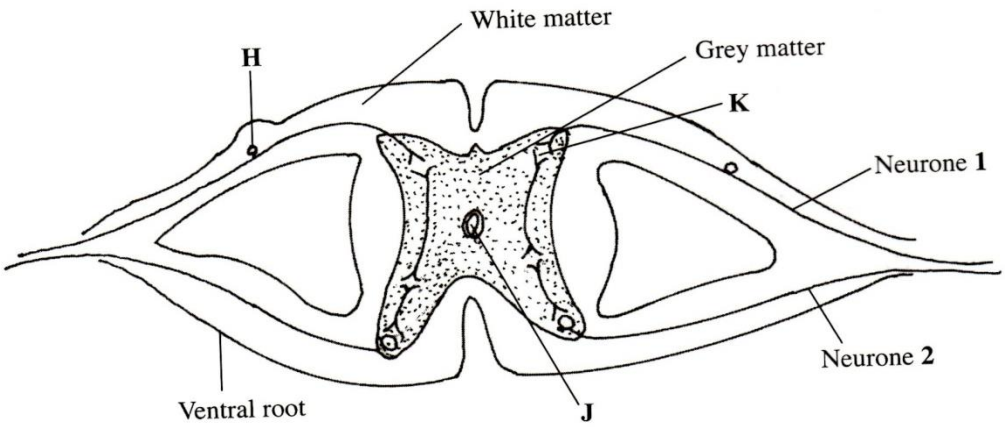
(ii) **H** (1 mark)

39. 2014 Q17 P1

Give a reason why the image is not formed when light is focused on the blind spot. (1 mark)

40. 2014 Q5 P2

The diagram below represents the transverse section of the spinal cord.



(a) Name the part labelled **H**. (1 mark)

(b) State **two** functions of the fluid fount! in the part labelled **J.** (2 marks)

(c) Give a reason for the colour of the white matter. (1 mark)

(d) Name and give the function of the enzyme found at the part labeled **K.**

Name: (1 mark)

Function: (2 marks)

(e) On the diagram, use an arrow to show the direction of impulse transmission along the neurone labeled I. (1 mark)

41. 2015 Q20 P1

Below are components of a simple reflex pathway:

- Interneurone
- Muscle
- Motor neurone
- sensory neurone
- pain receptor
- central nervous system

List the components in their proper sequence during the transimission of a nerve impulse (3 marks)

42. 2016 Q3 P1

State the importance of tactic responses among members of Kingdom Protista (2marks)

43. 2016 Q7 P2

Using a relevant example in each case, describe simple and conditional reflex actions (20 mks)

SUPPORT AND MOVEMENT IN PLANTS

1. **1998 Q9 P1**
   What makes young herbaceous plant remain upright? (2 marks)

2. **1999 Q6 P1**
   State three ways by which plants compensate for lack of ability to move from one place to another. (3 marks)

3. **2004 Q10 P1**
   How are the xylem vessels adapted for support? (1 mark)

4. **2006 Q3 P1**
   a) Name two tissues in plants which are thickened with lignin. (2 marks)
   b) How is support attained herbaceous plants? (1 mark)

5. **2007 Q24 (b) P1**
   Name two tissues in plants that provide mechanical support (2 marks)

6. **2009 Q14 P1**
   Name a support tissue in plants that is not thickened with lignin (1 mark)

7. **2009 Q5 P2**
   (a) What happens when a wilting young plants is well watered (3 marks)
   (b) Name a support tissue in plants thickened with
   (i) Cellulose (1 mark)
   (ii) Lignin (1 mark)

8. **2012 Q23 P1**
   Name the strengthening materials found in the following support tissues:
   (a) Collencyma;
   (b) Xylem (2marks)

9. **2012 Q24 P1**
   State four characteristics of Apical meristem cells. (4marks)

10. **2012 Q4(b) P2**
    State three ways in which support is brought about in a leaf. (3 marks)

