

**BIOLOGY PAPER 231/1 K.C.S.E 1999**

**QUESTIONS**

**SECTION A**

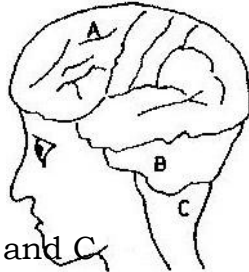
1. Name two processes that bring about the translocation of manufactured food
2. Give two reasons why accumulation of lactic acid during vigorous exercise leads to an increase in heartbeat.
3. Explain why sexual reproduction is important in organisms
4. State two advantages of natural selection to organisms
5. Suggest three reasons why green plants are included in a fish aquarium.
6. State three ways by which plants compensate for lack of ability to move from one place to another.
7. An investigation plants with red flowers were crossed with plants with white flowers.

All the plants in the F1 generation had pink flowers.

- a) Give a reason for the appearance of pink flowers in the F1 generation.
- b) If the plants the F1 generation were selfed, state the phenotypic ratio of the F2 generation.
8. State two disadvantages of self-pollination.

**SECTION B (40 MKS)**

9. The diagram below shows surface view of a human brain.



Name the parts labeled B and C

- b) State three functions of the part labelled A
- c) State what would happen if the part labeled B was damaged.

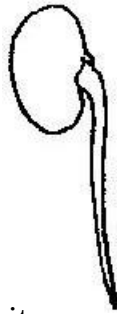
10. Below is a list of organisms, which belong to classes Insecta, Myriapoda and Archnida: Tick, centipede, praying mantis, tsetse fly, millipede and spider. Place the organisms in their respective classes in the table below. Give reason in each case.

Classes	Organisms	Reasons
Insecta		
Myriapoda		
Arachnida		

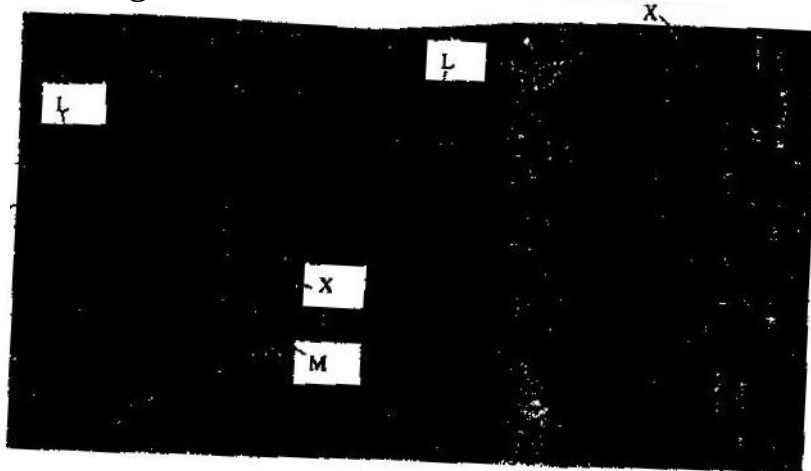
11. Give reasons for each of the following:
  - a) Constant body temperature is maintained in mammals.
  - b) Low blood sugar level is harmful to the body.
12. A student set up an experiment as shown in the diagram below.



- a) i) What is being investigated in the experiment?  
ii) On the diagram below indicate the expected results after three days.



- iii) Why was it necessary to have wet cotton wool in the container?  
b) What is the role of the following to a germinating seed/  
i) Oxygen  
ii) Cotyledons.
13. a) Distinguish between a community and population.  
b) Describe how population of grasshoppers in a given area can be estimated.
14. The photograph below represents a blood smear obtained from a person suffering from a certain disease.



- a) Name the structure labeled X.  
b) i) Name the structure labeled L  
ii) State the function of the source labeled M  
c) What disease was the person suffering from?  
d) List three ways by which micro-organisms enter the human body.

### SECTION C (40 MARKS)

15. An experiment was carried out to investigate haemolysis of human red blood cells. The red blood cells were placed in different concentrations of sodium

chloride solution. The percentage of haemolysed cells was determined. The results were as shown in the table below.

