JUNIOR LYCEUM ANNUAL EXAMINATIONS 2009

Directorate for Quality and Standards in Education
Educational Assessment Unit

BIOLOGY – FORM IV
TIME: 1H 30MIN

NAME: _____ CLASS: _____

Question No.	Section A								Section B					
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**	
Max mark	5	7	6	10	6	9	6	6	15	15	15	15	15	
Actual mark														**TOTAL MARK**

85% Theory Paper	15% Practical	100% Final Score

Section A
Answer all questions in this Section.

1. Where do **each** of the following passages lead to?

a) gullet _____

b) duodenum _____

c) rectum _____

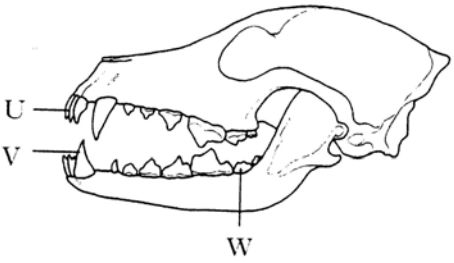
d) ureter _____

e) vena cava. _____(1, 1, 1, 1, 1 mark)

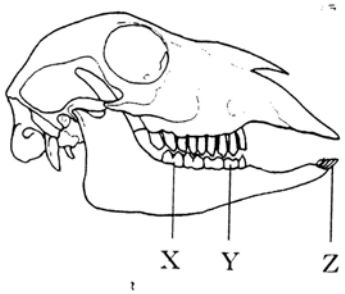
Total 5 marks

2. The diagrams below show the skulls of two mammals (**A** and **B**)

Skull A



Skull B



a) Write the letter of the skull of a herbivore.

_____ (1 mark)

b) Use the letters in the diagrams to identify:

(i) the incisors _____ _____

(ii) the tooth used to pierce and hold the prey _____

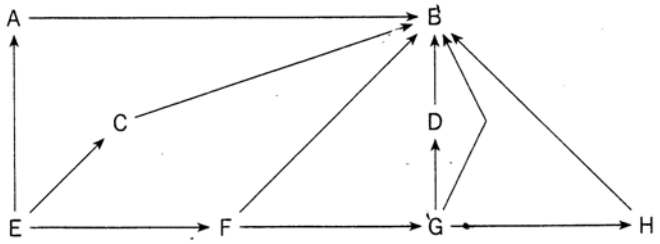
(iii) the teeth used to crush and grind plant material _____ _____

(2, 1, 2 marks)

c) Label the carnassial tooth, on the appropriate skull. (1 mark)

Total 7 marks

3. The following diagram shows a food web in which each letter in the diagram represents a different species of organism.



a) From the diagram write ONE letter that represents:

(i) a herbivore _____

(ii) an organism in the 4th trophic level _____

(iii) a producer _____

(iv) a secondary consumer. _____ (1, 1, 1, 1 mark)

b) Use the letters in the food web to write a food chain including four trophic levels.

_____ (1 mark)

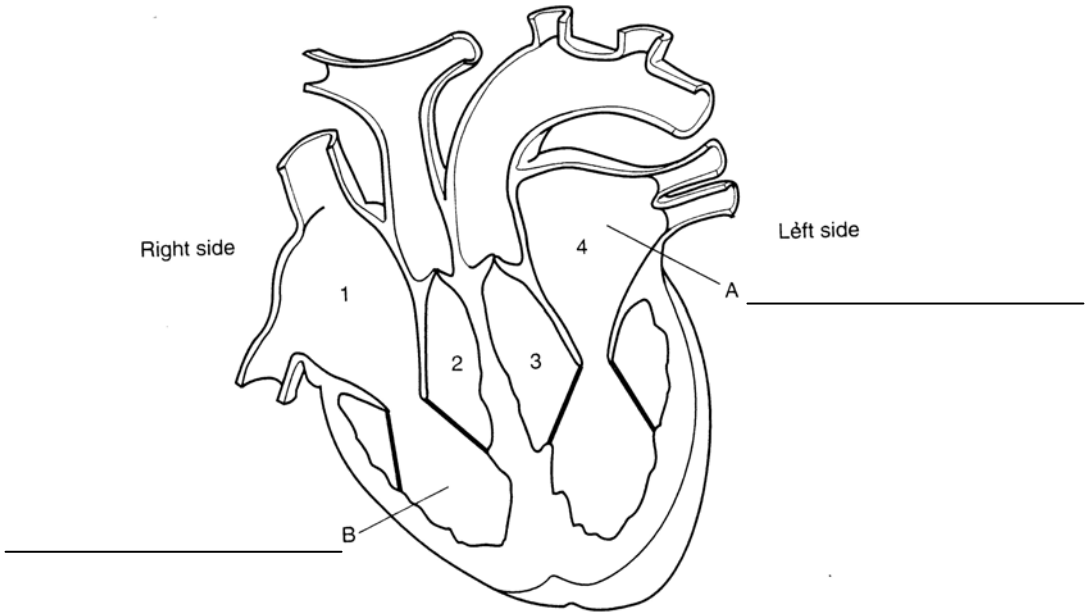
c) Most food chains do NOT extend beyond the 4th trophic level. Explain.

