

Biology I

001

06th Nov 2013 8.30am-11.30am

ORDINARY LEVEL NATIONAL EXAMINATION 2013

SUBJECT : BIOLOGY I

TIME : 3 HOURS

INSTRUCTIONS:

- This paper consists of **THREE** Sections A, B and C.
- Answer **ALL** the questions in section A. **(55 marks)**
- Answer **THREE** questions in section B. **(30 marks)**
- Answer only **ONE** question in section C. **(15 marks)**

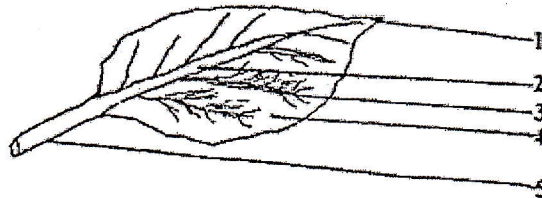
SECTION A: ATTEMPT ALL QUESTIONS.

(55 MARKS)

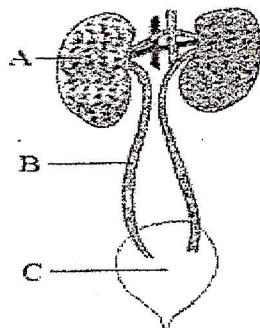
1. a) Name ONE characteristic feature common to fish, reptiles and birds but not found in mammals. (1 mark)
- b) Name the kingdom to which each of the following belongs: (3 marks)
 - i. grass
 - ii. Mould
 - iii. Spirogyra
2. Copy and complete the table below.

ANIMAL	PHYLUM	CLASS
Cockroach		
Toad		
Centipede		
Elephant		

3. The diagram below shows the structure of a leaf.

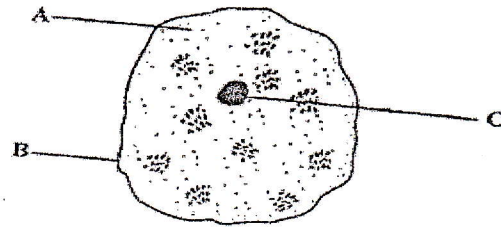


- a) Identify the parts labeled 1, 2, 3, 4 and 5. (5 marks)
- b) What are the functions of parts labeled 4 and 5? (2 marks)
- c) State two ways in which the external structure of the leaf is modified to perform its function. (2 marks)
4. a) Where in the body are red blood cells made? (2 marks)
- b) State three ways in which red blood cells are specialized to carry out their functions. (3 marks)
5. What is the difference between excretion and egestion? (2 marks)
6. Knowledge acquired through the study of BIOLOGY can help us to fight against HIV/AIDS and other sexually transmitted diseases. Explain how this can help you. (4 marks)
7. The diagram below shows part of the system that controls the amount of water in the body.



- a) Give the name and the function of each labeled part. (6 marks)
- b) This system also excretes a substance called urea. Why is it necessary in the body? (1 mark)

8. The diagram below shows an animal cell.



Name each labeled part and explain its functions.

(6 marks)

9. Animals and plants carry out common life processes like exchanging gases and excretion.

Copy and complete the table to name or describe processes common to all animals and plants.

(6 marks)

Name of the life process	Description.
.....	Living things produce off springs
.....	Living things get bigger and develop
.....	Living things change the position of their body, of part of their body.
Respiration
Feeding or nutrition
.....	Detect and respond to changes in the environment.

10. a) How does glucagon increase glucose level in the blood?

(2 marks)

b) How does glucagon effect differ from that of insulin?

(2 marks)

11. Give the functions of the following hormones in the human body.

a) Follicle stimulating hormone. (FSH)

b) Progesterone

c) Antidiuretic hormone.

(3 marks)

SECTION B: ATTEMPT ANY THREE QUESTIONS.

(30 MARKS)

12. a) Bile is produced by the gall bladder. It contains no enzymes. What is its function? (2 marks)

b) Give at least four enzymes present in the pancreatic juice and a function of each. (8 marks)

13. a) Mice (rats) with black fur can have the genotype **BB** or **Bb**, while mice with brown fur have the genotype **bb**.

i) Use a genetic diagram to show what fur color you would predict in the F1 off spring produced by two mice which are both Bb.