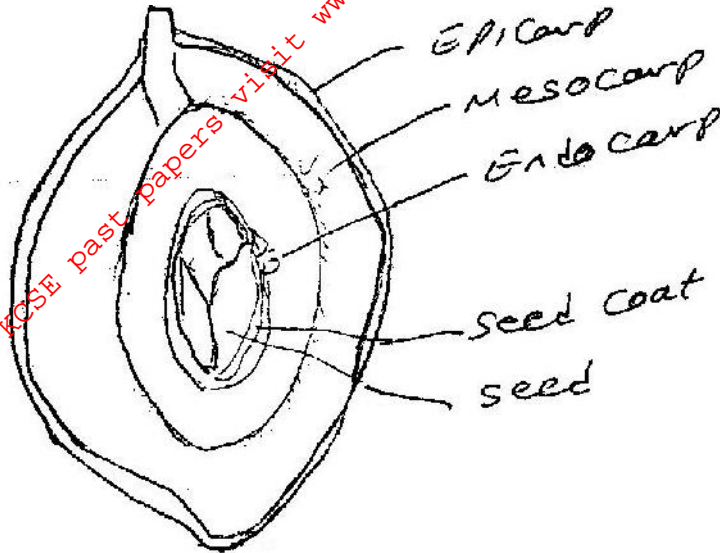
Salt concentration g/100cm <sup>3</sup> (%)	0.33	0.36	0.38	0.39	0.42	0.44	0.48
Red blood cells Haemolysed (%)	100	91	82	69	30	15	0

- a) i) On the grid provided, plot a graph of haemolysed red blood cells against salt concentration.  
ii) at what concentration of salt solution was the proportion of haemolysed cells equal to non-haemolysed cells?  
iii) State the percentage of cells haemolysed at salt concentration of 0.45%
- b) Account for the results obtained at:  
i) 0.33 percent salt concentration.  
ii) 0.48 percent salt concentration.
- c) What would happen to the red blood cells if they were placed in 0.50 percent salt solution?
- d) Explain what would happen to onion epidermal cells if they were placed in distilled water.
16. Describe the:  
a) Process of inhalation in mammals.  
b) Mechanisms of opening and closing of stomata in plants.
17. Explain how the various activities of man have caused pollution of air.

**BIOLOGY PAPER 231/2 K.C.S.E 1999  
PRACTICAL MARKING SCHEME**

1. **Confidential requirement: Specimen S- Mango fruit, mature but not ripe, Specimen T- Leguminous pod (bean fruit) any legume.**

You are provided with specimens labeled S and T. draw a plan diagram of the cut surface of specimen S. label it.



- (b) Open specimen T longitudinally. State three differences between specimen S and T

S- One seed - Meso-carp/ epicarp and endocarp separated	T - Several seeds/ many, two - ten - Mesocarp fused with epicarp and endocarp
- Placentation central Rej free central - Fleshly succulent fruit	- Placentation marginal - Dry fruit
- Absence of sutures/ lines of weaknesses - Pericarp thick	- Presence of sutures/ lines of weakness - Pericarp thin

- (c) With reasons in each case state the type of fruit and method of dispersal for specimen S and T

**Specimen S**

Type of fruit - Drupe

Reason - One seed/ hard endocarp/ fibrous endocarp/owwte

Method of dispersal - Animal/ Man

Reason - Fleshly mesocarp/ scented/ juicy/succulent/ brightly Coloured. Rej. Edible

**Specimen T.**

Type of fruit - legume pod/ leguminous fruit

Reason - two sutures/ lines of weakness

Method of dispersal- Mechanical ( self) explosive mechanism

Reason - lines of dehiscence(two) lines of weakness.