11. **2016 Q29(b) P1**

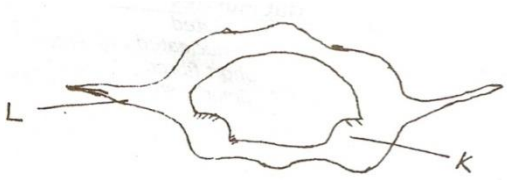
    b) Name two tissue s in plants that provide mechanical support (2 marks)

12. **2018 Q21 P1**
    State two ways in which plants with weak stems obtain mechanical support (2 marks)

SUPPORT AND MOVEMENT IN ANIMALS

1. **1989 Q6 P1**

   The diagram below represents a mammalian bone



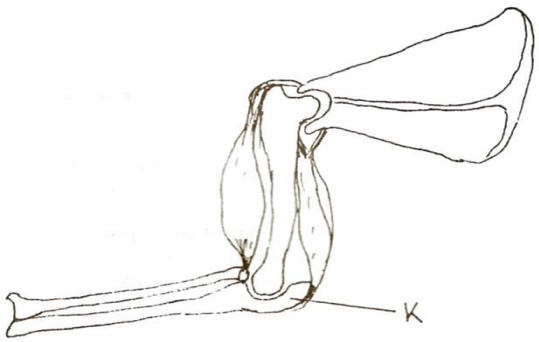
   (a) State the functions labelled K and L
   (b) State the region of the body in which the bone is found

2. **1991 Q1 P1**

   State two ways in which skeletal muscle fibers are adapted to their functions

3. **1991 Q5 P1**

   The diagram below shows the arrangement of bones and muscles in a human arm



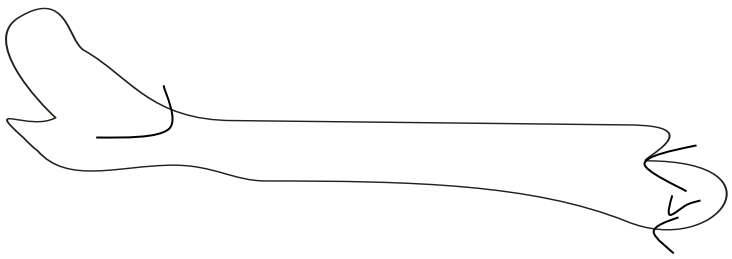
   (a) Name the part of the bone labelled K
   (b) How do the muscles work to extend the arm?

4. **1997 Q7 P1**

   State three structural differences between biceps muscles and muscles of the gut (2 marks)

5. **1998 Q7 P1**

   The diagram below represents a mammalian bone



   (a) Name the bone (2 marks)
   (b) Name the type of joint formed by the bone at its anterior end with adjacent bone. (1 mark)

6. **2000 Q6 P1**

Give a reason why lumbar vertebrae have long and broad transverse process (2 marks)

7. 2002 Q8 P1

Which type of joint is found at the articulations of

a) Pelvic girdle and femur

b) Humerus and ulna? (2 marks)

8. 2002 Q20 P1

a) Name three types of skeletons found in multicellular animals (3 marks)

b) Describe how the cervical, lumbar and sacral vertebrae are suited to their functions. (17 marks)

9. 2003 Q5 P1

A bone obtained from a mammal is represented by the diagram below.

i. Name the bone. (2 marks)

ii. Which bones articulate with the bone shown in the diagram at the notch? (2 marks)

10. 2004 Q1 P1

a) Name the cartilage found between the bones of the vertebral column (1 mark)

b) State the function of the cartilage named in (a) above (1 mark)

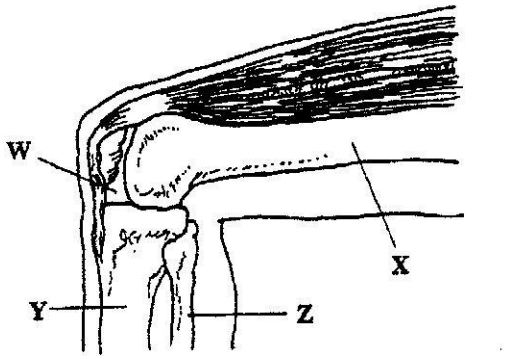
11. 2006 Q20 P1

a) What name is given to response to contact with surface exhibited by tendrils and climbing stems in plants?

b) State three biological importances of tropisms plants.

