**SECTION B QUESTIONS**

**(OBSERVATIONAL BIOLOGY & STATISTICS)**

***Nutrition in Plants and Animals***

1. What is meant by enzyme activity?

Figure 2(i), (ii), (iii) and (iv) shows the rate of reaction of an enzyme.

Optimum pH

pH

Rate of reaction

Optimum

Temperature

Temperature

Rate of reaction

Substrate concentration

Rate of reaction

Optimum

Enzyme concentration

Rate of reaction

Temperature = 370C

pH = 9

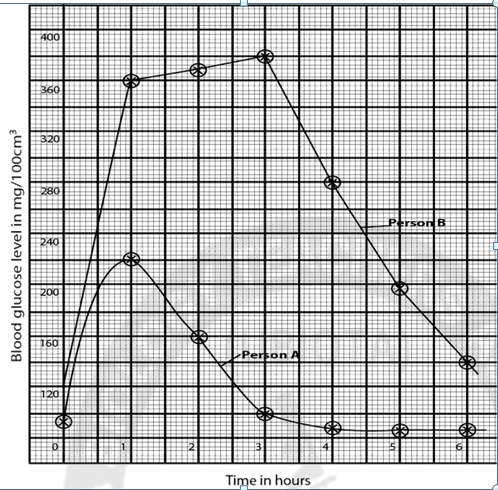
Fig 2 (i) Fig 2 (ii) Fig 2 (iii) Fig 2 (iv)

1. State what each figure shows
2. Fig 2 (i) ii) Fig 2 (ii) iii) Fig 2 (iii) iv) Fig 2 (iv)
3. Describe what happens in each figure.
4. Fig 2 (i) ii) Fig 2 (ii) iii) Fig 2 (iii) iv) Fig 2 (iv)
5. Explain what each figure shows.

Fig 2 (i) ii) Fig 2 (ii) iii) Fig 2 (iii) iv) Fig 2 (iv)

***Homeostasis***

1. In an investigation, two persons A and B drank the same amount of glucose solution. Their blood sugar levels were determined immediately and thereafter at intervals of one hour for the next six hours. The results obtained are shown on the graph below.



1. Describe the trends of the graph.
2. For person A
3. For person B
4. Give reasons for the trends of blood glucose levels in person A between;
5. O and 1 hour
6. 1 and 4 hours
7. Suggest a reason for the high glucose level in person B.
8. What are the Biological importances of maintaining a relatively constant sugar level in human body?
9. Describe how the glucose level in an individual can be maintained constant

***Soil Cycle (Nitrogen)***

1. In an investigation carried out by a biologist, a fish tank was filled with water and some bacteria were added, some phytoplankton (microscopic water plants) were then introduced. The tank was put in a dark place and left for eight months,. At intervals the water was tested to find out what it contained. The results obtained are shown on the graph in the figure below

**Dead phytoplankton**

**Ammonia**

**Nitrates**

**Amount per litre**

**Month**

N

D

J

F

M

A

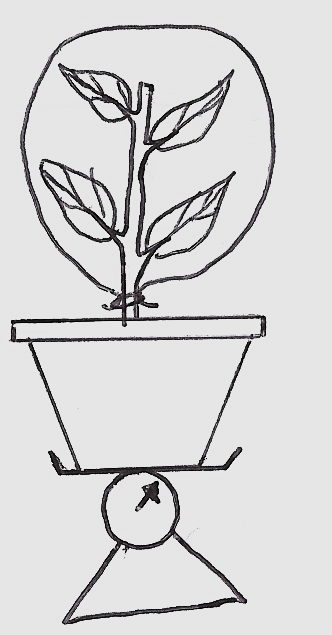
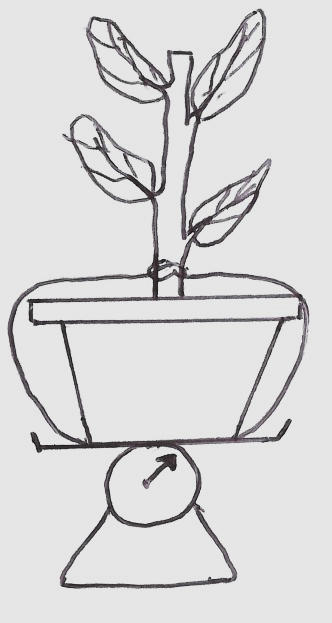
M

