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Coimisiún na Scrúduithe Stáit State Examinations Commission

LEAVING CERTIFICATE EXAMINATION, 2008

BIOLOGY - ORDINARY LEVEL

THURSDAY, 12 JUNE - MORNING, 09.30 to 12.30

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

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

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

It is recommended that 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 this examination paper with your answer book at the end of the examination.

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

1. The following food chain is from a hedgerow.

| |
|---|
| hawthorn leaves → caterpillar → blue tit → sparrowhawk |
|---|

Complete any **four** of the following by reference to **this** food chain.

- (a) The primary consumer in this food chain is _____
- (b) If the number of sparrowhawks increases, the number of blue tits may _____
- (c) In this food chain the hawthorn leaves represent the _____
- (d) Name a carnivore from this food chain _____
- (e) The number of trophic (feeding) levels in this food chain is limited by the small transfer of _____ from one level to the next.

2. Choose a term from the following list and place it in **Column B** to match the description in **Column A**. The first one has been completed as an example:

amino acid, nitrogen, haemoglobin, keratin, enzyme

| Column A | Column B |
|--|-------------|
| A protein present in blood | haemoglobin |
| An element always present in proteins along with C, H, O | |
| A protein which changes reaction rates | |
| The end product of protein digestion | |
| A structural protein | |

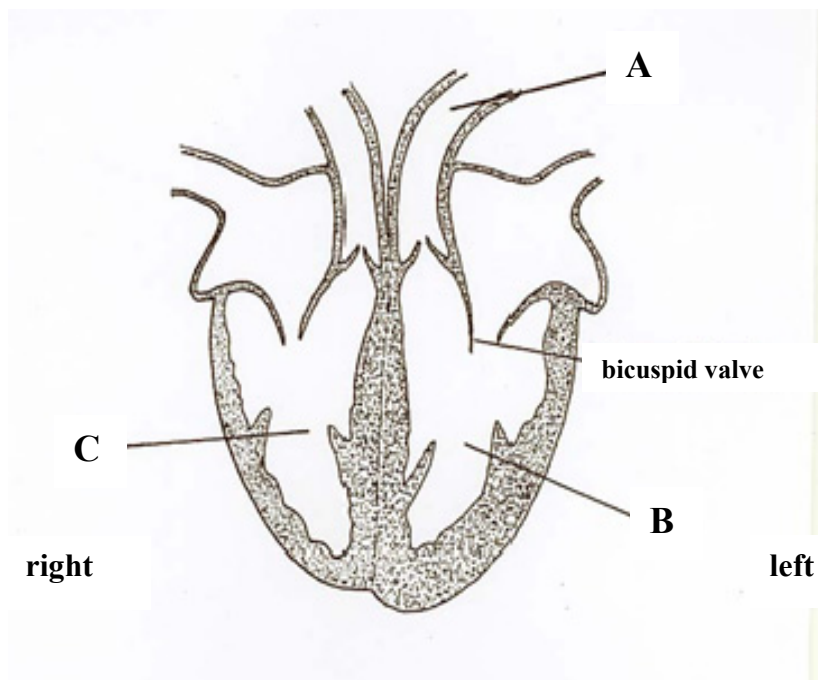
3. Indicate whether the following are true (T) or false (F) by drawing a circle around T or F.

Example: Carbon dioxide is produced during respiration.

T **F**

- | | | |
|--|----------|----------|
| (a) Stage 1 of respiration requires oxygen | T | F |
| (b) Stage 1 of respiration takes place in the cytoplasm | T | F |
| (c) Stage 2 of respiration also takes place in the cytoplasm | T | F |
| (d) Some of the energy released in respiration is lost as heat | T | F |
| (e) Lactic acid is a product of anaerobic respiration | T | F |

