SECONDARY SCHOOL 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 _____

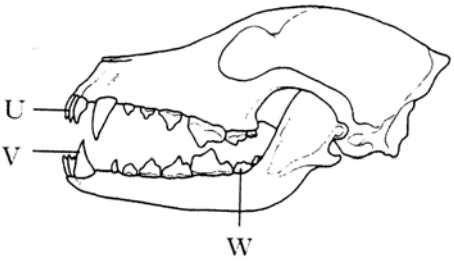
d) ureter _____

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

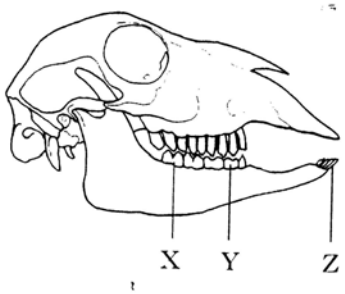
Total 5 marks

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 _____

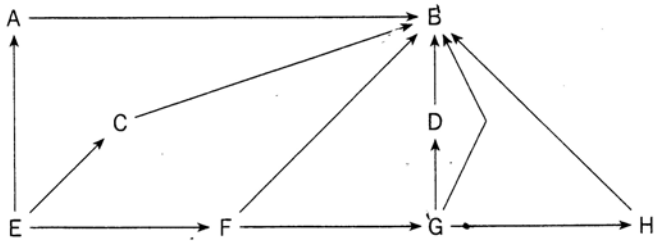
(iii) the teeth used to crush and grind plant material _____ _____

(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)

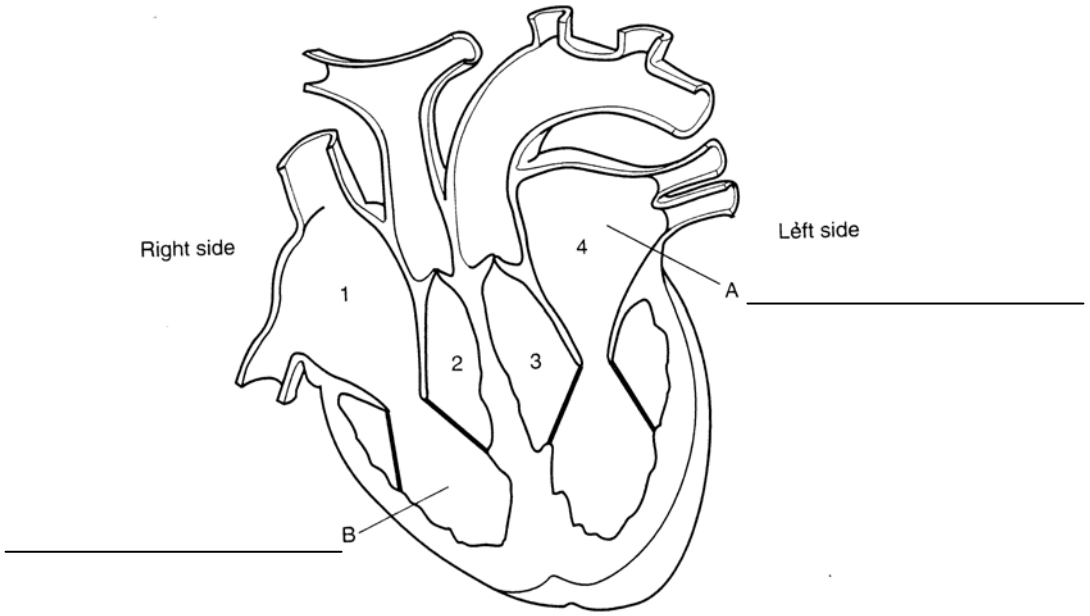
c) Most food chains do NOT extend beyond the 4th trophic level. Explain.

