NAME _____ ADM NO:_____

CLASS _____ INDEX NO:_____

BIOLOGY
231/2
2 HOURS
JULY 2013

ALLIANCE HIGH SCHOOL
TRIAL EXAMINATION 2013
BIOLOGY PAPER TWO

INSTRUCTIONS TO CANDIDATES

a) *Write your name, class, index number and admission number in the spaces provided.*

b) *Answer all questions in section A.*

c) *In Section B answer question 6 (compulsory) and either question 7 or 8 in the space provided after question 8.*

For examiners use only

Section	Question	Maximum score	Candidates score
A	1	8	
	2	8	
	3	8	
	4	8	
	5	8	
B	6	20	
	7	20	
	8	20	
	Total	**80**	

SECTION A (40 Marks)

1. Sickle cell anaemia is a hereditary disease due to a recessive gene which changes normal haemoglobin (Hb- A) to abnormal haemoglobin (Hb – S). The red blood cells of people with sickle anaemia are sickle shaped.

a) What are the possible phenotypes of the offspring of a man who is heterozygous and a woman who is also heterozygous.

b) What percentage of the offspring would have. (2 mks)

i) Sickle cell anaemia.

_____

_____

ii) Sickle cell trait.

_____

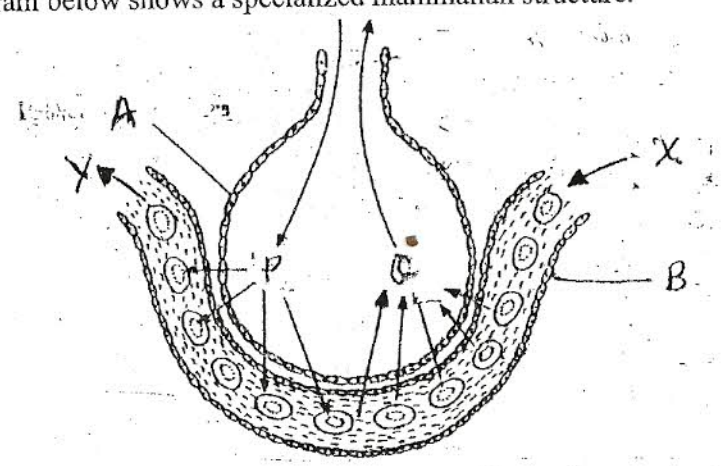
_____

c) What is the adaptive advantage of sickle cell trait. (1 mk)

_____

_____

2. The diagram below shows a specialized mammalian structure.



a) Name the structure represented by the diagram. (1 mk)

_____

b) Identify the structures represented by (2 mks)

A- _____

B – _____

c) State the difference in the composition of blood at point X and Y . (2 mks)

_____

_____

_____

_____

d) Name two structures for gaseous exchange in aquatic plants. (2 mks)

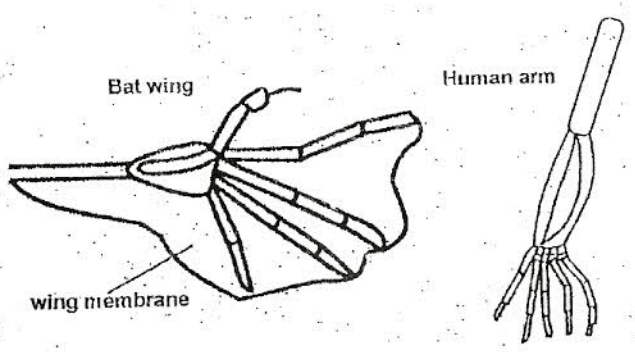
_____

_____

e) Name the substance that accumulates in muscles where respiration occurs with insufficient oxygen. (1 mk)

_____

3. The diagram bellows structures of human arm and bat wing.



a) These structures are thought to have similar ancestral origin. State one structural similarity and one adaptational difference between the two.

i) Structural similarities. (1 mk)

_____

_____

ii) Adaptational difference. (2 mks)

_____

_____

_____

_____

b) What type of evolution is shown by the above structures. (1 mk)