4. The diagram shows a section through a human heart.



(a) Name blood vessel **A**. _____

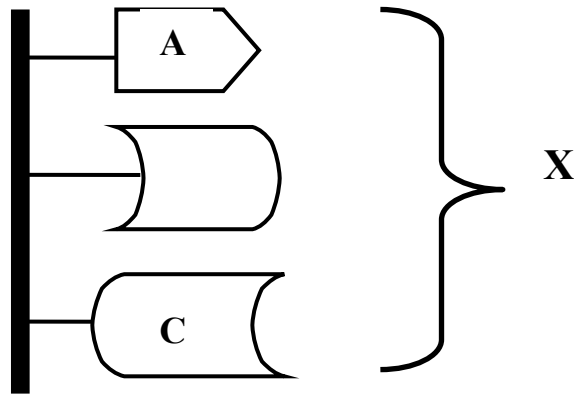
(b) Is the blood in **A** oxygenated or deoxygenated? _____

(c) Name the chamber of the heart labelled **B**. _____

(d) Give **one** reason why the wall of chamber **B** is thicker than the wall of chamber **C**.

(e) What is the role of the bicuspid valve? _____

5. The diagram represents a part of a DNA molecule. A and C represent nitrogenous bases.



Complete the following in relation to DNA.

(a) Name the nitrogenous bases whose first letters are A and C.

A _____ C _____

(b) The structure labelled X is called a _____

(c) Where in the cell would you expect to find most DNA? _____

(d) DNA contains the instructions needed to make protein.

These instructions are called the _____ code.

6. The diagram shows a section through human skin.

(a) Name parts A and B.

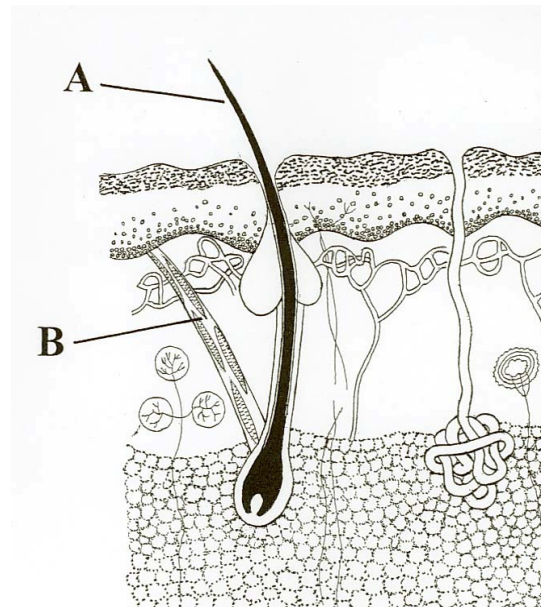
A _____

B _____

(b) Place X on the diagram to show where sweat reaches the skin surface.

(c) Apart from water, name **one** other substance which is found in sweat _____

(d) Describe briefly **one** way by which the skin helps to retain heat in cold conditions.



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. It is important to use sterile apparatus when working with micro-organisms.

(a) (i) What is meant by sterile? _____

(ii) How may apparatus be sterilised? _____

(b) Answer the following questions about an investigation that you carried out to show the growth of leaf yeast.

(i) Name the container in which you grew the leaf yeast. _____

(ii) What was present in this container to provide food for the yeast?

(iii) Describe how you put leaf yeast into the container. _____

(iv) How long did it take for the leaf yeast to appear? _____

(v) Describe the appearance of the leaf yeast in the container.

8. (a) State the location in the human body of the following muscles which are used for breathing:

(i) diaphragm _____

(ii) intercostals _____

(b) Answer the following questions about an activity that you carried out to investigate the effect of exercise on the breathing rate **or** pulse of a human.

(i) At the start of the investigation you asked the person who was about to do the exercise to sit down for a few minutes. Explain the purpose of this. _____

(ii) How did you measure the breathing rate **or** the pulse?

(iii) Describe how you conducted the investigation after the period of rest.

(iv) State the results of your investigation. _____

9. (a) (i) What is meant by the germination of seeds? _____

- (ii) Seeds may remain inactive for a period before germination. What term is used to describe this period of inactivity? _____
- (b) Answer the following questions about an investigation that you carried out on the effect of water, oxygen and temperature on germination.
- (i) What seeds did you use? _____
- (ii) Explain how you set up a control for the investigation.

- (iii) How did you deprive some of the seeds of oxygen?

