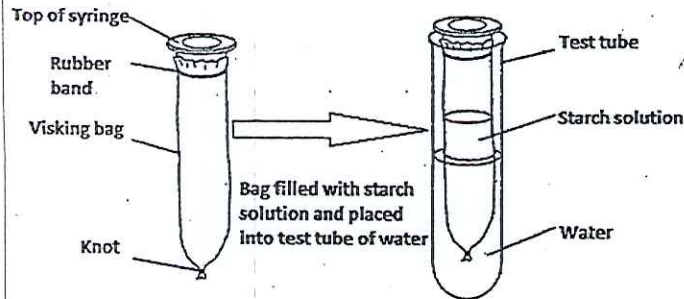


MARKING  
SCHEME

**SECTION A (40MKS)**

1. A student set up an experiment using a visking bag as shown



ALLIANCE HIGH SCHOOL EXAMS



10 Copies

Kenya Certificate of Secondary Education (K.C.S.E)

**INSTRUCTION TO CANDIDATES**

- Write your name and index number in the spaces provided above
- Sign and write the date of examination in the spaces provided above.
- This paper consists of two sections A and B.
- Answer all the questions in Section A in the spaces provided
- In section B answer questions 6 (compulsory) and either question 7 or 8 in the spaces provided.

**For examiner's use only**

Questions	Maximum score	Candidate score
Section A	40	
Section B	20	
Section C	20	
<b>TOTAL</b>	<b>80</b>	

The student added some iodine solution to the water in the test-tube. After 30 minutes at room temperature, the contents of the visking bag were stained blue-black, but the water outside remained a yellow colour.

(a) Explain these results. (4mks)

Iodine solution/molecules diffused into the visking bag; iodine molecules small (enough to pass thro' the membrane); iodine solution/molecules stain/react with starch; No starch diffused out of the bag/through visking tubing; starch molecules too large (to pass through membrane)  
OWTTE;

(b) State factors that influence the movement of molecules through visking bag (3mks)

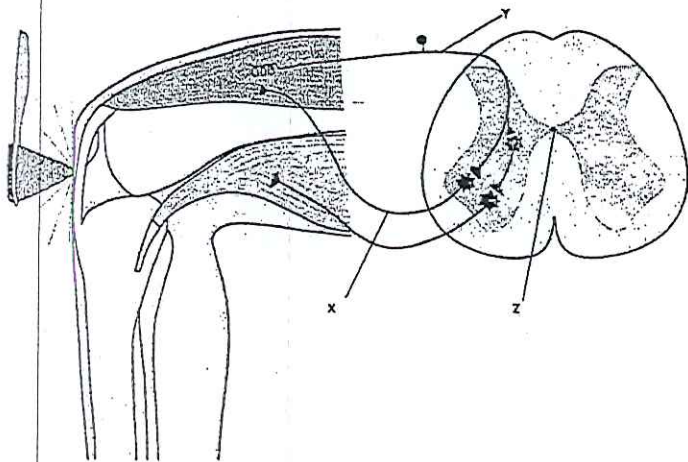
Temperature; surface area; concentration gradient/water potential; thickness/distance/permeability of membrane

(c) Tobacco smoke affects the gas exchange system. Name one components of tobacco smoke and describe their effect on the gas exchange system. (2mks)

Component. Tar; Nicotine; Carbon(IV)oxide/carbon monoxide  
 effect. Tar; carcinogenic/cause mutation/cause lung cancer/  
 Nicotine; cause vasoconstriction blood vessels/harder for oxygen reach cells  
 Carbon Monoxide; reduced ability of RBCs to transport oxygen

(d) Name the part of the blood in which most carbon (IV)oxide is transported. (1mk)  
 Plasma

5. The diagram below illustrates the components of a simple reflex that takes place when during a knee jerk



(a) Name the neurones labelled X and Y. (2mks)

X Sensory (neuron);  
 Y Motor (neuron);

(c) State one function of the fluid found in the part labelled Z. (1mk)  
 shock absorber prevent mechanical damage; nourish/  
 supply nutrients and oxygen to spinal cord

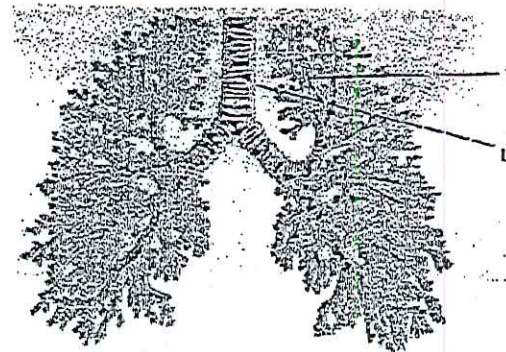
c) What is the probability of having a sickle cell child (2mks)

$$= \frac{1}{4} \times 100\% \\ = 25\%$$

d) Describe the effects of sickle cell anaemia on the body (2mks)

