

Write your Examination Number here 



Coimisiún na Scrúduithe Stáit State Examinations Commission

LEAVING CERTIFICATE EXAMINATION 2004

BIOLOGY - ORDINARY LEVEL

WEDNESDAY, JUNE 16 - AFTERNOON, 2.00 to 5.00

Section A. Answer any **five** questions from this section.
Each question carries 20 marks.
Write your answers in the spaces provided on the examination paper.

Section B Answer any **two** questions from this section.
Each question carries 30 marks.
Write your answers in the spaces provided on the examination paper.

Section C Answer any **four** questions from this section.
Each question carries 60 marks.
Write your answers in the answer book.

You should spend not more than 30 minutes on Section A and 30 minutes on Section B, leaving 120 minutes for Section C.

You must return your examination paper with your answer book at the end of the examination.

Section A

**Answer any five questions.
Write your answers in the spaces provided.**

1. Complete **four** of the following sentences by putting **one word** in the blank space.
- (a) The hepatic portal vein carries blood from the alimentary canal to the
 - (b) A tendon joins to bone.
 - (c) Phototropism is the growth response of a plant to
 - (d) Hormones are secreted by glands.
 - (e) Gas exchange between a leaf and the atmosphere takes place through the

2. Select the correct cell component from the following list and write it opposite its partner in column B.

ribosome, vacuole, chloroplast, cell membrane, mitochondrion

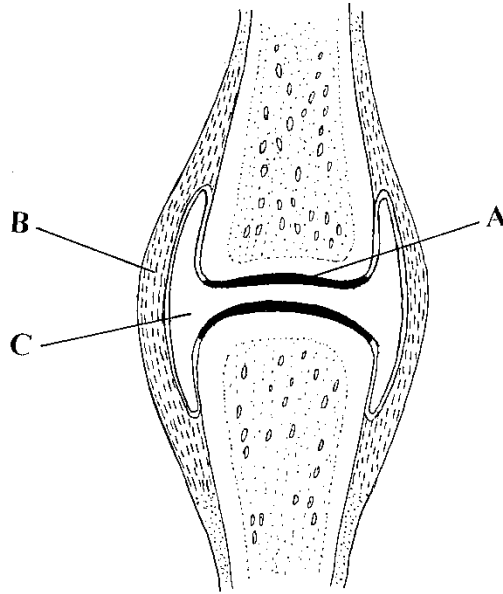
| Column A | Column B |
|--|----------|
| Contains chlorophyll | |
| Site of protein formation | |
| Site of energy release | |
| Site of storage of water, salts and sugars | |
| Allows osmosis to occur | |

3. Indicate whether each of the following statements is true (T) or false (F) by drawing a circle around T or F.

| | | |
|---|----------|----------|
| Example: The pulmonary artery carries blood to the lungs | T | F |
|---|----------|----------|

| | | |
|---|----------|----------|
| Mitosis is the division of a nucleus into two identical nuclei | T | F |
| A sperm contains the haploid number of chromosomes | T | F |
| Chromosomes are made of DNA and lipid | T | F |
| Organisms of the same species can usually produce fertile offspring | T | F |
| Aerobic respiration is the release of energy in the absence of oxygen | T | F |
| RNA is not found in ribosomes | T | F |
| Immobilised enzymes can act as catalysts | T | F |

4. The diagram shows the structure of one type of joint.



Name this type of joint.

Give **one** location in the human body of this type of joint.

Name the following parts.

A

B

C

Name another type of joint found in the human body

5. Fats are composed of fatty acids and

What name is given to fats that are liquid at room temperature?

State **two** functions of fats in the human body

(i)

(ii)