12. 2006 Q1 P2

The diagram below represents bones at a joint found in the hind limb of a mammal.



a) Name the bones labelled XY and Z (3 marks)

b) i) Name the substance found in the place labelled W. (1 mark)

ii) State the function of the substance named in (b) (i) above. (1 mark)

c) Name the structure that joins the bones together at the joint. (1 mark)

d) State the differences between ball and socket joint and the one

illustrated in the diagram above. (1 mark)

e) Name the structure at the elbow that performs the same function as the same function as the patella. (1 mark)

13. 2007 Q24(a) P1

State characteristic that is common to all cervical vertebrae (1 mark)

14. 2007 Q4 P2

(a) Name the three type of muscles found in mammals and give an example of where each of them is found (3 marks)

(b) State the difference between ball and socket and hinge joint (1 mark)

(c) State the functions of synovial fluid (2 marks)

(d) State two advantages of having an exoskeleton (2 marks)

15. 2008 Q19 P1

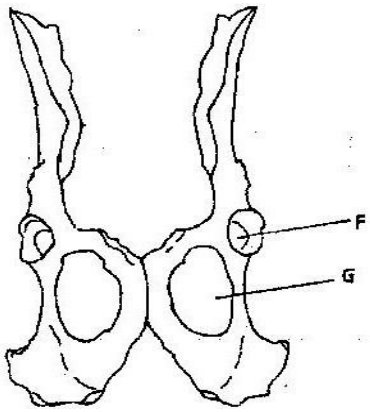
The diagram below represents a tissue obtained from an animal

(a) Identify the tissue (1 mark)

(b) State the functions of the tissue named (a) above (1 mark)

16. 2008 Q30 P1

The diagram below shows two fused bones of a mammal



(a) Identify the fused bone (1 mark)

(b) Name the

(i) Bone that articulates at the point labelled F (1 mark)

(ii) The hole labelled G (1 mark)

17. 2008 Q4 P2

(a) Give three reasons in each case why support is necessary in

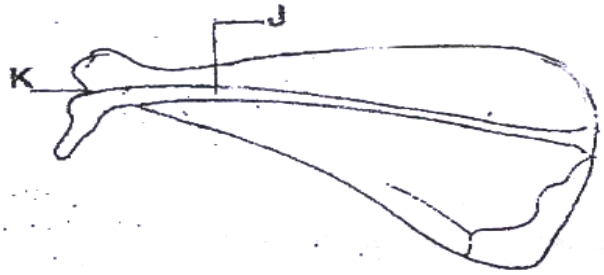
(i)Plants (3 marks)

(ii) Animals (3 marks)

(b) Why is movement necessary in animals (2 marks)

18. 2009 Q12 P1

The diagram below represents a bone obtained from a mammal



(a) Name the bone (1 mark)

(b) Name the:

(i) Bone which articulate with the bone named in (a) above at the cavity labeled K; (1 mark)

(ii) Joint formed by the two bones (1 mark)

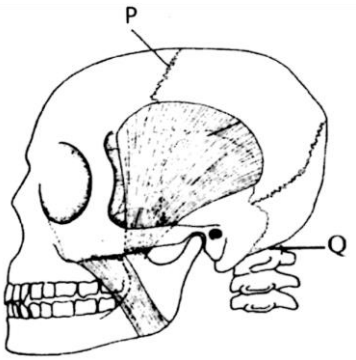
(c) State the function of the part labelled J (1 mark)

19. 2009 Q5(c) P2

Give three functions of pectoral and pelvic fins in a fish (3 marks)

20. 2010 Q21 P1

The diagram below represents part of the human skeleton.



a) Name the part labeled **P** (1 mark)

b) i) Name the bone the articulates with the part labeled **Q**. (1 mark)

ii) What type of joint is formed between the part labeled **Q** and the bone named in (b) (i) above? (1mark)