_____ (1 mark)

Total 6 marks

4. The following diagram shows a cross-section through the mammalian heart.

a) Label the parts A and B. (1, 1 mark)



b) On the diagram above draw arrows to show the direction of blood flow at points **1**, **2**, **3**, **4**. (4 marks)

c) Name:

(i) the red pigment present in red blood cells _____

(ii) the condition caused due to lack of red blood cells _____

(iii) the proteins produced by some white blood cells to destroy antigens. _____ (1, 1, 1 mark)

d) Give ONE situation in which the heart pumps faster than normal.

_____ (1 mark)

Total 10 marks

5. A green plant was placed in a dark cupboard and after 48 hours some of its leaves [illegible] for starch.

a) No starch was found in the leaves after the plant had been in the cupboard for 48 ho[illegible] Explain.

_____

_____ (1 mark)

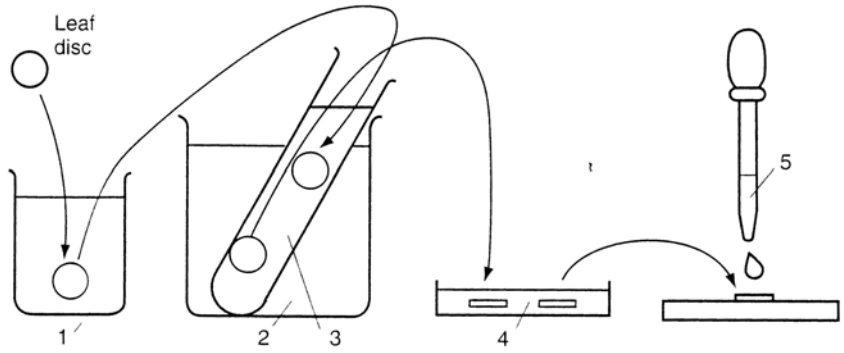
b) (i) Name the mineral necessary for the formation of the pigment chlorophyll.

_____ (1 mark)

(ii) What happens if the mineral necessary for the formation of chlorophyll is not available for the plant?

_____ (1 mark)

c) The following diagram shows the method used to test leaf discs (pieces from the leaf) for starch. The leaf discs were transferred in the direction of the arrows.



Write the number of the liquid that is:

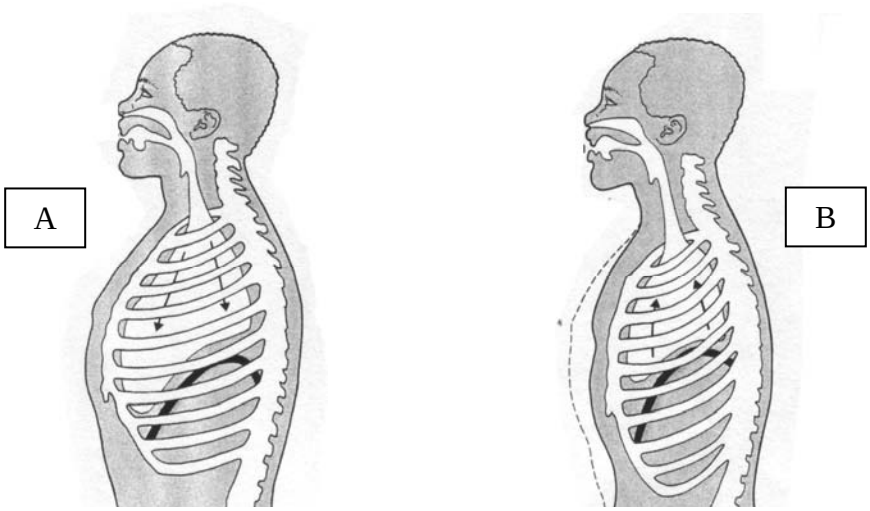
(i) used to decolourise the leaf discs _____

(ii) used to kill the leaf discs _____

(iii) iodine solution. _____ (1, 1, 1 mark)

Total 6 marks

6. The following two diagrams (**A** and **B**) show the breathing process.



a) List TWO differences between diagrams A and B.