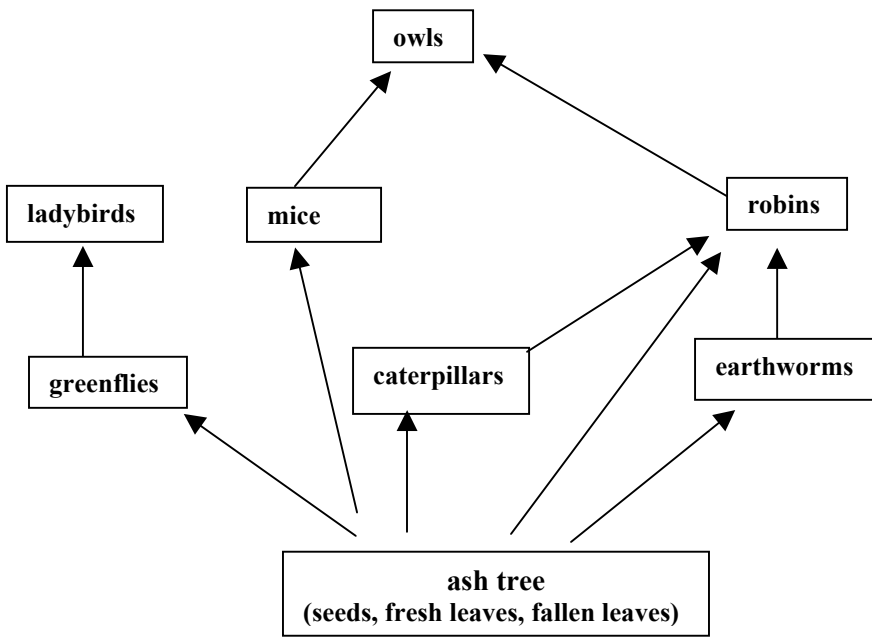
An example of a fat-soluble vitamin is

A good source of this vitamin is

A lack of this vitamin may lead to

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6. Answer the following questions in relation to the food web shown below.



Write out a food chain with **four** organisms in it

Name the primary producer in the web

Name **two** secondary consumers in the web.

1 2

Name **two** herbivores in the web.

1 2

Name **one** omnivore in the web

Name **one** carnivore in the web

Section B

Answer any two questions.

Write your answers in the spaces provided.

Part (a) carries 6 marks and part (b) carries 24 marks in each question in this section.

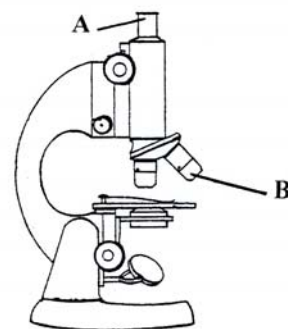
7. (a) Name the parts of the light microscope labelled A and B.

A

B

If the magnification of A is X 10 and the magnification of B is X 40, what magnification results when a slide is viewed using B?

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- (b) Answer the following in relation to preparing a slide of stained plant cells and viewing them under the microscope.

(i) From what plant did you obtain the cells?

(ii) Describe how you obtained a thin piece of a sample of the cells.

.....
.....
.....
.....

What stain did you use for the cells on the slide?

.....

Describe how you applied this stain

.....
.....

What did you do before placing the slide with the stained cells on the microscope platform?

.....
.....

State **two** features of these cells that indicate that they are typical plant cells.

1.

2.

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9. (a) Answer the following in relation to human breathing rate OR pulse rate.

State which of these you will refer to

What is the average rate at rest?

State a possible effect of smoking on the resting rate

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(b) How did you measure the resting rate?

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Describe how you investigated the effect of exercise on this rate.

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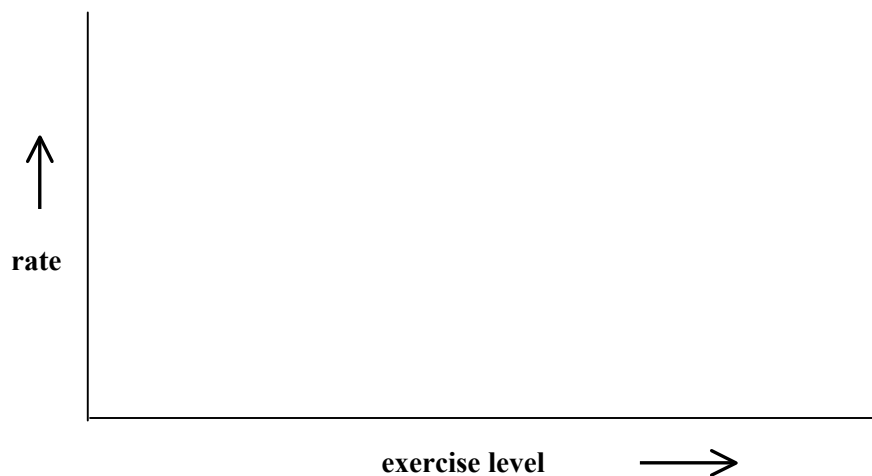
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Using the axes below draw a graph to show how rate is likely to vary as the exercise level increases.