(3 marks)

ii) Why might your predictions of fur color in F1 generation NOT be proved right? (1 mark)

b) i) What is the difference between dominant and recessive alleles? (2 marks)

ii) What is the difference between alleles and genes? (2 marks)

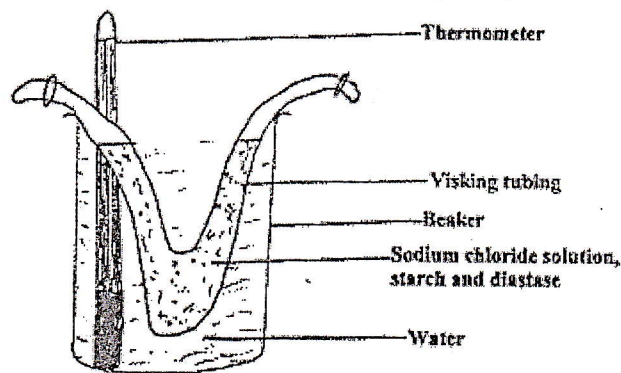
iii) Describe the difference between homozygous and heterozygous chromosomes. (2 marks)

14. Use a table to show the differences between endocrine and exocrine glands. Give the similarities of these glands. (10 marks)
15. a) Write STD's in full and give two examples of STDs. (3 marks)
 b) Outline the general symptoms of STDs common to both men and women. (7 marks)
16. a) What is the advantage to an animal of having capillaries which are:
 i. Very narrow? (2 marks)
 ii. Repeatedly branched? (2 marks)
 iii. Very thin walled? (2 marks)
 b) How do you think microscopic animals can survive without having a circulatory system? (4 marks)

SECTION C: THIS SECTION IS COMPULSORY:

(15 MARKS)

17. The experiment below is used to demonstrate a biological process.



Visking tubing is made of material which acts as a semi-permeable membrane. After some time water from the beaker entered the visking tubing and water in the beaker became salty. The temperature of the experiment was kept between 35°C and 40°C throughout the experiment.

- a) By what process has water entered the visking tubing? (1 mark)
 b) Give an example of the process in (a) above occurring in:
 i. Animal cell
 ii. Plant cell. (4 marks)
- c) By what process has salt entered water in the beaker? (1 mark)
- d) Give an example of the process in (c) above occurring in:
 i. Animal cell
 ii. Plant cell. (4 marks)
- e) i) Name one more substance, you think has entered the water in the beaker by the same process as salt. (1 mark)
 ii) How can you test for the presence of that substance? Give details of your test. (5 marks)

END

MARKING GUIDE FOR 2013

SECTION A

Answer to Question 1.

- (a) All don't give birth to live young ones but rather lay eggs. Also, all don't have mammary glands except mammals.
- (b) (i) grass – Kingdom Plantae
(ii) Mould – Kingdom Fungi
(iii) Spirogyra – Kingdom Protocista /Protista

Answer to Question 2.

ANIMAL	PHYLUM	CLASS
Cockroach	Arthropoda	Insecta
Toad	Chordata	Amphibian
Centipede	Arthropoda	Chilopoda
Elephant	Chordata	Mammalia

Answer to Question 3.

- (a) **1** – Apex , **2** – mid-rib, **3** – vein, **4** – Lamina, **5** – Leaf stalk
(b) **4** – It traps sunlight for photosynthesis to take place, **5** – attaches leaf to stem.
(c) - It is broad to trap sunlight for photosynthesis
- It has veins which transport manufactured food.

Answer to Question 4.

- (a) In bone marrows.
(b) - They are numerous to transport blood, They have haemoglobin to transport oxygen, They lack a nucleus for more space, They are bi-concave for easy movement, They are thin for easy diffusion of gases.

Answer to Question 5.

Excretion is the removal of waste products of metabolism from the body while egestion is the removal of undigested food from the body.

Answer to Question 6.

The knowledge teaches us how to;

- Abstain from sexual activities in order to prevent the spread of AIDS
- To know which preventive measures that can be used against the spread of HIV/AIDS e.g. Condoms
- Encourage married people to remain faithful to each other
- To know how the virus reproduces and how minimize it from spreading
- To know which instruments to avoid using e.g. sharp objects

Answer to Question 7.

- (a) A – Right kidney **function:-** *it filters blood to form urine.*
B – Right ureter **function:-** *it connects urine from the kidney to the bladder*
C –Bladder **function:-** *it stores urine temporarily before it is removed.*
- (b) it helps to keep the blood concentration constant.

Answer to Question 8.

Part and function

Part	Name	Function
A	Cytoplasm	It contains cell organelles
B	Cell membrane	It separates the cells content from the outside of the cell
C	Nucleus	It controls all cell's activities

Answer to Question 9.