- (iv) How did you ensure that some of the seeds were deprived of a suitable temperature for germination? _____

- (v) State the results of the investigation, including those of the control.

Section C

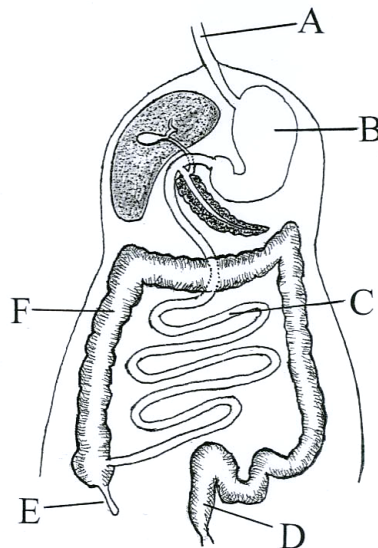
Answer any four questions.
Write your answers in the answer book.

10. (a) (i) What is meant by nitrogen fixation?
(ii) Name a group of organisms involved in nitrogen fixation. (9)
- (b) Answer the following questions by reference to an ecosystem that you have studied.
(i) Name the ecosystem.
(ii) Name **two** habitats from the ecosystem.
(iii) Name an animal that is present in **one** of these habitats and describe **one** way in which it is adapted to that habitat.
(iv) Describe briefly how you carried out a quantitative survey of a **named** plant found in the ecosystem. (27)
- (c) (i) What is meant by pollution?
(ii) Give an example of pollution which may result from domestic (household) or industrial or agricultural activity.
(iii) Suggest **two** ways to prevent or control pollution.
(iv) Write a short paragraph (about 5 lines) on waste management. (24)
11. (a) (i) What is a chromosome?
(ii) The haploid number of chromosomes is found in the human egg and sperm.
Explain the underlined term. (9)
- (b) Hair colour in humans is genetically controlled. The allele for brown hair (**B**) is dominant to the allele for red hair (**b**).
(i) Explain the underlined terms.
(ii) For hair colour Seán is heterozygous (**Bb**) and Máire is homozygous (**bb**).
1. What colour is Seán's hair?
2. What colour is Máire's hair?
(iii) Use a Punnet square or other means to show the following:
1. the genotypes of all the gametes that Seán and Máire can produce.
2. the genotypes of the children that Seán and Máire may have.
(iv) What is the probability that one of their children may have red hair? (Give your answer as a ratio or a percentage). (27)
- (c) (i) What is meant by evolution?
(ii) Name **one** of the scientists associated with the Theory of Natural Selection.
(iii) Give a brief account of the Theory of Natural Selection.
(iv) Outline the evidence for evolution from any **one** named source. (24)

12. (a) (i) In what main part of a plant does most photosynthesis take place? (9)
 (ii) In what cell structure does photosynthesis take place? (9)
- (b) (i) What is the main source of energy for photosynthesis?
 (ii) Suggest **two** reasons why life on earth might not continue without photosynthesis.
 (iii) In photosynthesis water (H₂O) is split into three products.
 1. Name these **three** products.
 2. State what happens to each of these products. (27)
- (c) Describe an activity that you carried out to investigate the influence of light intensity **or** carbon dioxide concentration on the rate of photosynthesis. Include a diagram of the apparatus that you used in your answer. (24)

13. (a) Bile is involved in digestion in the human body.
 (i) 1. Where is bile produced?
 2. Where is bile stored?
 (ii) Where does bile act in the alimentary canal? (9)

- (b) The diagram shows the digestive system of the human.