21. 2010 Q8 P2

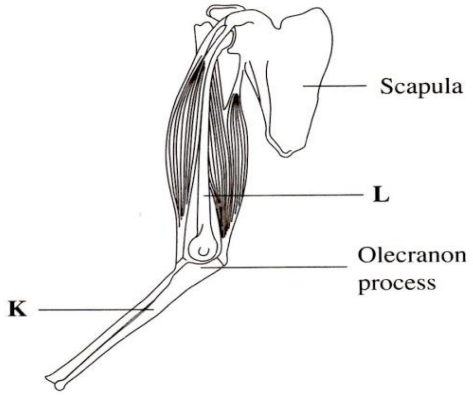
Describe how a finned fish such as Tilapia moves in water. (20 marks)

22. 2010 Q8 (a) P2

Describe the exoskeleton and its functions in insects. (13marks)

23. 2012 Q4 P2

(a) The diagram below illustrates the arrangement of bones and muscles in the human arm.



(i) Name the bones labeled K and L (2 marks)

(ii) Explain how the upward movement of the lower arm is brought about by the bones and muscles shown in the diagram above. (3 marks)

24. 2013 Q28 P1

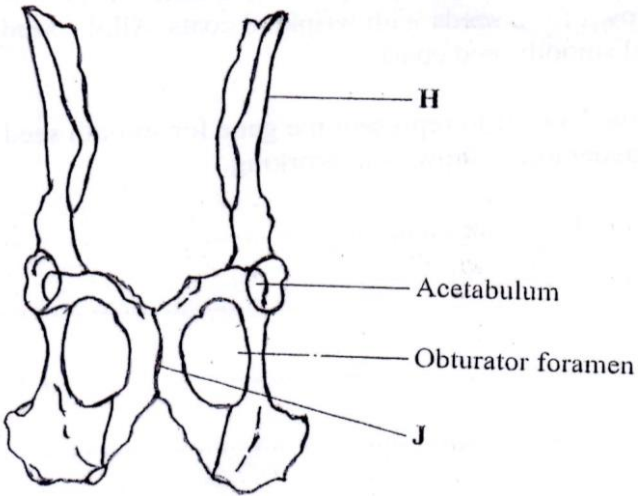
State two functions of pelvic girdle in mammals. (2 marks)

25. 2013 Q29 P1

State two ways in which osmosis is significant to plants. (2 marks)

26. 2013 Q5 P2

The diagram below represents a mammalian pelvic girdle.



a) How are the structures labelled H and J adapted to their function?

H..... (2 marks)

J..... (2 marks)

b) State the function of obturator foramen. (1 mark)

c) i) Name the bone that articulates with the pelvic girdle at acetabulum (1 mark)

ii) Name the type of joint formed by the acetabulun and the bone named in(c)(i)above. (1 mark)

d) Name the bone formed by the fusion of caudal vertebrae in human beings. (1 mark)

27. 2014 Q9 P1

State **two** functions of intervertebral discs in the mammalian skeleton. (2 marks)

28. 2014 Q15 P1

(a) Which type of mammalian muscles is voluntary? (1 mark)

(b) Distinguish between a tendon and a ligament. (1 mark)

29. 2014 Q21 P1

Name the type of skeleton that makes up each of the following animals

(a) Locust. (1 mark)
(b)Bird . (1 mark)

30. 2015 Q14 P1

a) Name two types of involuntary in mammals (2 marks)

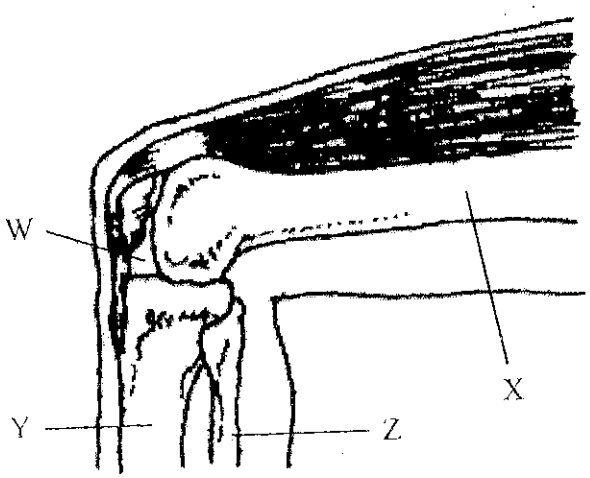
b) State the location of each of the muscles named in (a) above (2 marks)