_____ (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)

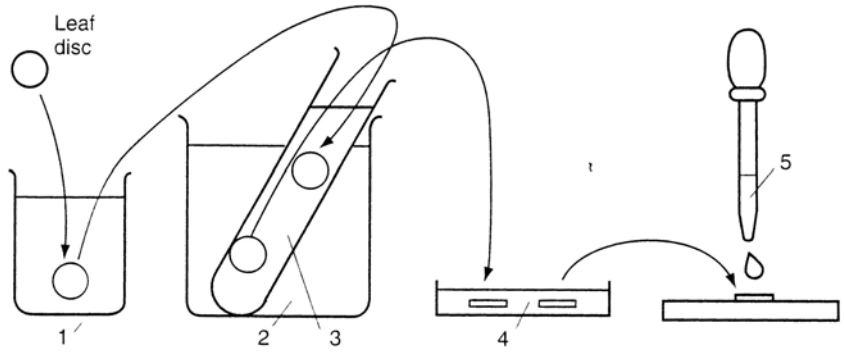
b) (i) Name the mineral necessary for the formation of the pigment chlorophyll.

_____ (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:

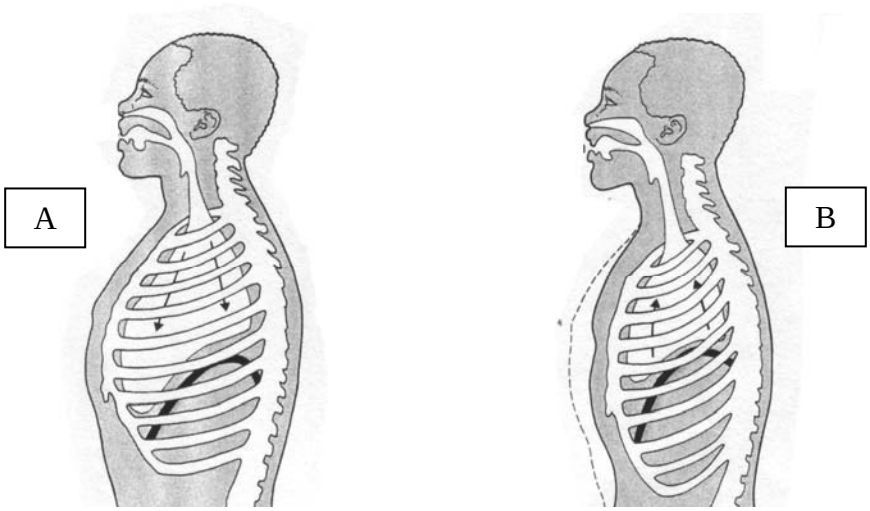
(i) used to decolourise the leaf discs _____

(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

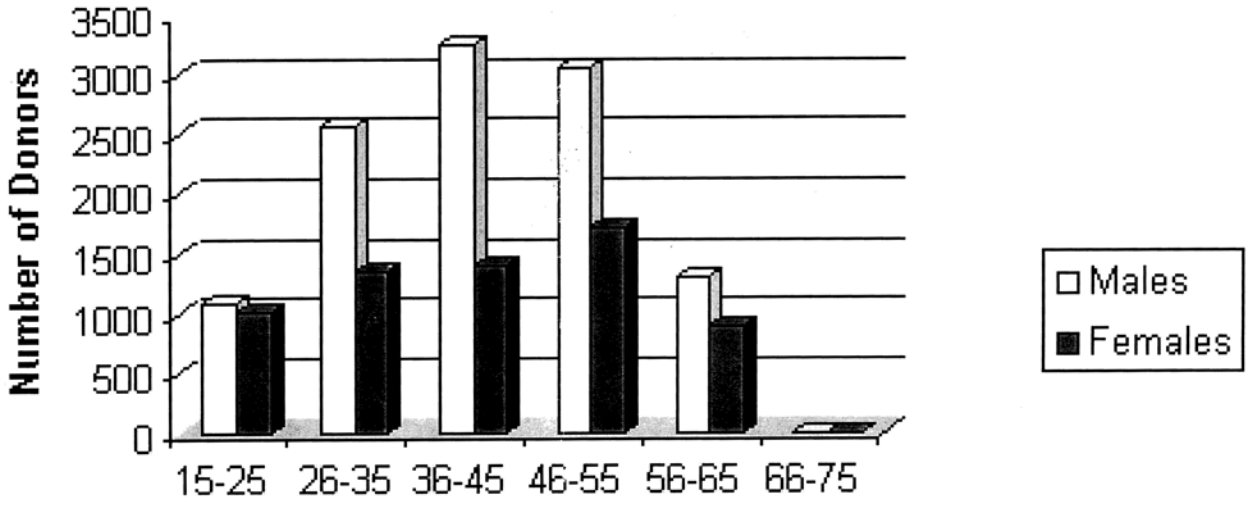
Compare the water loss by the skin and the kidneys in the three different conditions. Give a reason for your answer.