J

J

A

1. Explain the shape of the graph obtained for
2. Dead phytoplankton
3. Ammonia
4. Nitrates
5. Suggest the possible bacteria that were added to the water at the beginning of the investigation give a reason in each case.
6. What would be the effect on the results of the experiment if the tank was left in a well-lit place during the entire investigation?
7. An experiment was set up as shown in the figure below to investigate the change in mass of plants potted in damp soil



Polyethene bag

Pot

Leafy shoot B

Polyethene bag

Scale

Leafy shoot A

Two plants A and B were used; plant A had its shoot covered with a polyethene bag while plant B had the pot covered with polyethene bag. The graph below shows the loss in mass over a period of 5 days

Loss in mass (g)

Time in days

**Curve 2**

**Curve 1**

1. (i) Identify which of plants A and B whose graph of loss in mass is represented by

Curve 1:

Curve 2:

(ii) Explain your identity for the curves in a(i) above

Curve 1

Curve 2

1. On the graph extrapolate curve 1 to show the change in loss of mass if the experiment was allowed to run for 7 days instead of 5 days
2. With reasons suggest what would happen to the loss in mass of the two plants if at the start

(i) Humidity of the surrounding increased

(ii) The conditions became windy

(iii) All the leaves were removed from the shoot

1. State any two internal factors that can affect the loss in mass of both plants

***Coordination in plants***

1. a) What is meant by tropism?

b) The diagram below shows the effect of auxins on different seedlings growing in the same condition. The effect the parts of the growing seedling were shown in the graph.

10-6

10-5

10-4

10-3

10-2

10-1

0.1

10

100

100

50

0

50

100

150

Inhibition

Stimulation

**Growth %**

**Concentration of auxins (parts per million)**

X

Y

* 1. Suggest what each curve represents on the part of the seedling.
  2. Give two reasons for each of your answer.
  3. State any 3 differences and similarities between curve X and Y.

c) i) Name the type of growth response under investigation.

ii) State any 2 importance of the growth response.

d) Explain how auxins can be of importance to plants.

***Nutrition (photosynthesis)***

1. Carbohydrates used during respiration and that formed during photosynthesis by a certain plant were measured over a period of 24 hours at an interval of 3 hours.

|  |  |  |
| --- | --- | --- |
| Time of day | Carbohydrates formed during photosynthesis (mg) | Carbohydrates used during respiration (mg) |
| 12 am | 0 | 10 |
| 3 am | 0 | 10 |
| 6 am | 5 | 10 |
| 9 am | 30 | 10 |
| 12 pm | 60 | 10 |
| 3 pm | 30 | 10 |
| 6 pm | 5 | 10 |
| 9 pm | 0 | 10 |

1. Using the same axes, plot a graph of carbohydrates formed during photosynthesis and carbohydrates used during respiration against time.
2. Calculate the net carbohydrates formed by the plant.
3. At what time of the day does light compensation occur?
4. Account for the shape of the curve on the carbohydrates formed between;
5. 12.00am and 3.00a. ii. 3.00am to 12.00noon
6. How can cloudy weather influence the net amount of carbohydrates formed over the 24 hour period?
7. Give other external factors, apart from temperature and light intensity that influence the rate of carbohydrates formed.
8. In which form are the carbohydrates stored in;
   1. Plant tissue? ii) Animal tissue?

***Temperature regulation***

1. In an experiment a healthy naked man was closed in a well lagged room whose temperature was maintained at 450C, he was allowed to stand in a room for five minutes then later swallowed pieces of ice, his internal body temperature was and skin temperature were monitored for 25 minutes and the results obtained are shown on the graph below.

