

RWANDA NATIONAL EXAMINATIONS COUNCIL



015

B.P. 3817 KIGALI - TEL/FAX : 86871

NATIONAL EXAMINATION 2001/2002

SUBJECT : BIOLOGY II

LEVEL : MATHS-PHYSIQUE/TTC

DURATION : 3 Hours

INSTRUCTIONS :

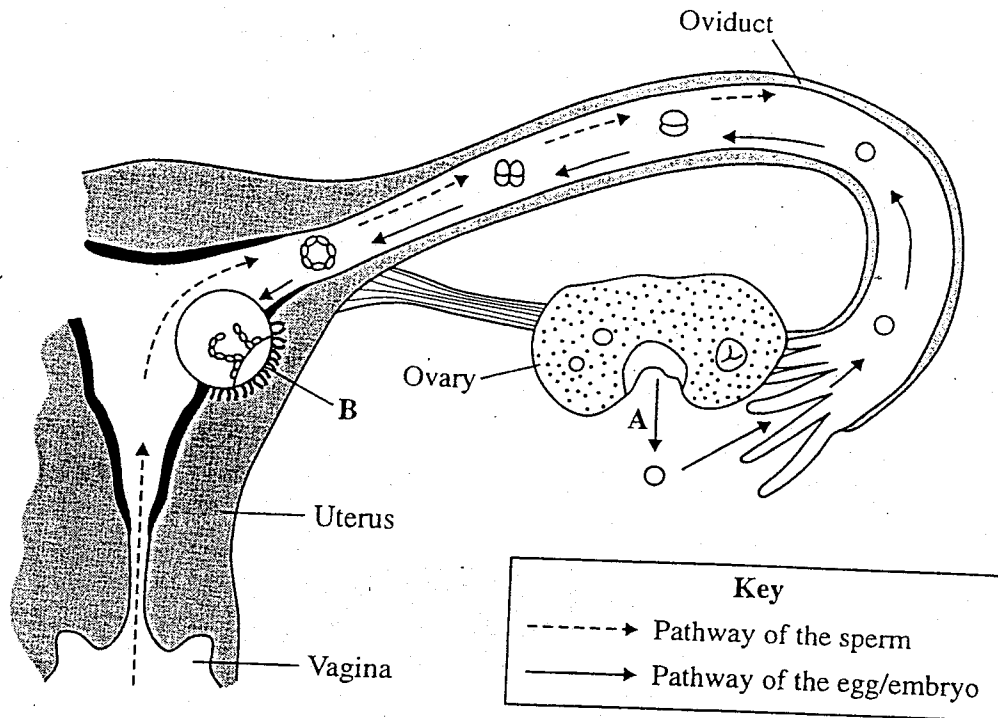
Answer all questions in Section **A**, Three questions in Section **B** and only One in Section **C**.

SECTION A: (55 Marks)

Answer ALL questions in this Section.

1. Why are bacteria classified as a prokaryote. **/2marks**
2. Why is a Mushroom regarded as a fungus rather than a plant? **/2marks**
3. How do microscopic animals survive without having a circulatory system? **/2marks**
4. In what ways does a zygote differ from any other cell in the body? **/2marks**
5. The lungs and ileum are adapted for absorption.
What features do they have in common which facilitate absorption. **/4marks**
6. (a) Where are the following digestive substances made?
Bile.....
Amylase.....
Lipase.....
Protease..... **/2marks**
- (b) How does the mouth break down starchy foods? **/2marks**
- (c) Explain why there is no digestion of starch in the stomach. **/2marks**
- (d) What is the role of liver in fat digestion? **/2marks**
- (e) Give any other two functions of the liver. **/2marks**
7. (a) What is homeostasis? **/1mark**
- (b) Why is the removal of water from the body an example of homeostasis? **/2marks**
- (c) Why is homeostasis important in the body? **/2marks**

8. The diagram shows part of the female reproductive system.



(a) Name the process shown at A.

/1mark

(b) (i) Indicate on the diagram exactly where fertilization takes place.

/1mark

(ii) After fertilization, implantation occurs. what structure is formed at position marked B on the diagram?

/1mark

(c) Assuming fertilization does not occur what will happen?