Leads to defective RBC's/abnormal shape transport oxygen  
 poorly causing anaemia/deprives oxygen to vital organs/can cause death

4. The figure below shows the human gas exchange system.



(a) Name structures K and L. (2mks)

K Bronchioles;  
 L Trachea/

(b) Explain how structure L is adapted to its function (3mks)

Lined with cilia to waft/sweep mucus/micro-organisms/pathogens  
 away from lungs, lined with mucus secreting cells/goblet cells  
 to secrete mucus; Has rings of cartilage to keep it  
 open; tubular to allow movement of gases

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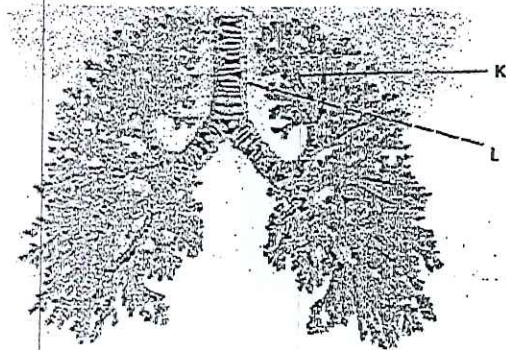
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4. The figure below shows the human gas exchange system.



(a) Name structures K and L (2mks)

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L.....

(b) Explain how structure L is adapted to its function (3mks)

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(c) Explain how the above simple reflex action takes place. (5mks)

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**SECTION B (40 MKS)**

Answer question 6 (compulsory) and either question 7 or 8 in the spaces provided.

6. A student grew two separate cultures of single celled organisms. One culture contained *Paramecium caudatum* and the other contained *Paramecium aurelia*. The cultures were grown under the same condition and the number of paramecia (per drop) in each culture was estimated every two days for a period of 16 days. The results are shown in the table below

No. of days		0	2	4	6	8	10	12	14	16
No. of Paramecia present (per drop)	<i>T. caudatum</i>	4	10	30	48	58	62	60	61	60
	<i>T. aurelia</i>	4	10	46	66	70	69	71	71	71

(a) Using the same axis, draw graphs of number of paramecia in the culture against time. (8mks)

(c) Explain how the above simple reflex action takes place. (5mks)

Tapping of patella tendon cause stimulation; an impulse is generated; transmitted by sensory neurone to the spinal cord; impulse passed via a synapse; cross to motor neurone; travels along motor neurone to muscle (extensor); (extensor) muscle contracts causing lower part of leg more forward/jerk forward

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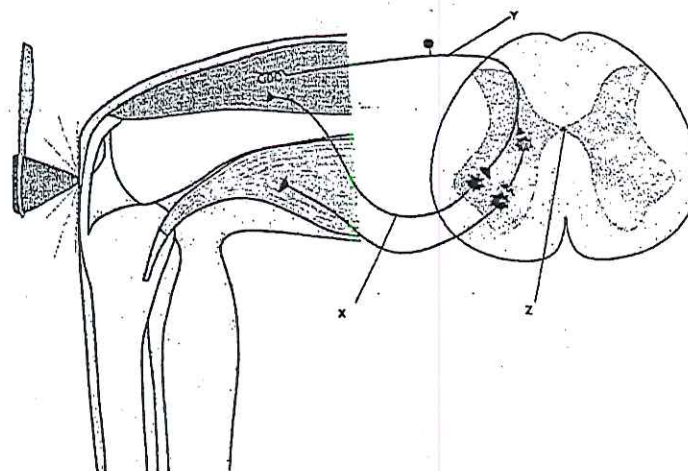
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Component Tar; effect Carcinogenic / cause mutation / cause lung cancer

(d) Name the part of the blood in which most carbon (IV)oxide is transported. (1mk)

Plasma

5. The diagram below illustrates the components of a simple reflex that takes place when during a knee jerk



(a) Name the neurones labelled X and Y. (2mks)

X. Sensory (neurone)

Y. Motor (neurone)

(c) State one function of the fluid found in the part labelled Z. (1mk)

Acts shock absorber protect spinal cord from mechanical damage; provides nutrients and oxygen to spinal cord

(d) (i) What happens to *P. caudatum* between day 10 and 16? (1mk)

Population remains constant (carrying capacity attained)

(ii) What biological phenomenon is represented by observation in (d) (i) above? (1mk)

Competition / Intra-specific competition;

(e) State any four biological factors that regulate population growth of animals in their habitat. (4mks)