**Temperature (oC)**

**Ice eaten**

**Internal body temperature**

**Skin temperature**

**Time (minutes)**

**36.6**

**36.8**

**37.0**

**37.2**

**37.4**

**37.6**

**37.8**

**0**

**5**

**10**

**15**

**20**

**25**

**30**

1. How does it take for man to regain his normal body temperature upon swallowing ice
2. Explain the changes in each of the following temperatures of man upon swallowing ice
3. Suggest why;
4. The man’s skin temperature is lower than internal body temperature in the first five minute
5. Man was enclosed in a well lagged room
6. State ways how man loses
7. Water
8. Heat
9. Explain why an African fox has larger ears than those of arctic fox

***Nutrition (Digestion)***

1. In an experiment to investigate a physiological process in cells. Two visking tubing each was filled with a mixture of starch solution and salivary amylase and latter dipped in two separate beakers containing distilled water, with one maintained at 20oC and the other at 35oC. at intervals of time, the quantity of starch in the visking tubing and that of reducing sugars in distilled water was determined and the results were as shown on the graph below.

**Time**

Quantity of nutrient

35oC

20oC

35oC

20oC

**Key**

Reducing sugars

Starch

1. State the physiological process being investigated
2. From the graph state;
3. The relationship between the variation in the quantity of starch and reducing sugars with time.
4. Two ways the variation in the quantity of starch differs from that reducing sugars with time.
5. Using the graphs obtained at 35oC, explain the relationship between the variation in the quantity of the nutrients.
6. Explain the difference in the variation in the quantity of each nutrient at the two temperatures
7. Reducing sugar.
8. Starch.
9. Suggest reasons for the following observations
10. At start the quantity of starch is highest while that of glucose is zero.

When water was tested for starch during the experiment it was found absent

***Transport (Osmosis)***

1. a) Differentiate between the following;
2. Heamolysis and crenation
3. Plasmolysis and turgidity

b) Fresh green pepper strips were placed in sucrose solutions of varying concentrations to investigate the changes in mass. The stripes, each measuring 4 cm X 0.5 cm, were cut from the wall of the fruit. A total of 18 strips were cut and the mass of each determined. Three strips were then placed in each of the following solutions: 0.2, 0.4, 0.6, 0.8 and 1.0 mol/dm3, respectively three were placed in distilled water. All were left for 30 minutes and then removed and reweighed. The mean mass of each group of three trips was calculated.

The results were recorded on a table as shown below.

|  |  |  |
| --- | --- | --- |
|  | Mean mass (g) | |
| Molarity of sucrose (mol/dm3) | At the beginning | After 30 minutes |
| 0.0 | 1.74 | 1.83 |
| 0.2 | 1.47 | 1.46 |
| 0.4 | 1.45 | 1.35 |
| 0.6 | 1.52 | 1.34 |
| 0.8 | 1.80 | 1.53 |
| 1.0 | 1.38 | 1.15 |

1. Calculate the change in mass and the percentage change of each strip; Record the information in a table above.
2. Plot a graph of the percentage change in mass against the molarity of the sucrose solution.

c) From your graph, determine the molarity of the sucrose solution that is isotonic to the pepper tissue.

d) Account for the change in mass when the molarity of sucrose solution was;

* 1. 0.0
  2. 1.0

***Growth and development***

1. The table below shows the changes observed in the dry weight of a maize seedlings, its embryo endosperm and other parts during the first 10 days of germination

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Time (days)** | **Embryo (mg)** | **Endosperm (mg)** | **Other part (mg)** | **Whole Seedling**  **(mg)** |
| 0 | 2 | 41 |  | 45 |
| 2 | 2 | 39 |  | 43 |
| 4 | 7 | 32 |  | 41 |
| 6 | 15 | 21 |  | 38 |
| 8 | 22 | 11 |  | 35 |
| 10 | 35 | 6 |  | 43 |

1. Complete the table by filling in the missing values for the weight of other parts.
2. Plot in the same axes graph of dry weight of embryo endosperm other part and whole seedling against time
3. Using the graph explain what happens to the weights of other parts of seedlings.
4. explain the changes in the following dry weights

i)whole seed

ii) Embryo

1. i)State the relationship between the embryo and endosperm weights

ii) Give reasons for your answer.