_____

_____ (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 any THREE questions from this section. Write your answers 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 barley, 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. It is this liquid that undergoes fermentation. Yeast is added to the wort and uses maltase enzymes to breakdown maltose into glucose.

a. From the passage name the:
   (i) monosaccharide
   (ii) disaccharide
   (iii) polysaccharide. (1, 1, 1 mark)

b. List the THREE elements present in ALL carbohydrates. (1 mark)

c. Distinguish between aerobic and anaerobic respiration. (2 marks)

d. Anaerobic respiration also takes place in muscle cells.
   (i) Why does anaerobic respiration take place in muscle cells, during heavy exercise?

   (ii) When anaerobic respiration takes place in muscle cells, the person feels muscle cramps. Explain. (1, 1 mark)

e. A baker also uses yeast when making bread. Explain. (2 marks)

f. Maltase is the enzyme acting on maltose. Trypsin and pepsin are two proteases.
   (i) What type of substrate do proteases act on?

   (ii) Name the sites where trypsin and pepsin are produced.

   (iii) Enzymes remain unchanged after an enzyme-catalysed reaction. What is the advantage of this? (1, 2, 2 marks)

Total 15 marks

2a. Name the two parts of the vascular tissue in plants, and explain the function of **each**

b) The epidermis of the leaves is often covered by a waxy cuticle. Explain the importance waxy cuticle. (1 ma

c) The upper epidermis in leaves is transparent.
(i) Explain why the upper epidermis is transparent.

(ii) Explain why it is important for leaves to have a transparent upper epidermis. (1, 1 mark)

d) Name the mesophyll layer just under the upper epidermal cells and give ONE structural feature of it. (2 marks)

e) Draw a labelled diagram to show the external structure of a leaf. (3 marks)

f) List ONE limiting factor to the rate of photosynthesis for a
(i) plant growing in a shady place
(ii) plant growing in a cold region like the Arctic. (1, 1 mark)

Total 15 marks

3. Distinguish between:
a) hepatic vein and hepatic artery
b) gall bladder and urinary bladder
c) trachea and gullet
d) ingestion and egestion
e) rickets and scurvy
f) lipase and lactase. (4, 2, 2, 3, 2, 2 marks)

Total 15 marks

4. Give a biological explanation for **each** of the following statements:
a) Air in main streets is more polluted than that in side streets.
b) Excess proteins in the body are not stored.
c) Insects have tiny holes on their cuticle.
d) Smoking is an addictive habit.
e) Milk, eggs and meat are highly recommended in the diet of children. (4, 3, 4, 2, 2 marks)

Total 15 marks

5a. (i) Teeth play an important part in digestion. Explain.

(ii) Name the enzyme present in saliva and explain its function. (2, 3 marks)

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

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

d) Name ONE food substance you would recommend to a person suffering from:
(i) anaemia
(ii) night blindness. (1, 1 mark)

e) Many nutritionists suggest that fats should be limited in all diets. Explain. (4 marks)

Total 15 marks