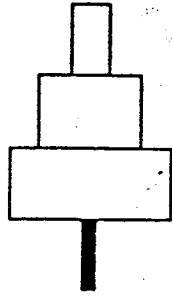
/2marks

9. (a) Differentiate between food chain and food web.

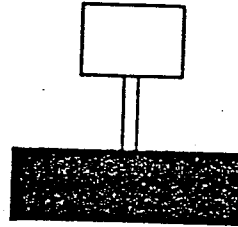
/2marks

(b) Explain the shapes of the following pyramids of numbers.
Black areas are producers.

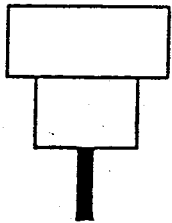
A



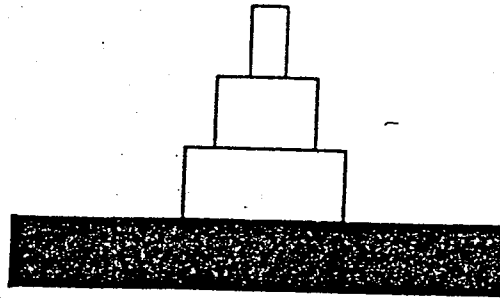
C



B



D



/4marks

10. A human liver cell contains more mitochondria than a plant root cell. Suggest an explanation for this.

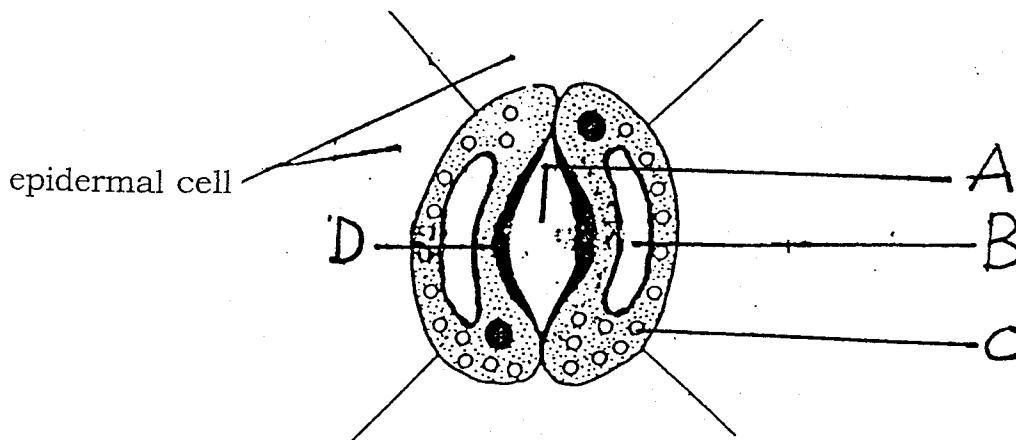
/4marks

11. Explain the possible effect of decrease in environmental temperature on the rate of gas exchange in:-
(i) a well illuminated foliage leaf.
(ii) a small mammal

/2marks

/2marks

12. The diagram shows the structure of a stoma and adjacent cells.



(a) Name the parts labeled A, B, C, D.

/2marks

(b) Describe the way in which the stoma opens.

/2marks

13. (a) Differentiate between sex linked and sex-limited genes.