1. The graph below shows the changes in the fresh mass with time in a germinating seed up to maturity.

A

Fresh mass in grams

Time in days

B

C

E

D

1. Describe the shape of the graph.
2. Explain the changes in fresh mass with the germinating seed.
3. state

i) Any four limitations of parameters used to measure growth.

ii) The limitations of each of the parameter mentioned in c(i) above

1. Describe an experiment to show the region of growth on of a plant root

***Ecology (population)***

1. The table below shows the number of organisms after they were introduced in grassland.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Time in years | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| Number of animals | 100 | 190 | 420 | 1000 | 1200 | 1400 | 1600 | 1620 | 1630 | 1650 | 800 | 50 |

* 1. Plot a suitable graph to represent the data in table above
  2. Describe the shape of the graph obtained in i) above
  3. Explain the shape of the graph
  4. Estimate the carrying capacity of the ecosystem.

***Osmosis (Transport)***

1. An experiment was carried out to investigate haemolysis in human red blood cells. The red blood cells were placed in solutions with different concentrations of sodium chloride. The percentage of haemolysed cells was determined. The results were recorded as shown in the table below.

|  |  |
| --- | --- |
| **Salt concentration (g/100cm3)** | **% of red blood cells haemolysed** |
| 0.33 | 100 |
| 0.36 | 91 |
| 0.38 | 82 |
| 0.39 | 69 |
| 0.42 | 30 |
| 0.44 | 15 |
| 0.48 | 0 |

1. On the graph paper, plot a graph of the percentage of haemolysed red blood cells against the salt concentration.
2. At what concentration of salt solution was the proportion of haemolysed cells equal to that of non- haemolysed cells?
3. State the percentage of cells haemolysed at a salt concentration 0.45g/100cm?
4. i) State the effect of the change in solid concentration on the percentage of red blood cell heamolysed.

ii) Suggest the reason for the effect stated in d (i) above

***Ecology***

1. The figure below shows the results of an experiment in which water weeds were grown in a transparent tank, the oxygen concentration and the pH of the water were recorded continuously every hour over a 24 hour period.

**Changes in water properties**

**Time of day**

**12 midnight**

**6 am**

**12 noon**

**6 pm**

**12 midnight**

**Oxygen concentration**

**pH**

1. (i) Between 12:00 midnight and 6:00 am and between 6:00pm and 12:00 midnight, the variation in both oxygen concentration and pH follow a similar trend. State how the trend is similar at both periods of time.

(ii) Explain the similarity in trend stated in (a)(i) above.

1. (i) From the graph in figure1, state the time of the day when the water is most acidic and most alkaline.

Most acidic:

Most alkaline:

(ii) Give reason(s) why the water is most acidic and most alkaline at that time stated in (b) (i) above

Most acidic

Most alkaline

1. If a fish was introduced into the tank, what would be the effect on the pH of water?
2. The tank was sealed inside a black polyethene bag, after a few days the fish that was introduced was found dead. Explain why this happened? (03 marks)

***Ecology (Water pollution)***

1. Sewage pollution is as one of the man activities which degrade the environment the graph below show the effect of its disposal in a lake with increasing distance down from the point of sewage discharge.

Dissolved oxygen

X Distance down stream

Point of sewage discharge

Concentration of constituents

Ammonium

1. What is sewage?
2. Describe the variation of
   1. Dissolved oxygen and
   2. Ammonium ion along the distance down the stream.
3. Explain your answer.
4. state the likely effect on the biotic component of the lake at a shorter distance down the stream from the point of sewage disposal discharge

***Nutrition (photosynthesis)***

1. An experiment was carried out using aquatic plant and leaves dipped in a strong sodium hydrogen carbonate solution to determine the effect of light intensity on photosynthesis. The leaves were exposed to the different light intensities as well as in the dark. In the process the amount of oxygen released at specific time interval was measured and recorded in the table below.

|  |  |  |
| --- | --- | --- |
| **Light intensity** | **Time (mins)** | **Volume of oxygen released (cm3)** |
| Bright light | 3 | 54 |
| 6 | 60 |
| 12 | 65 |
| Dim light | 15 | 15 |
| 18 | 20 |
| Dark | 21 | -15 |
| 24 | -18 |
| 30 | -20 |

a) Plot a suitable graph of the information represented in the table above

b) From the graph determine;

1. the suitable time for the process
2. the unsuitable time for the process

c) Explain your answers above.