Table

Name of the life process	Description.
Reproduction	Living things produce off springs
Growth	Living things get bigger and develop
Movement	Living things change the position of their body, of part of their body.
Respiration	Living things produce energy
Feeding or nutrition	Living things need food to survive.
Irritability	Detect and respond to changes in the environment.

Answer to Question 10.

- (a) It causes the liver cells to convert glycogen into glucose. It also causes the conversion of stored fats into glucose.
- (b) Glucagon increases the levels of glucose in blood while insulin lowers the levels of blood glucose.

Answer to Question 11.

- (a) FSH stimulates the development of follicles. It also causes the release of oestrogen.
- (b) It causes the thickening of uterus walls
- (c) It causes increase in water reabsorption from the kidney.

SECTION B**Answer to Question 12.**

- (a) The role of bile is to cause emulsification of fats and to neutralise the acid coming from the stomach.
- (b)

Name of enzyme	Function
Pancreatic amylase	To break down starch to maltose
Trypsin	To break down proteins to dipeptides
Lipase	To break down lipids to fatty acids and glycerol

Answer to Question 13.

(a) (i) Parents : Male x Female
 Phenotype: Black Black
 Genotype: Bb B
 Gametes: (B) (b) (B) (b)

Gametes	(B)	(b)
(B)	BB	Bb
(b)	Bb	bb

F1 phenotype: 3 black and 1 brown

- (ii) This is because the predications are just a probability.
- (b) (i) Dominant alleles are those which express themselves in the phenotype even in absence of another while recessive alleles are those which express themselves in the phenotype only in the presence of another.
- (ii) Alleles are any one of two or more genes that occur on a chromosome while genes are a segment on the DNA that carry information on a specific protein.
- (iii) Homozygous chromosomes are two chromosomes which are identical and carry the same information while heterozygous chromosomes are those which are not identical and carry different information.

Answer to Question 14.

Similarities of endocrine and exocrine glands

- Both produce chemical substances
- Both are controlled by autonomic nervous system.
- Both are found in the epithelial tissue

Differences between endocrine and exocrine glands

Endocrine glands	Exocrine glands
Have no ducts	Have ducts
They pour secretions directly into the blood	The secretion is poured directly at the site of action or reaches the target
They secrete hormones	They secrete enzymes
They control long term of target organs	They control short term activity

Answer to Question 15.

- (a) STD's – Sexually Transmitted Diseases e.g. AIDS, Syphilis, Gonorrhoea
- (b) - A discharge from the penis, urethra, vagina, or anus. The discharge may be blood-streaked, and it may or may not have a strong odour.
- Genital and/or anal itching or irritation.
 - A rash, blisters, sores, lumps, bumps, or warts on or around the genitals, anus, or mouth.
 - Burning or pain during urination.
 - Swollen lymph glands in the groin.
 - Pain in the groin or lower belly.
 - Pain or swelling of the testicles, Swelling or redness of the vagina.
 - Weight loss, loose stools and night sweats.
 - Flu-like symptoms (such as aches and pains, fevers, and chills).
 - Painful sex, Bleeding from the vagina other than during a monthly period.

Answer to Question 16.

- (a) (i) Narrow capillaries increase the blood pressure hence faster blood flow.
(ii) This ensures that all body cells are well covered and can get all the bodies' needs.
(iii) To allow easy diffusion of gases across the wall.
- (b) They have a smaller size and because of that, their surface area to volume ratio is very bigger. Because of this, nutrients and even gasses can easily move in and out passively by use of diffusion process.

SECTION C

Answer to Question 17.

- (a) Osmosis
- (b) (i) During water absorption in the ileum and also during formation of tissue fluid in the body.
(ii) During water absorption in root hairs.
- (c) Diffusion
- (d) (i) - Uptake of gases via the alveoli surface.
- Oxygen diffuses from the blood cells in the blood stream into muscles.
(ii) Movement of food down the plant.
- (e) (i) maltose
(ii) Test for maltose

Apparatus:

- Test tubes
- Benedict's solution
- Dilute hydrochloric acid
- Dilute sodium hydroxide solution
- Heat source, dropper

Procedure:

- Place 2cm³ of the solution (from the beaker) in a test tube followed by 2cm³ of dilute hydrochloric acid and heat for 1 minute.
- Cool and add 2cm³ of dilute sodium hydroxide followed by 2cm³ of Benedict's solution and heat.

Observation:

- The blue colour of benedict's solution turns to green to yellow and finally brown.

END