

Biology III

017

09 Nov. 2006

8.30 a.m -11.30 a.m

RWANDA NATIONAL EXAMINATIONS COUNCIL



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ORDINARY LEVEL NATIONAL EXAMINATION 2006

SUBJECT : BIOLOGY III

DURATION : 3 HOURS

INSTRUCTIONS :

This paper consists of THREE Sections: A, B, and C.

Section A : Attempt ALL questions in this section (55 marks)

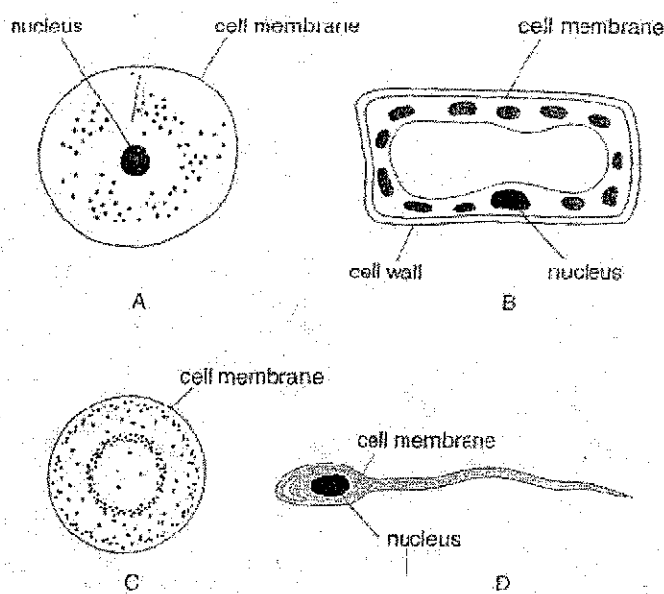
Section B : Attempt any THREE questions in this section (30 marks)

Section C : This section is compulsory (15 marks)

SECTION A (55 marks)

Attempt all questions in this section.

1. The diagrams below represent types of cells.



a) Which diagram : A, B, C or D shows a plant cell ? Explain your answer.

3marks

2. Using ✓ and X, show the parts of the cell found in a plant cell and animal cell.
The first one is done for you.

Part	Plant cell	Animal cell
a nucleus	✓	✓
a cell membrane		
Cytoplasm		
a cell wall		
a vacuole		
Chloroplast		

5marks

3. Photosynthesis takes place in cells containing chlorophyll.

- What colour is chlorophyll ?
- Where in a cell is chlorophyll found ?
- What is the function of chlorophyll ?

3marks

4. Plants need mineral salts.

- a) Through which part do mineral salts get into the plant ?
- b) Explain why water is important in this process.

1mark
2marks

5. Copy and complete the table below

Mineral ions	Why needed by a plant	Effect if missing in soil
Nitrate		
Phosphate		
Potassium		

6 marks

6. Blood contains plasma, platelets, Red cells and white cells. Each has one or more important functions. Copy the table below and draw a line from each part to its function.

- | | |
|---------------|------------------------------------|
| . Red cells | . Fight bacteria |
| . Platelets | . Carries dissolved hormones |
| . Plasma | . Carries dissolved urea |
| . White cells | . Transport oxygen around the body |
| | . Help blood to clot. |

5 marks

7. For each of the following digestive substance, name the site of its production.

Digestive substance	Site of Production
Bile	
Amylase	
Lipase	
Protease	

4 marks

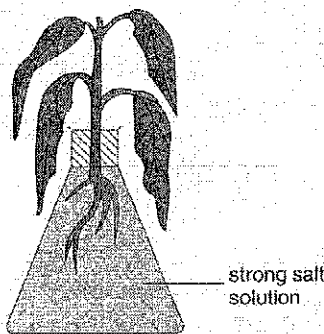
8. Describe how the liver helps to digest fats.

2marks

9. Red blood cells contain haemoglobin. Explain how this enables red blood cells to pick up oxygen from the alveoli and release it to the cells in other parts of the body.

4marks

10. The thickest muscular wall in the heart is that of the left ventricle.
Why is this wall so thick ? **2marks**
11. Give THREE functions of the human skeleton. **3marks**
12. a) What is a synovial joint ? **1mark**
- b) What function does each of the following have in a joint.
- (i) a tendon
 - (ii) a ligament
 - (iii) synovial membrane
 - (iv) synovial fluid
 - (v) a cartilage
- 5marks**
13. In a pea plant the allele for being tall plant (T) is dominant over the allele for being a dwarf plant (t).
- a) Explain using a genetic diagram what would be produced if
- (i) A homozygous tall plant is crossed with a homozygous dwarf plant. **2marks**
 - (ii) Two plants from the crossing in (i) above were crossed. **2marks**
- b) Why is it impossible to have a heterozygous dwarf plant. **2marks**
14. The diagram below shows what happens to a plant after 6 hours in strong salt solution.