1. Describe the changes in oxygen released with light intensities during
   1. Bright light
   2. Dim light
   3. Dark light
2. Explain your answer above
   1. Bright light
   2. Dim light
   3. Dark light
3. What is the role of sodium hydrogen carbonate in the experiment?

***Soil***

1. The table below shows amount of soil removed annually per 1000m2 and the number of years needed to erode 18 cm of top soil in southern piedmont on different fields having five different types of ground cover

|  |  |  |
| --- | --- | --- |
| **Type of ground cover** | **Kg of soil removed annually per 1000m2** | **Number of years needed to erode 18 cm top soil at this rate** |
| Virgin forest | 5 | 500000 |
| Grass | 775 | 3225 |
| Rotation | 35800 | 70 |
| Cotton | 79000 | 32 |
| Bare ground | 166000 | 15 |

1. From the table, which ground cover(s) show

(i) the highest rate of erosion

(ii) the lowest rate of erosion

1. Explain why; the ground cover stated in (a) above has

(i) the highest rate of erosion

(ii) the lowest rate of erosion

1. Outline two ways in which the top soil could be lost in the following fields

(i) Virgin forest

(ii) Rotation field

(iii) Bare ground

1. Suggest ways how erosion can be reduced in the field with the highest rate of erosion stated in a(i) above
2. If the figures from southern piedmont which is a generally flat land were compared to those obtained from the steep slopes of mountain Elgon with similar ground cover.
3. Explain the difference in the time needed to erode 18 cm top soil

**SECTION C**

**(ESSAY)**

***Cells***

1. a) With aid of a well labeled diagram, describe the structure of a plant cell.

b) State how the structures that make up a plant cell are related to their functions.

c) Compare a plant and an animal cell.

d) Explain the following;-

1. Without the nucleus the plant cell ceases to have life.
2. An animal cell bursts when placed in distilled water for along time.

***Microscope***

1. a) Outline the necessary adjustments and steps taken by a student to observe clearly an epidermal cell from an onion.

b) Suggest the measures taken to maintain and care for the microscope in your school.

c) What is magnification?

d) The table below shows the magnification in the microscope,

**Table 1 Table 2**

|  |  |  |
| --- | --- | --- |
| **Magnification** | **Image length** | **Object length** |
| 200 | 10 |  |
|  | 15 | 3 |
|  | 90 | 100 |
| 150 |  | 10 |
|  | 100 | 200 |

|  |  |  |
| --- | --- | --- |
| **Total magnification** | **Eye piece** | **Objective** |
| 1000 | 50 |  |
|  | 100 | 250 |
| 2000 | 500 |  |
|  | 60 | 40 |

* 1. Copy and complete it
  2. Explain how you have arrived to your answer above.

***Roots***

1. a) Describe the structure of the tap root system.

b) Describe the internal structure of a monocotyledonous root.

c) State how;-

1. The internal structure of a monocot root is similar to a dicot root.
2. The internal structure of a monocot is different from the dicot root.

d) Explain how the roots are modified to perform different functions.

***Leaves***

1. a) With the aid of a labeled diagram, distinguish between pinnate and bi-pinnate leaves.

b) Explain how leaves are adapted to;-

* 1. minimize water loss,
  2. Efficiently to carry out photosynthesis.

c) Describe how leaves are modified to perform different functions.

***Insects***

1. a) What is metamorphosis?

b) Describe how the life cycle of a house fly differs from a cockroach.

c) Explain how;-

1. Spread of malaria by mosquito can be controlled.
2. Spread of cholera by housefly can be minimized.

***Soil***

1. a) What are the constituents of fertile soils?

b) In what ways may human activities;

i) Improve soil?

ii) Degrade the soil?

1. a) Explain the importance of the following components of soil;-
   1. Micro organisms
   2. Macro organisms
   3. Humus
   4. Air

b) Describe an experiment to show that

1. Sandy soil has the lower water retention capacity than clay soil.
2. Clay soil has the higher capillarity than loam soil.