_____

_____

_____ (4 marks)

b) When a person has stopped breathing as a result of electric shock or heart attack, it is advisable to give mouth to mouth respiration immediately, in order to try to revive the person.

(i) Why is it important to act quickly in such cases?

_____

(ii) Describe what happens to the patient's chest when another person carries out mouth-to-mouth ventilation.

_____

(1, 1 mark)

c) In the space below draw a diagram to show the gas exchange process in the alveolus.

(3 marks)
Total 9 marks

7. The following table shows the concentration of 4 substances (**A**, **B**, **C** and **D**) in blood plasma, glomerular filtrate and urine respectively.

Concentration (g/100cm^3)			
Material	**Blood Plasma**	**Glomerular Filtrate**	**Urine**
A	0.03	0.03	2.00
B	0.10	0.10	0.00
C	0.05	0.05	0.00
D	8.00	0.00	0.00

a) Write the letter of the substance representing protein. Give a reason for your answer.

_____

_____ (2 marks)

b) Explain why there is a small concentration of substances B and C in both blood plasma and glomerular filtrate but no presence of them in urine.

_____ (1 mark)

c) Write the letter of the subtance that is being excreted in urine.

_____ (

d) The following table shows the water loss from a person's skin and kidneys under differe conditions.

Water Loss (cm^3 per day)			
Organ	**Normal Room Temperature**	**Hot Weather**	**Prolonged Heavy Exercise**
Skin	450	1750	5350
Kidneys	1400	1200	500

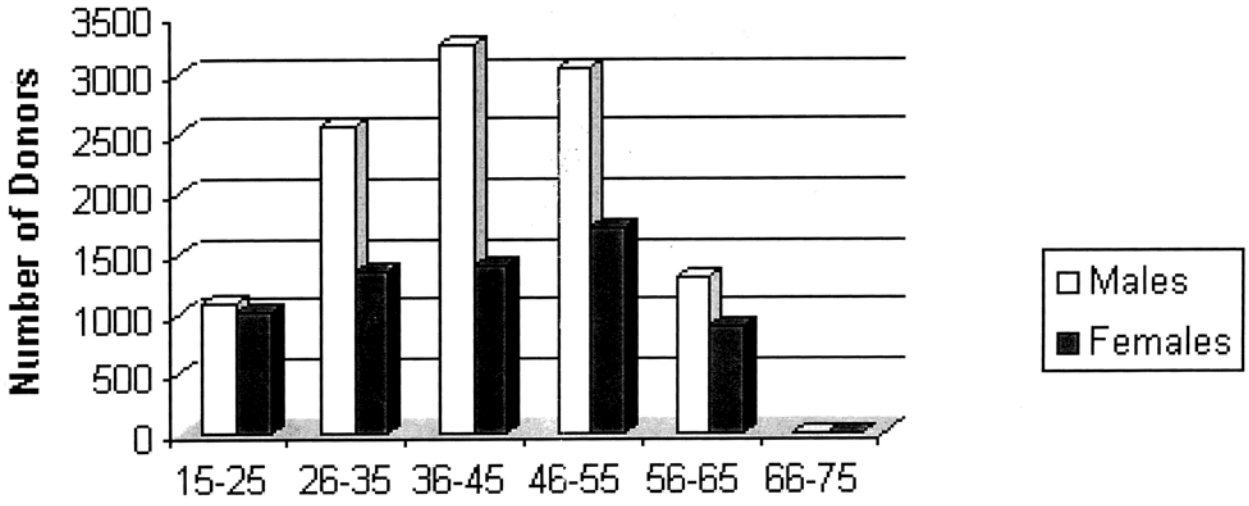
Compare the water loss by the skin and the kidneys in the three different conditions. Give a reason for your answer.

_____

_____ (2 marks)

Total 6 marks

8. The following bar graph shows the number of blood donors by age group.



Age In Years

a) List TWO observations from the data in the bar graph.

_____

_____ (2 marks)

b) In blood donation, a needle is inserted into a donor's vein. List TWO structural characteristics of veins.