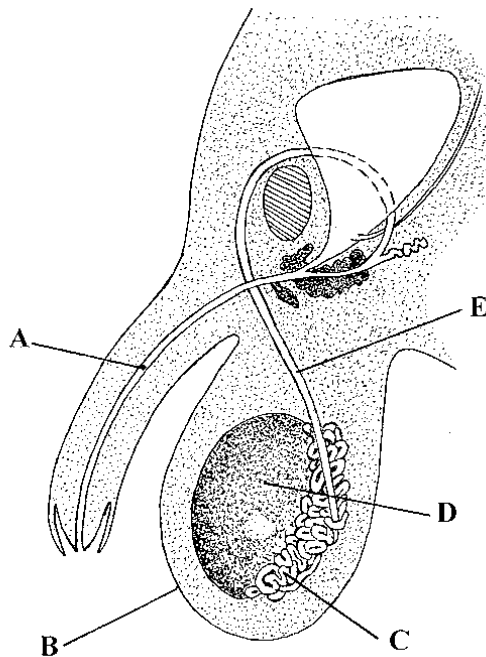


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Section C

Answer any **four** questions.
Write your answers in the answer book.

10. (a) Water has many functions in the human body. State **three** of these functions. (9)
- (b) (i) Name the chemical elements present in carbohydrates.
(ii) Give an example of a carbohydrate that has a structural role. Where would you expect to find this carbohydrate in a living organism?
(iii) State a role of carbohydrates other than a structural one.
(iv) Name a test that you would carry out to show the presence of a reducing sugar (e.g. glucose).
(v) Describe how you would carry out the test that you have named in (iv). (24)
- (c) (i) Name a chemical element found in proteins that is **not** found in carbohydrates.
(ii) State **two** good sources of protein in the human diet.
(iii) Proteins are digested to simpler substances. What are these simpler substances called?
(iv) State **one** function of protein in the human body.
(v) Name a test for protein.
(vi) Describe how you would carry out the test that you have named in (v). (27)
11. (a) What are secondary sexual characteristics? Give an example of a human secondary sexual characteristic. (9)
- (b) The diagram shows the reproductive system of the human male.



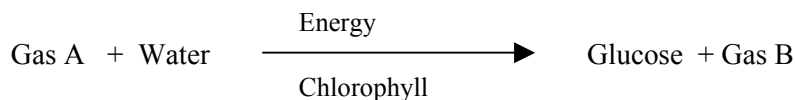
- (i) Name the parts A, B, C, D, E.
(ii) Where are sperm produced?
(iii) What is the function of the prostate gland?
(iv) State **one** way in which a sperm differs from an ovum (egg). (24)
- (c) (i) What is meant by infertility? State **one** cause of infertility in the human male.
(ii) Name **three** methods of contraception and, in each case, explain how the method prevents conception. (27)

12. (a) Explain the following terms that are used in genetics; dominance, genotype, phenotype. (9)
- (b) In Aberdeen Angus cattle, the polled (**P**) condition (absence of horns) is dominant to the horned (**p**) condition. A heterozygous polled bull was crossed with a horned cow. Use the following layout in your answer book to find the possible genotypes and phenotypes of the calves that may result from this cross.

| | | | | |
|----------------------|--------------------------|---|------------|------|
| | Heterozygous polled bull | X | Horned cow | |
| Genotypes of parents | | | | |
| Gametes | | | | |
| Genotypes of calves | | | | |
| Phenotypes of calves | | | | (27) |

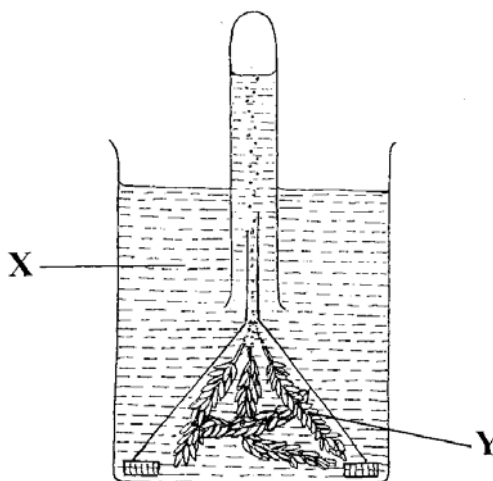
- (c) (i) What is meant by DNA profiling?
(ii) Describe briefly how DNA profiling is carried out.
(iii) Give **two** uses of DNA profiling. (24)

13. (a) What is metabolism? Describe briefly the part played by enzymes in metabolism. (9)
- (b) The following equation summarises the process of photosynthesis.



- (i) Name Gas A.
(ii) Name Gas B.
(iii) Name the energy source.
(iv) Plants obtain Gas A from the air. Name **two** processes that release this gas into the air.
(v) Suggest **two** possible fates for Gas B, following its production in the plant.
(vi) Where in a leaf would you expect to find cells with most chlorophyll?
(vii) What term is used to describe the nutrition of plants? (27)

- (c) The apparatus shown below may be used to investigate the effect of an environmental factor on the rate of photosynthesis.