***Nutrition***

1. A child ate a meal consisting of yams and fish,
2. Describe the activities of digestion that occur in the child’s gut to ensure that the proteins are made useful to the child body cells.
3. The ileum performs the function of digestion and absorption. Explain how the two functions are achieved by small intestine.
4. a) What is meant by rate of photosynthesis?
5. Explain the factors limiting rate of photosynthesis in each of the following conditions
6. Aquatic habitat
7. At night
8. Thick forest
9. Describe an experiment to show that carbon dioxide is necessary for photosynthesis.

***Transport in Plants and Animals***

1. a) What is transpiration?

b) Explain how the following factors affect the rate of transpiration,

1. Humidity
2. Temperature
3. Stomata size and distribution
4. Leaf surface area

c) State how the following plants over come the challenge of water;-

1. Xerophytes
2. Mesophytes
3. Hydrophytes
4. a) The transport system in man is made of lymphatic and blood circulatory system, State;-
   1. Any 5 difference between the two systems
   2. Any 3 similarities between two systems

b) Explain the changes that occur in the composition of blood as it passes through the capillaries of the following parts of the body;-

1. Liver
2. Lungs
3. Kidney

***Homeostasis***

1. a) Differentiate between osmoregulation and excretion.
2. Describe the role of vasopressin in regulating water in man.
3. Explain how;-
   1. Kidney nephron is related to its function of urine formation.
   2. Urea is formed and eliminated in man.
   3. The body regulates amino acids.
4. a) Explain how
5. Ectotherms regulate temperature variation.
6. Endotherms regulate temperature variation
7. Give reasons why,
   1. It is necessary to maintain body temperature in mammals.
   2. It is necessary to expel out carbon dioxide in a mammal.
8. State the advantages of ectotherms have over the Endotherms in regulating the body temperature
9. a) What is meant by excretion?

b) Describe how carbondioxide is removed from a mammalian body tissue into the atmosphere.

***Respiration and gaseous exchange***

1. a) Distinguish between gaseous exchange and respiration.

b) Describe how the action of the muscles can bring about opposite movement of atmosphere air through the gaseous exchange organ to the body cells of a mammal.

c) Describe how the following are adapted to suit their functions;-

1. The lungs
2. Tracheoles
3. a) What is meant by cellular respiration?
4. Explain

i) Any four application of the process above

ii) Why an individual may develop muscle pains after a long distance?

iii) The adjustment an individual may undergo to run long distance when moving from at low altitude to high altitude.

e) Describe an experiment to show that energy is given off by the germinating seed

***Coordination***

1. a) What is meant by accommodation?

b) Describe with the aid of a well labeled diagram events that occur in the eye to focus and see clearly;

* + 1. An aeroplane in the sky.
    2. An apple while seated on a dining table.

c) Explain how footballer during a match is able respond to the sound of a whistle made by the referee.

1. a) What is meant by a hormone?

b) A student was frightened by a snake and immediately made an alarm.

1. Giving a reason, suggest the hormone that is most likely found in the student’s blood at a higher concentration.
2. State the effect of that hormone to the student’s body.

c) Compare nervous and hormonal coordination

d) Explain why

* 1. The pituitary gland is referred to as the master gland.
  2. The pancreas is both an exocrine and endocrine gland.

e) Draw a well labeled diagram showing the location of the glands in the endocrine system in man.

f) A child sees a fierce lion and gets frightened, describe the events that occur in the child’s body to escape this lion.

1. a) What is meant by;-
   1. A reflex action?
   2. Conditioned action?
   3. Involuntary action?
   4. Voluntary action?

b) Compare each of the following responses

i) conditioned reflex and voluntary actions

ii) Reflex action and voluntary action

***Locomotion***

1. a) Distinguish between locomotion and movement.
2. Explain the importance of skeleton to a mammal.
3. Describe the instabilities that occur in a fish during locomotion in water; and state how each is over came.
4. a) Explain how muscles can bring about
   1. Flight in insects
   2. Flight in birds
   3. Raising and lowering of the arm

b) Describe how the following organisms are suited for movement and locomotion.