_____

_____ (2 marks)

c) Give ONE reason why it is dangerous to lose more than two litres of blood.

_____ (1 mark)

d) The blood is normally stored in a blood bank for about a month. Give a reason w
cannot be used for transfusions after a month's time.

_____ (1 ma

Total 6 marks

Section B

Answer the first question and choose any TWO other. Answer the questions of Section B on a foolscap.

1. Read the following passage and answer the questions that follow.

Brewing

The basic techniques involved in brewing are centuries old. Alcoholic fermentation is carried out by yeast and relies upon anaerobic conditions inside the fermenter.

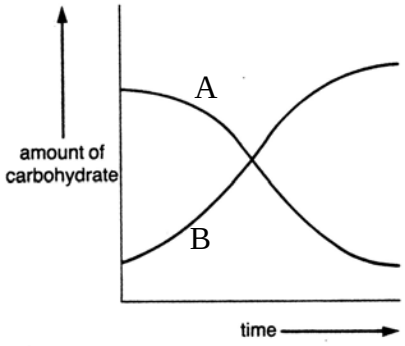
The initial source of carbohydrate in brewing is barely, although yeast cannot digest the starch until the barley has been malted and mashed. These processes allow the starch to be digested into simple sugars by enzymes found in the barley. Hops are also added for flavour and a sugary liquid called wort is created. Yeast is added to the wort and maltase enzyme is used to break maltose into glucose.

a. (i) From the passage name the disaccharide and its monomer.
(ii) Name the process that breaks a polysaccharide into its monomers.
(iii) List the THREE products of alcoholic fermentation. (2, 1, 1 mark)

b. (i) Name a protease, its substrate and the product/s formed by the enzyme-catalysed reaction.
(ii) Enzymes can be used again after the enzyme-catalysed reaction. Explain.

c. (i) When a person is running very fast, the body cells switch to anaerobic respiration. Explain.
(ii) Compare the amount of energy produced in anaerobic respiration with that produced in aerobic respiration.

d. The graph below shows the relative amounts of carbohydrate in two parts (**A** and **B**) of a potato plant, towards the end of the growing season.



Write the letter of the plant representing the potato tubers. Give a reason for your answer.
(3 marks)

e. (i) In some parts of the world fermentation of carbohydrate-rich crops such as s… used to produce bio-fuel (a petrol substitute in cars).
(ii) Explain why yeast is necessary to a baker. (1, 1…
Total 15 ma…

2a. Describe vascular tissue in plants and explain its importance. (5 marks)

b. Give a biological explanation for **each** of the following statements.
(i) The upper epidermis of the leaf is transparent.
(ii) The cells in the spongy mesophyll have fewer chloroplasts than those in the palisade mesophyll.
(iii) Leaves have a network of veins. (2, 2, 2 marks)

c. List TWO external features of leaves that make them well adapted for photosynthesis. (2 marks)

d. List ONE limiting factor to the rate of photosynthesis for a plant growing on the forest floor. Give a reason for your answer. (2 marks)
Total 15 marks

3. Distinguish between:
a. lactose and lactase
b. trachea and gullet
c. pancreatic juice and gastric juice
d. hepatic portal vein and hepatic vein
e. gall bladder and urinary bladder
f. deamination and detoxification. (2, 2, 4, 2, 2, 3 marks)
Total 15 marks

4. Give a biological explanation for **each** of the following statements.
a. Air in main streets is more polluted than in side streets.
b. Insects have tiny holes on the cuticle.
c. Babies born to women who smoke during pregnancy are smaller than average.
d. Water is an essential constituent in our diet.
e. Tissue fluid is formed from blood. (3, 4, 2, 4, 2 marks)
Total 15 marks

5a. Digestion starts in the mouth. List ONE:
(i) mechanical (physical) way
(ii) chemical way
in which digestion in the mouth takes place. (1, 2 marks)

b. Name a region of the gut with a:
(i) low pH
(ii) high pH. (1, 1 mark)

c. The villi in the walls of the small intestine have tiny hairs of microvilli. Explain the importance of villi and microvilli. (2 marks)

d. (i) Explain the effect of a diet low fibre.
(ii) Recommend TWO types of food to increase fibre in the diet. (2, 2 marks)

e. (i) List TWO food substances in an egg sandwich.
(ii) Explain what happens to the food substances present in the egg sandwich as they pass along the gut. (2, 2 marks)
Total 15 marks