- (i) Name X and Y.
(ii) How would you measure the rate of photosynthesis?
(iii) Name an environmental factor that you would vary in this experiment.
(iv) Explain how you would vary the factor that you have named in (iii).
(v) Other environmental factors should be kept constant during the experiment. Name **one** of these factors. (24)

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14. Answer **any two** of (a), (b), (c).

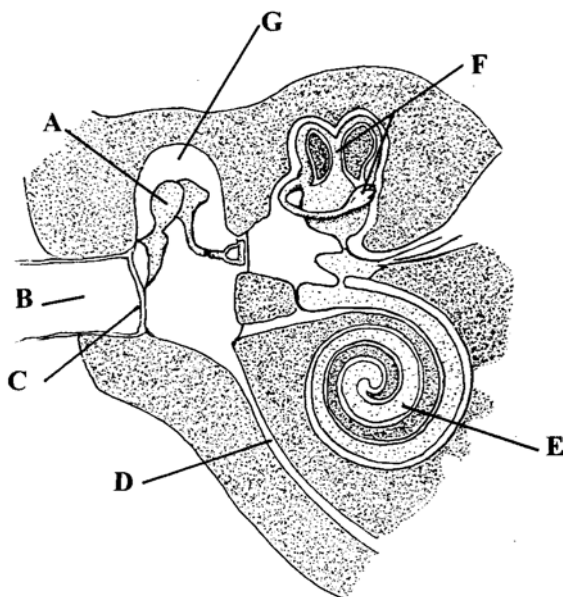
(30, 30)

- (a) (i) State a function of each of the following parts of a flower:
1. petal 2. sepal 3. anther.
- (ii) Explain what is meant by pollination. What is the difference between self-pollination and cross-pollination?
- (iii) Name **two** ways in which cross-pollination happens.
- (iv) Suggest why cross-pollination is preferable to self-pollination.
- (b) (i) Name a part of a flower from which a fruit develops.
- (ii) In each of the following cases give **one** example of a plant that uses the stated method of seed dispersal:
1. wind
2. animal.
- (iii) Why is it important for plants to disperse their seeds?
- (iv) What is meant by the dormancy of seeds?
- (v) Suggest an advantage of dormancy of seeds to a plant.
- (c) (i) What is meant by germination?
- (ii) List **three** factors that are essential for germination.
- (iii) In the case of **one** of the factors that you have named in (ii), explain how it affects germination.
- (iv) Describe an experiment to demonstrate that the factors you have named in (ii) are essential for germination. Include a diagram of the apparatus in your answer.

15. Answer **any two** of (a), (b), (c).

(30, 30)

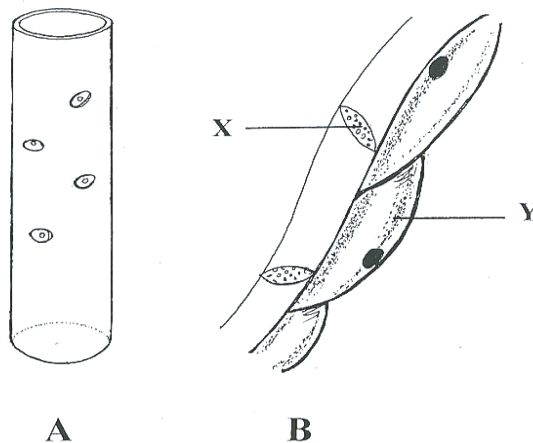
- (a) The diagram shows the structure of the human ear.



- (i) Name the parts A, B, C, D, E, F.
- (ii) What is connected to the ear by D?
- (iii) Which is present in G, gas or liquid?
- (iv) State the function of E.
- (v) State the function of F.

- (b) (i) What is a hormone?
- (ii) Draw an outline diagram of the human body and indicate on it the location of the following hormone-producing glands by using the following letters:
 W Pituitary
 X Thyroid
 Y Pancreas (Islets of Langerhans)
 Z Adrenals
- (iii) In the case of **one** of the hormone-producing glands that you have located in your diagram, state:
 1. the gland and a hormone that it produces.
 2. a function of this hormone.
 3. a deficiency symptom of this hormone.
- (iv) State **one** way in which hormone action differs from nerve action.

- (c) Diagrams A and B are of plant vascular tissues.



- (i) Identify A and B.
- (ii) What is meant by a vascular tissue?
- (iii) Name X and Y.
- (iv) State a function of A.
- (v) State a function of B.
- (vi) Where would you expect to find A and B in a leaf?
- (vii) Name **one** substance found in the walls of A but not found in the walls of B.

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