_____

_____

c) Give two other examples of structures in nature that show the type of evolution in (b) above. (2 mks)

_____

_____

d) Apart from structures discussed in a,b and c above, state one other anatomical structure in organisms that has been observed in nature to support organic evolution. (1 mk)

_____

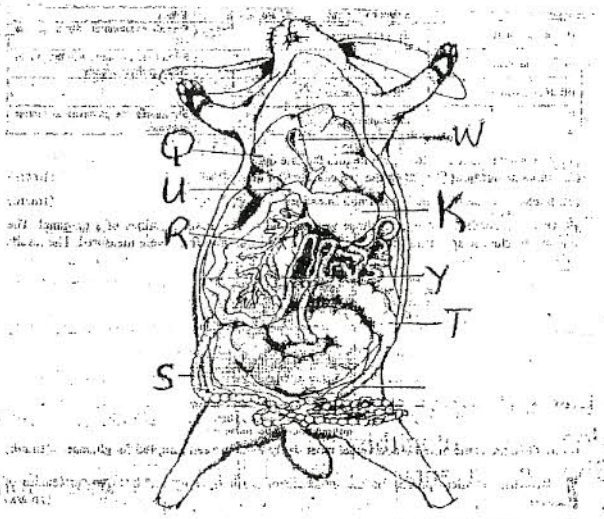
_____

e) Explain the phrase survival of the fittest. (1 mk)

_____

_____

4. Below is a photograph of a dissected mammal. Study it and answer the questions that follow.



a) Name each of the structures labeled Q,R,S and T. (4 mks)

_____

_____

_____

_____

b) State the function of the part labeled W. (1 mk)

_____

_____

c) State two functions of the part labeled K in human beings. (2 mks)

_____

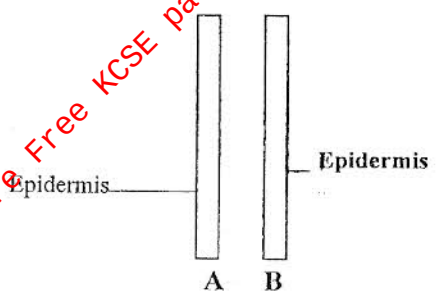
_____

_____

_____

d) What is the function of part labeled T in a rabbit. (1 mk)

5. A freshly obtained zebrina stem measuring about 4cm long was split lengthwise to obtain two similar pieces.
Below is the diagram of the two pieces obtained.



Piece **A** was placed in distilled water while piece **B** was placed in a strong salt solution.

a) Draw the appearance of the two pieces (**A** and **B**) after 20 minutes
A **B** (2 mks)

b) Account for the appearance of piece A which was put in distilled water. (4 mks)

_____

_____

_____

_____

c) State the significance of the biological process involved in the experiment. (2 mks)

_____

_____

SECTION B (40 MKS)

6. The table below shows the percentage saturation of blood with oxygen in myoglobin and haemoglobin (under different carbon(iv)oxide concentration).

Oxygen Concentration	*% Saturation of blood with oxygen*		
	Myoglobin	Haemoglobin	
		2.7 CO_2 concentration (A)	10.7 CO_2 Concentration (B)
0	0	0	0
2	30	30	10
4	90	80	30
6	95	92	65
8	98	95	82
10	100	98	90
12	100	98	92

a) Plot curves of percentage saturation of blood with oxygen against oxygen concentration. (8 mks)

b) Account for the difference in curves of myoglobin and haemoglobin. (2 mks)

_____

_____

_____

_____

c) Account for the shape of curves A and B. (4 mks)

_____

_____

_____

_____

d) What is the significance of the effect of carbon(iv) oxide concentration on percentage saturation of blood with oxygen in

i) Tissues (2 mks)

ii) Lungs

(2 mks)

e) Name the compound formed when haemoglobin combines with

i) Oxygen gas.

ii) Carbon (iv) oxide gas. (2 mks)

7. Describe the Nitrogen cycle. (20 mks)

8. Describe how the human male reproductive system is adapted to its function. (20 mks)