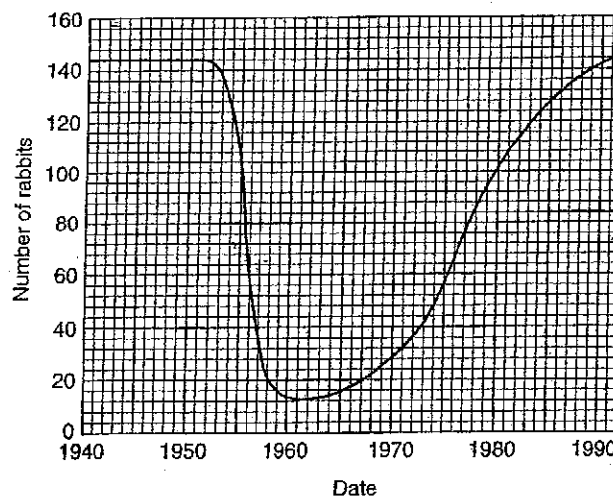


Why has this plant wilted ? **3 marks**

SECTION B. (30 marks)

Attempt any THREE questions in this section

15. a) What draws water all the way from the roots to the leaves of a plant ? **4 marks**
b) What is transported along the xylem tissues ? **2 marks**
c) What is transported along the phloem tissue ? **2 marks**
d) Describe how cells become turgid but do not burst. **2 marks**
16. A population of rabbits lived on a small island. The graph below shows their population over the last 50 years.



- a) (i) How many rabbits were there on the island in 1950 ? **1 mark**
(ii) Give one year when there were 88 rabbits on the island. **1 mark**
- b) (i) Calculate the decrease in rabbit population between 1950 and 1960. **1 mark**
(ii) Suggest reason (s) why the rabbit population fell in these years. **3marks**

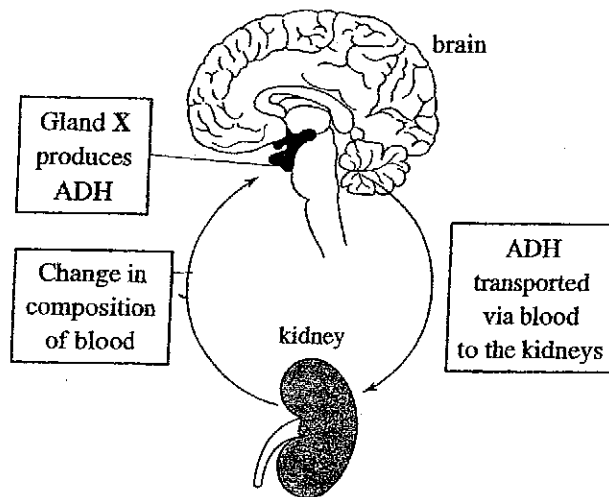
c) (i) The population of rabbits increased after 1960. Suggest reasons.

2marks

(ii) The highest number of rabbits on the island is always about 140. Suggest reason (s) for this.

2 marks

17. The diagram below shows some of the processes which control the composition of blood.



a) (i) Name gland X

1 mark

(ii) What is the stimulus which causes gland X to produce ADH ?

2 marks

(iii) What is ADH and write it in full.

2 marks

b) Describe the effect of an increase in ADH production on the kidney and on composition of urine.

2 marks

18. a) i) Where are hormones produced ?

1 mark

ii) How do hormones move around the body?

1 mark

b) (i) Insulin and glucagons are hormones. Where are they produced ?

2 marks

(ii) Explain the roles of insulin and glucagons in controlling blood sugar levels.

6 marks

19. a) (i) In hot weather the diameter of the blood vessels supplying the capillaries in the skin changes. Explain how this change keeps us cool.

4 marks

(ii) Give other ways how the skin keeps us cool.

3 marks

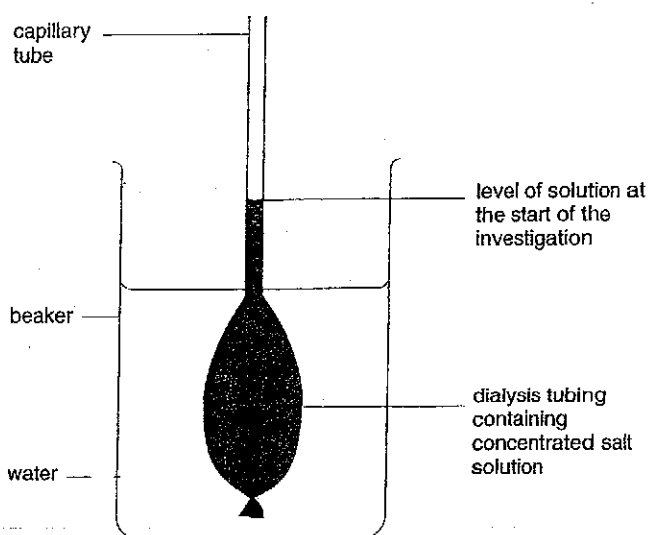
(iii) Give other functions of the skin.

3 marks

SECTION C (15 marks)

This section is compulsory

20. Some students set up the equipment below to investigate osmosis.



a) Define osmosis.

3 marks

b) (i) What will happen to the water level in the capillary tube during investigation of osmosis.

1 mark

d) Use your Knowledge of osmosis to explain why this happens

5 marks

d) A red blood cell when put in a beaker containing pure water eventually bursts but a plant cell never bursts in pure water. Using your Knowledge of osmosis explain why this happens.

6 marks

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