

Biology III

002

07 Nov. 2008

8.30am-11.30am

RWANDA NATIONAL EXAMINATIONS COUNCIL



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ORDINARY LEVEL NATIONAL EXAMINATION 2008

SUBJECT : BIOLOGY III

TIME : 3 HOURS

INSTRUCTIONS:

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

- Answer **ALL** questions in section A. **(55 marks)**
- Answer **THREE** questions in section B. **(30 marks)**
- Answer only **ONE** question in section C. **(15 marks)**

Section A: Answer all questions. (55 marks)

1. (a) Explain what it means when a person is said to be HIV positive. **(1mark)**
(b) Name THREE common ways HIV/AIDS can be transmitted from one person to another. **(3marks)**
2. Explain why:
(a) Babies need a high proportion of protein in their diet than adults. **(2marks)**
(b) Marathon runners need a high proportion of carbohydrates. **(2marks)**
3. (a) What is the function of a root? **(1mark)**
(b) Explain the significance of root hairs. **(1mark)**
(c) Suggest why the proteins in cell membranes are globular rather than fibrous. **(2marks)**
4. Name the primary nitrogenous excretory products in the following organisms.
(a) Man
(b) Lizard
(c) Fish
(d) Insects. **(4marks)**
5. (a) Define an ecosystem. **(1mark)**
(b) Explain the role of producers to the functioning of an ecosystem. **(3marks)**
6. The diagram below shows a bryophyllum leaf carrying out a biological process.



- (a) Name this biological process. **(1mark)**
- (b) Give one advantage and disadvantage of this process. **(2marks)**

7. (a) Briefly explain the role of the following in germination:

- (i) Water
- (ii) Oxygen
- (iii) Gibberellic acid.

(3marks)

(b) An adult man needs about 60g of proteins per day.
Why does he gain nothing if he eats more than this?

(2marks)

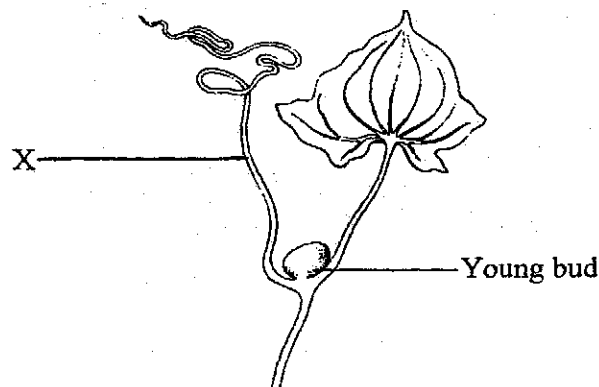
8. (a) Describe two ways in which plants manage to attract animal pollinators.

(2marks)

(b) Compare the efficiency (effectiveness) of wind and insect pollination. Give reason for your answer.

(3marks)

9. The diagram below shows a leaf of a wild yam.



(a) Label the structure X.

(1mark)

(b) What is the function of X?

(1mark)

10. (a) Explain what is meant by the term:

(2marks)

- i) diastole
- ii) systole

(b) Explain how the body manages to increase the rate of blood flow during exercise.

(2marks)

11. The diagram below shows a cactus plant.



What features does this plant have to show that it is a desert plant?

(3marks)

12. (a) The leaf surface is covered with the waxy cuticle. Explain why. **(1mark)**
(b) Explain why the leaf epidermis is transparent. **(1mark)**
(c) Explain why leaves are usually broad and flat. **(2marks)**
13. Define the following terms:
(a) Metamorphosis
(b) Moulting
(c) Instar. **(3marks)**
14. (a) Diabetes insipidus is one type of diabetes caused by lack of ADH. Based on what you know of the role of ADH in Kidney function, describe the symptoms of this disease. **(2marks)**
(b) Suggest how this disease might be treated. **(1mark)**
(c) Explain why alcohol consumption in excess causes dehydration and thirst. **(2marks)**

15. The table below shows the diploid number of chromosomes in the cells of some organisms.

Organism	Diploid number
Human	46
Pea	14
Mouse	40
Maize	20

(a) Define the terms:

- (i) Diploid
- (ii) Haploid

(2marks)

(b) What is haploid number of chromosomes in a mouse?

(1mark)

(c) How many chromosomes would you find in leaf cell of a pea?

(1mark)

Section B: Answer only THREE questions. (30 marks)

16. (a) Although Ebola is dangerous disease, it is probably less likely to cause as many death as the HIV/AIDS pandemic. Explain why AIDS has greater potential to kill a large proportion of the world population.

(6marks)

(b) Suggest ways in which people in your village could reduce the occurrence of Malaria carrying mosquitoes in their immediate area.