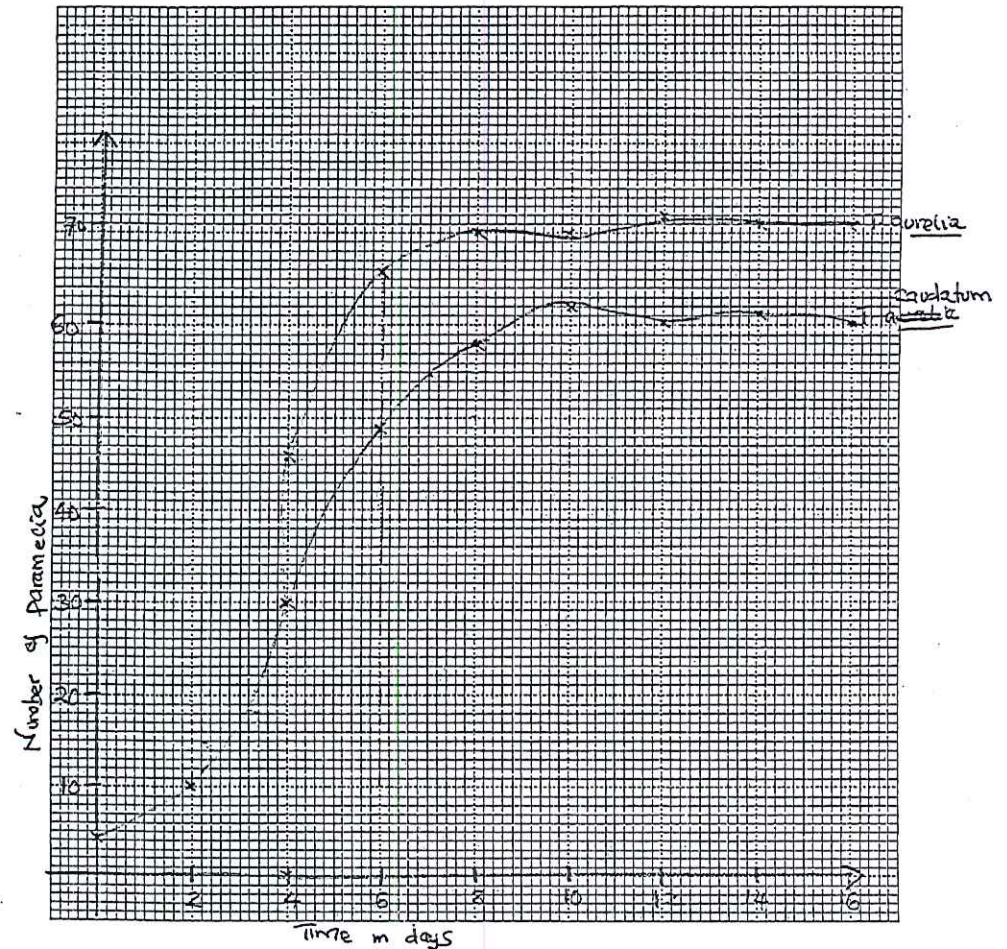
Competition; Predation; Diseases and parasites; Emigration  
Social stress / overcrowding

7. (a) Explain how a bony fish is adapted to swim? (15mks)

(b) State five functions of an insects exoskeleton. (5mks)

8. (a) Explain the economic importance of fungi (10mks)

(b) Describe various ways of breaking seed dormancy (10mks)



(b) How many paramecia were present on the 7<sup>th</sup> day? (2mks)

*P. caudatum*... 55 ± 1;

*P. aurelia*... 68 ± 1;

(c) Account for the change in the two populations between day 0 and 8. (4mks)

Both population increase in number / rapid increase in number between 0-5 days; <sup>enough nutrients/resources</sup> slow population growth from day 6/7/8; reduced nutrients/space.  
Population of *E. aurelia* increase faster rate than *E. caudatum*;  
*E. aurelia* is better adapted to the ecosystem

Scarification; weakening impermeable seed coats to allow water to enter/use of saprophytic bacteria/passing through gut of animals;

Increasing conc. of hormones gibberellins/cytokinins that stimulate germination;

Providing favourable conditions/ enough water/temp/oxygen;

Providing suitable light wavelength of light to

trigger secretion of hormones i.e. gibberellins;

Allowing more time for embryo to mature;

Heating/boiling/roasting some seeds i.e. Acacia

Application of synthetic plant hormones i.e. gibberellins;

7.4)

Vertebral column has series of vertebrae/held together loosely for flexibility (when swimming); Has

myotomes/segmented muscle blocks on either side of vertebral column whose antagonistic contractions and

relaxations produce movements; Head is not flexible/lacks

neck to maintain forward thrust; Body streamlined to reduce resistance in water; presence of fins; for

propulsion and balance in water; Scales overlap/point

backwards; to reduce friction; Swimbladder/gas bladder/air

bladder; make fish buoyant/less dense when moves to high

levels; Body is mucous/coated with mucus; lubricate/reduces

friction; Paired fins (pectoral and pelvic) control pitching (tendency

to vertically plunge)/braking and steering/change direction;

Unpaired fins (dorsal, ventral/anal fins) control yawing and

rolling; Caudal fin/tail fin; propel the fish forward

Max 5 marks

b) Protects internal structures from mechanical damage; prevents

reduces/reduce water loss/dehydration/desiccation; provides

surface for attachment of muscles; pigmented for

camouflage; supports internal structures; modified to form mouthparts; thin at joints to allow movement

Max 5 marks