/2marks

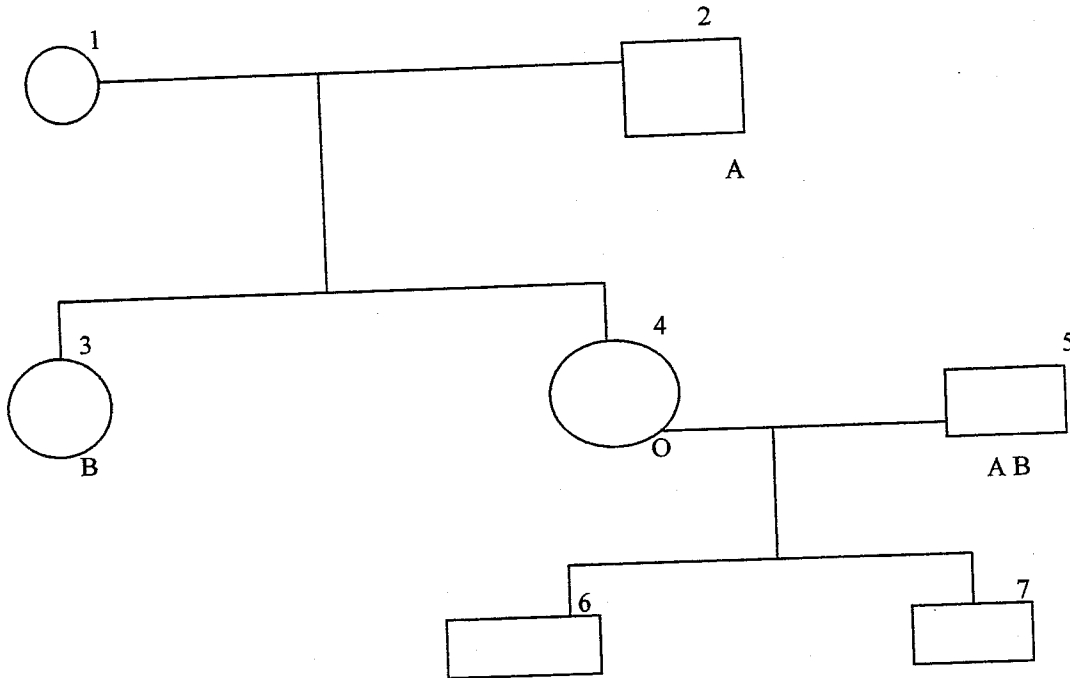
(b) Night blindness is a condition in which affected people have difficulty in seeing in dim light. The allele for night blindness is sex-linked. Show how two normal parents can produce a night blind child.

/2marks

SECTION B: (30 Marks)

Answer only **THREE** questions.

14. Blood group is determined by multiple alleles, I^O , I^A , I^B .
 I^O is recessive to both I^A and I^B , I^A and I^B are codominant.
 The diagram shows inheritance of ABO blood group in one family.



- (a)(i) Give the blood group genotype of individual 2.
 (ii) Give blood group phenotype of individual 1.
 (iii) What is the probability that the next child produced by individuals 4 and 5 will be a boy with blood group A. Show your working.

/1mark
/1mark

/3marks

- (b) Explain why a person with blood group O
 (i) Can safely give blood to someone with blood of any ABO type.
 (ii) Can only safely receive blood from someone with blood group O.

/2marks

/2marks

- (c) An investigation was carried out on people living in Kigali, Rwanda. The frequency of the I^O allele was found to be 0.45, and that of I^A allele, 0.28. What was the frequency of the I^B allele in this population?

/1mark

Total =(10marks)

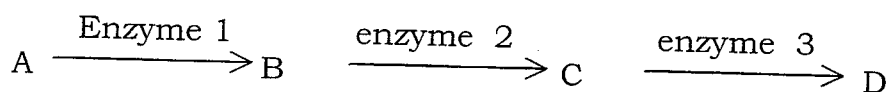
15. (a) Define the term enzyme.

/1mark

(b) Protein digesting enzymes can not digest carbohydrates. Explain.

/1mark

(c) Consider the reaction below in which substrate A is converted to product D with the aid of enzyme 1,2 and3.



What would happen to the rate of production of product D if:-

(i) the concentration of substrate A were reduced.

/2marks

(ii) the concentration of enzyme 1 were increased but that of 2 and 3 remained constant.

/2marks

(iii) the temperature was increased from 15°C to 25°C.

/2marks

(d) How can molecule D act as an end product inhibitor.

/2marks

16. Describe how carbondioxide is removed from mammalian body tissues to the atmosphere.

/10marks

17. Discuss the importance of water to a living organism.

/10marks

18. What substances are transported by

(a) the blood system of a mammal and

/7marks

(b) the vascular system of a flowering plant and from where to where?

/3marks

SECTION C : (15 Marks)

Answer only **ONE** question.

19. (a) Heart (cardiac) muscles are said to be myogenic. Explain.

/3marks

(b) Describe the mechanism of the heart beat.

/12marks

20. (a) How do we get infected with germs.

/6marks

(b) Describe all possible ways to avoid infections.

/9marks

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