(4marks)

17. (a) The xylem and phloem of the root are continuous with the xylem and phloem of the stem and leaves. Explain why this continuous system of tubes is necessary for the plant.

(7marks)

(b) Explain why it is necessary for root tip to be covered by a protective cap of cells.

(3marks)

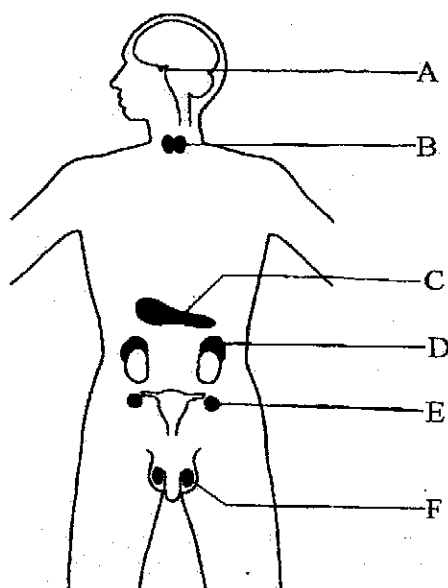
18. (a) Describe some of the potential disadvantages of reproducing asexually and advantages of reproducing sexually.

(8marks)

(b) What is parthenogenesis?

(2marks)

19. The diagram below show the position of Endocrine glands in humans.



(a) Name the glands A-F.

(6marks)

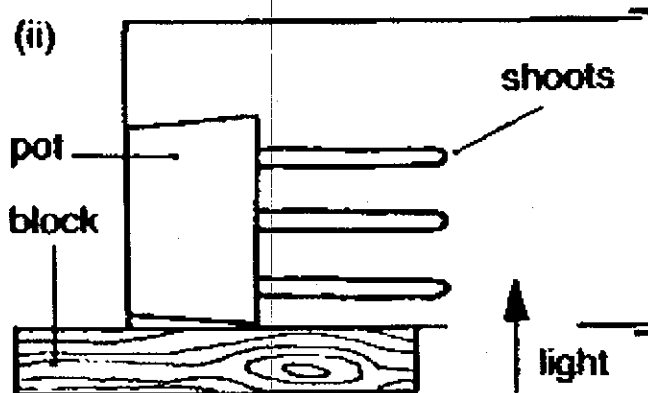
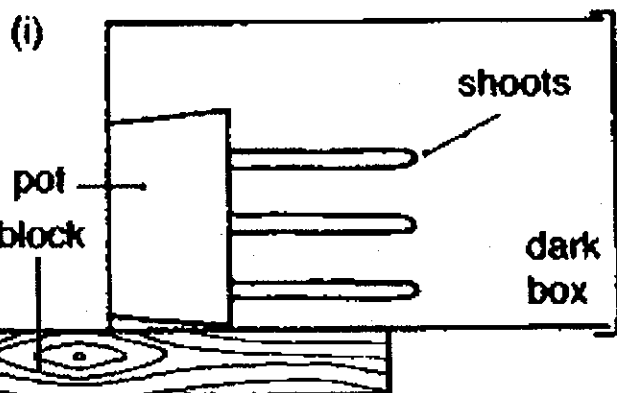
(b) Name some of the hormones produced by gland A.

(2marks)

(c) What are functions of Insulin hormone?

(2marks)

20. Two containers were set up as shown below.



(a) Describe why they are set up as they are.

(5marks)

(b) Describe what will happen in each case.

(5marks)

Section C: Answer only ONE question. (15 marks)

21. The following table gives data for the rate of blood flow to various parts of the body at rest and during heavy exercise.

ORGAN OR TISSUE	AT REST		HEAVY EXERCISE	
	$\text{Cm}^3 \text{ min}^{-1}$	% of total	$\text{Cm}^3 \text{ min}^{-1}$	% of total
Brain	700	14%	750	4.2%
Heart	200	- %	750	- %
Lung tissue	100	- %	200	- %
Kidney	1.100	- %	600	- %
Liver	1350	- %	600	- %
Skeletal	750	- %	12.500	- %
muscle	250	- %	250	- %
Bone	300	- %	1900	- %
Skin	50	- %	50	- %
Thyroid gland	25	- %	25	- %
Adrenal gland	175	- %	175	- %
Other tissues				
Total	5000	100%	17800	100%

- (a) Calculate the percentage of the total blood flow that each organ or tissue receives under each regime of activity. **(10marks)**

- (b) Compare the blood flow to the Kidney, liver and skeletal muscle and skin during both activities. Explain your answer. **(5marks)**

22. (a) Why are enzymes important? **(5marks)**

- (b) List characteristics of enzymes. For three characteristics describe controlled experiments which you can perform to demonstrate the characteristic. **(10marks)**

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