2. You are provided with specimen labeled X, Y and Z

- (a) Identify the specimens

X - Ulna

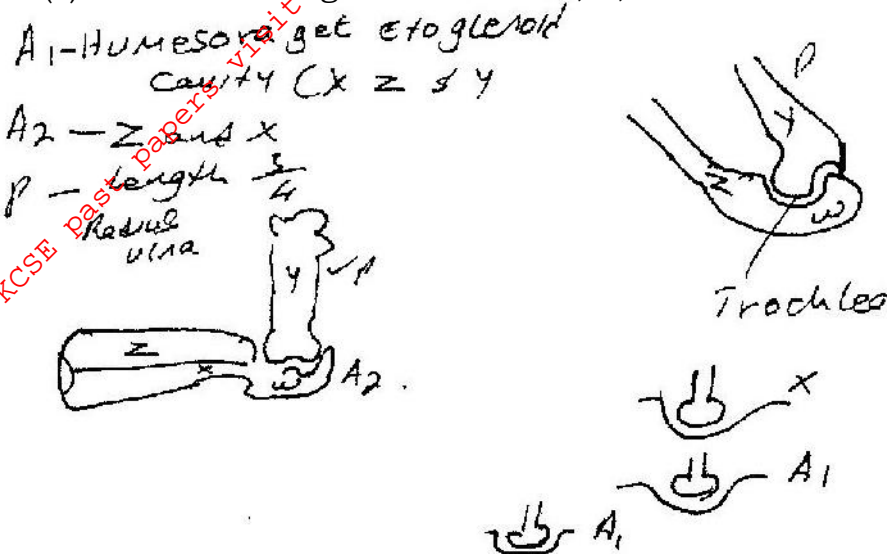
Y- Humerus Rej. Humerous

Z- Radius

(b) Name the part of the mammalian body from which the specimens were obtained.

- Forelimb/ arm/ legs/ humerus/ upper arm/ ulna and radius lower arm

(c) Make a drawing to show how X, Y, and Z are articulated



State the magnification of your drawing X  $\frac{1}{4}$  - X1

(d) With reasons name the type of joint formed at the proximal and distal ends of Specimen Y

Proximal end- Ball and socket

Reason- Head shaped like a ball/ ball like/ rounded head/ round head/ allow movement.

Distal end- Hinge joint

Reason - allow movement in only one plane/ presence of a groove/ presence of condy/ troches which articulates with sigmoid notch.

(e) What is the significance of the part labelled W

Attachment of muscles/ tendons; formation of hinge joint; with adjacent bone) Prevent overstretching of forearm backwards; allows movements in only plane/ 180 degrees.

**You are provided with a specimen labeled R. Examine it**

(f) Name the observable features that adapt the specimen to:

Forward movement

- Trail/ tail fin/ tail muscles/ caudal fin

Balancing

- Pectoral fins; pelvic fins

Staying upright

- Dorsal fins; anal fins/ ventral fins

Fast movement

- Streamlined body

- backward facing scales,

- Slimy/ Mucoid surface

**3. You are provided test for the food substances in the suspension in the table below.**

- (a) Using reagents provided test for the food substances in the suspension. In the table below record the food tested, your procedures, observations and conclusions.

Food Substance	Procedure	Observation	Conclusion
Starch	Add a drop of iodine on M on a white tile	Brown colour/ retain colour of iodine/ yellow/ reddish Acc. No colour change Rej. Red/No change alone	Starch absent
Reducing sugar	Add a few drops of benedict's solution and warm/ heat/ boil	Blue colour of benedict's solution/ colour change to purple/ violet Rej. No change alone	Reducing sugar absent/ monosachariaple sugar absent/ Rej specific names of sugars e.g glucose
No reducing sugar	Add a few drops of HCl and heat; (cool), add sodium bicarbonate; add benedict's solution and heat Note – stop heating if step is omitted.	Fizzing/ effervescence/bubbling; Red precipitate/ colour changed from blue to green, yellow orange/ brown/ red; order of colour must be correct. Acc. Final colour change. E.g green, yellow, orange brown	Non- reducing sugar; presence of reducing sugar after hydrolysis.
Protein	Add 1% CuSO <sub>4</sub> ; Sulphate and then sodium hydroxide - If formula is used must be correct. Order does not matter	Colour change to purple/violet	Protein present

- If food substance is omitted or wrong, procedure, observation and conclusion wrong
- If cooling absent in non- reducing sugars stop marking

- (b) Name two enzymes that may be required to digest suspension M in the alimentary canal in human beings.

- Pepsin/ trysin/ erepsin /sucrose/ invertase

- (c) State the role of hydrochloric acid and sodium hydrogen carbonate in the experiment.

- HCl hydrolyze/breakdown/ digest/convert/ change; non- reducing sugars/disaccharides/ complex sugars/(rej sucrose) for reducing sugars/simple sugars/ monosaccharides

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