31. 2016 Q29(a) P1

a) State a characteristic that is common to all cervical vertebrae (1 mark)

32. 2016 Q3 P2

The diagram below represents bones at a join found in the hind limb of a mammal.



a) Name the bones labeled X, Y and Z (3 marks)

X

Y

Z

b) i) Name the sub stance found in the place labeled w. (1 mark)

ii) State the function of the substance name din (b) (i) above (1 marks)

c) Name the structure that joins bones together at the joint. (1 mark)

d) State the difference between ball and socket joint and the one illustrated in the diagram above. (1marks)

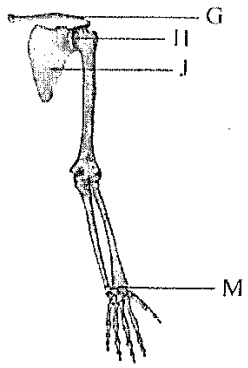
e) Name the structure at the elbow that performs the same function as the patella. (1mks)

33. 2018 Q16 P1

Name the bones that articulate to form a ball and socket joint at the hip (2 marks)

34. 2018 Q4 P2

The diagram below illustrates the arrangement of bones in a human arm.



a)Name

i)The type of joints formed at points H and M.

H (1 mark)

M (1 mark)

ii)Bone G (1 mark)

b)Name bone J and sate how it is adapted to its functions

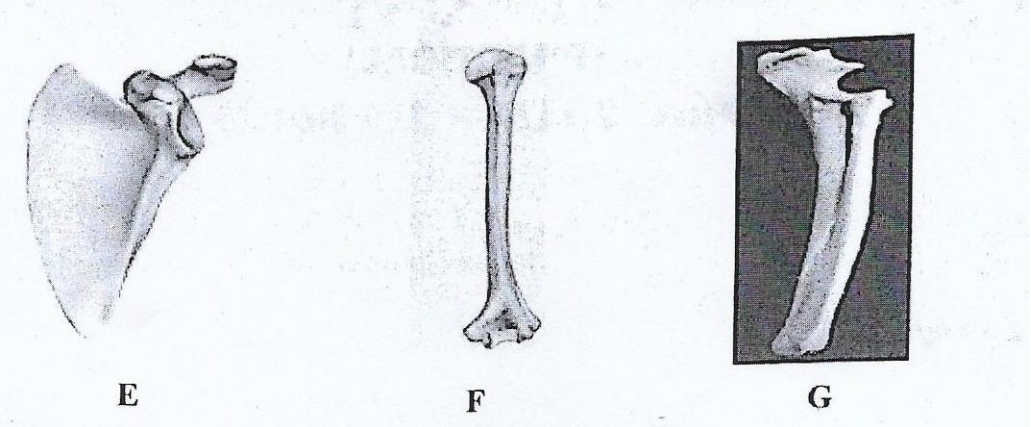
Name (1 mark)

Adaptation (3 marks)

c)State one functional difference between a tendon and a ligament (1 marks)

35. 2018 Q1 P3

1. The photographs below represent three mammalian bones, labeled E,F and G



a)With reasons, identify the bones

Bone	Identity	reason(s)	
E			(3mks)
F			(2mks)
G			(2mks)

b)Name the joints formed a the anterior and posterior ends of F.

Anterior end (1mk)

Posterior end (1 mk)

c)State the types of movement facilitated by the joint at the anterior end of specimen labeled F (1mk)

d i)Name the substance found inside the living tissue of the specimen represented in photograph F. (1 mk)

ii)State the function of the substance named in (d) (i) above, (1mk)

e i)Name the muscle bundle usually attached onto the front of the specimen represented in photograph F (1 mk)

ii)State the function of the muscle bundle named in(ed) (i) above (1 mk)