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:
      i. grass ii. Mould iii. Spirogyra (3 marks)

2. Copy and complete the table below.

<table>
<thead>
<tr>
<th>ANIMAL</th>
<th>PHYLUM</th>
<th>CLASS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cockroach</td>
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<td></td>
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<tr>
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<td></td>
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<tr>
<td>Elephant</td>
<td></td>
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</table>

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. (2 marks)

5. What is the difference between excretion and egestion? (3 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.

![Diagram of an animal cell]

Name each labeled part and explain its functions.

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.

<table>
<thead>
<tr>
<th>Name of the life process</th>
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<td>Detect and respond to changes in the environment.</td>
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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.

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 offspring 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)

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)

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   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?
    ii. Repeatedly branched?
    iii. Very thin walled?
    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.

![Experiment Diagram]

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 Protoctista /Protista

Answer to Question 2.

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<td>Insecta</td>
</tr>
<tr>
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<td>Chordata</td>
<td>Amphibian</td>
</tr>
<tr>
<td>Centipede</td>
<td>Arthropoda</td>
<td>Chilopoda</td>
</tr>
<tr>
<td>Elephant</td>
<td>Chordata</td>
<td>Mammalia</td>
</tr>
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</table>

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

<table>
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<tr>
<th>Part</th>
<th>Name</th>
<th>Function</th>
</tr>
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<tbody>
<tr>
<td>A</td>
<td>Cytoplasm</td>
<td>It contains cell organelles</td>
</tr>
<tr>
<td>B</td>
<td>Cell membrane</td>
<td>It separates the cells content from the outside of the cell</td>
</tr>
<tr>
<td>C</td>
<td>Nucleus</td>
<td>It controls all cell's activities</td>
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Answer to Question 9.
Table

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<tr>
<td>Irritability</td>
<td>Detect and respond to changes in the environment.</td>
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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)

<table>
<thead>
<tr>
<th>Name of enzyme</th>
<th>Function</th>
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</thead>
<tbody>
<tr>
<td>Pancreatic amylase</td>
<td>To break down starch to maltose</td>
</tr>
<tr>
<td>Trypsin</td>
<td>To break down proteins to dipeptides</td>
</tr>
<tr>
<td>Lipase</td>
<td>To break down lipids to fatty acids and glycerol</td>
</tr>
</tbody>
</table>
Answer to Question 13.

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

<table>
<thead>
<tr>
<th>Gametes</th>
<th>B</th>
<th>b</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>BB</td>
<td>Bb</td>
</tr>
<tr>
<td>b</td>
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<td>bb</td>
</tr>
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</table>

F1 phenotype: 3 black and 1 brown

(ii) This is because the predictions 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

<table>
<thead>
<tr>
<th>Endocrine glands</th>
<th>Exocrine glands</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have no ducts</td>
<td>Have ducts</td>
</tr>
<tr>
<td>They pour secretions directly into the blood</td>
<td>The secretion is poured directly at the site of action or reaches the target</td>
</tr>
<tr>
<td>They secrete hormones</td>
<td>They secrete enzymes</td>
</tr>
<tr>
<td>They control long term of target organs</td>
<td>They control short term activity</td>
</tr>
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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

(b) (i) Uptake of gases via the alveoli surface.

(ii) Movement of food down the plant.

(c) (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