1. Grasshopper
2. Tilapia
3. Flamingo bird
4. Amoeba

c) Compare flight in birds and insects

***Reproduction in Plants and Animals***

1. What is meant by?
2. Implantation
3. Menstruation
4. State the advantages of;
5. Asexual reproduction has over sexual reproduction
6. Internal fertilization has over external fertilization
7. Compare the adaptation of male and female reproductive system of a man.
8. Describe the process that occur after pollination in a flower leading to the formation of a fruit
9. How are plants adapted to promote;
   * 1. Self pollination?
     2. Cross pollination?
10. State how insect flowers are different from wind pollinated flowers for a successful pollination.
11. Explain the various methods of seed and fruit dispersal?
12. a) State any 3 functions of the hormones produced in man
    1. Before conception.
    2. After conception and parturition.

b) Describe how hormones control the menstrual cycle in human females.

c) Compare the secondary sexual characteristics in male and female.

***Growth and development***

1. a) Differentiate between;
   1. Growth and development,
   2. Primary growth and secondary growth
   3. Dormancy and germination

b) State any two importance of

1. Seed dormancy
2. Secondary growth

c) Explain the causes of seed dormancy and state how each is broken.

1. a) What is germination?

b) Explain the various factors necessary for a seed to germinate.

c) Describe an experiment to show that a seed does not germinate and grow in too much water.

***Genetics (Mendel’s experiment)***

1. a) What is meant by an allele?

b) Distinguish between

i) Dominant and recessive allele

ii) Homozygous and heterozygous

iii) Pure breed and hybrid

iv) Test cross and back cross

c) Outline the Mendel experimental procedure that resulted into a conclusion of a phenotypic ratio of 3:1 on the plant

d) In pea plant pure tall plant was crossed with pure short plants and all the f1 off springs were tall, if one of the f1 off springs was crossed with a heterozygous plant to form f2 offspring,

i) Explain the absence of short plant in f1.

ii) Work out using genetic crosses the F1 phenotypic ratio

iii) Calculate the percentage of offspring in F2 with allele for shortness

***Incomplete dominance***

1. a) Distinguish between incomplete dominance and codominance.
2. In a breeding experiment, when plants with red flowers were crossed with plants with white flowers all offspring had pick flowers

i) Explain the absence of white flowers in off springs

ii) Using suitable symbols work out the F2 genotypic ratio for a cross of F1 offspring

iii) Determine the probability of producing white flowered plants given that the total numbers of offspring were 120 plants which were white, 50 red and 60 heterozygote,

***Sex linked genes and character***

1. a) Distinguish between;
   * 1. Sex linked character and sex limited character
     2. Continuous and discontinuous variation

b) Red color blindness is sex linked A woman with normal color vision marries a man with red green color blindness and they have three children. The two girls have normal vision. Using genetic cross; show how the phenotype and genotype of the off springs are formed. One of the daughters married a man with normal colored vision. What will be the phenotype of their son show using genetic diagrams.

d) Explain how a father is able to transmit a sex linked character to his son.

***Ecology***

1. a) What is meant by;
2. a habitat
3. An ecosystem
4. a population
5. Game cropping

b) Describe the suitable method of determining the population of

i) Elephants

ii) Paspalum

iii) Grass hopper

1. a) Differentiate between
2. Food chain and food web
3. Pyramid of energy and bio mass
4. a biotic and biotic components

b) In ecological study the following organism were found in two habitat X and Y

X Tilapia water beetle weed and tadpoles

Y Chameleon, praying mantis, Predatory mouth green, Plant grass hopper

Construct a food chain in

1. Y
2. X

c) Explain what would happen to food chain if the water weed were removed.

1. Describe the flow energy is an ecosystem in habitat X.
2. Explain the role of the following organism in ecosystem.
3. Bacteria
4. Marabou stock
5. Termites

***Environmental biology, pollution***

1. What is meant by;-
   1. Global warming?
   2. Environmental degradation.
2. Explain how man activities can cause
3. Water pollution
4. Air pollution
5. Land pollution
6. Suggest the possible remedies for cause of pollution mentioned above.
7. Explain how a polythene bag can be harmful to the environment.

***Associations***

1. a) Giving 3 examples, explain the term;-
   1. Parasitism?
   2. Mutualism?
   3. Commensalism?

b) Explain the mode of life of the following organisms;

1. Tick.
2. Tape worm.

c) Explain how a parasite is able to live successfully in its host.

**END**