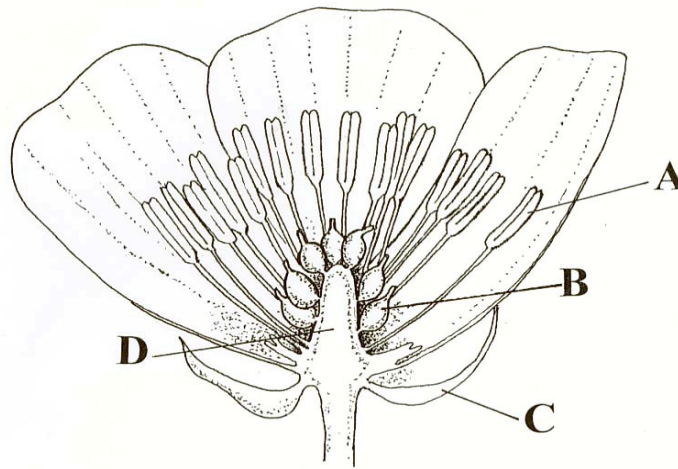
- (i) Name the parts labelled A, B, C, D, E and F.
 (ii) What is the role of peristalsis in the digestive system?
 (iii) Where do the products of digestion enter the blood?
 (iv) How do these products of digestion pass into the blood? (27)
- (c) (i) For each of the parts labelled B and C in the diagram above, state whether the contents are acidic, neutral or alkaline.
 (ii) Amylase is an enzyme that is found in saliva. State the substrate and the product of this enzyme.
 (iii) State **two** functions of symbiotic bacteria in the alimentary canal.
 (iv) What is meant by egestion? From which labelled part of the diagram does egestion occur? (24)

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

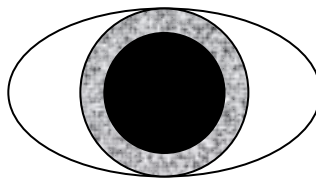
(30, 30)

(a) The diagram shows the structure of a flower.



- (i) Name the parts labelled A, B, C, D.
- (ii) In which labelled part is pollen produced?
- (iii) What is meant by pollination?
- (iv) From the list below, choose **three** characteristics in each case of;
 - 1. an insect-pollinated flower,
 - 2. a wind-pollinated flower.brightly coloured petals, feathery stigmas, anthers within petals, anthers outside petals, nectaries, petals reduced or absent.
- (v) What process follows pollination in the life cycle of a flowering plant?

(b) (i) Copy the diagram of the front of the eye into your answer book and label the iris and the pupil.



- (ii) Is the eye shown in the diagram above adapted for dim light or bright light? Explain your answer.
- (iii) Where in the eye is the retina located?
- (iv) Two types of cells that receive light are found in the retina. Name each of these.
- (v) Give **one** difference between the two types of cell that receive light.
- (vi) The optic nerve is attached to the eye. What is the function of the optic nerve?

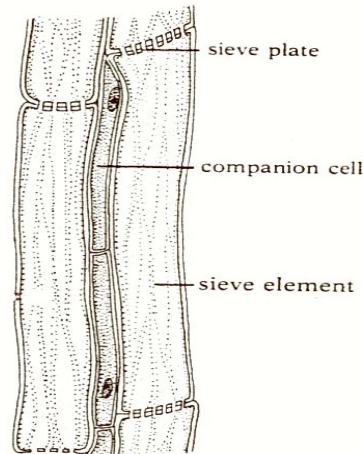
(c) (i) Draw a large labelled diagram of the human breathing tract and label the following parts; larynx, trachea, bronchus, bronchiole.

- (ii) What is the role of alveoli in the lungs?
- (iii) Name a breathing disorder.
- (iv) Suggest a possible cause of the breathing disorder that you have named in (iii) and state how it may be treated.

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

(30,30)

- (a)
- (i) Water enters the roots of plants by osmosis. Explain what is meant by osmosis.
 - (ii) Describe how you demonstrated osmosis as part of your practical activities.
 - (iii) Name the tissue that transports water from the root to the leaves.
 - (iv) Mention **one** way in which the tissue you have named in (iii) is adapted for the transport of water.
 - (v) The diagram below shows another tissue that is involved in transport in plants. Name this tissue and name a substance that is transported in it.



(b) Answer the following questions in relation to blood.

- (i) What is blood plasma? Give a role for blood plasma.
- (ii) Name **two** types of cell found in the blood and give a function for each of them.
- (iii) The ABO blood group system has four blood groups. What are these **four** groups?
- (iv) Suggest a reason why it is important to know a person's blood group.

(c) Answer the following by reference to *Rhizopus*.

- (i) To which kingdom does *Rhizopus* belong?
- (ii) Draw a diagram to show the structure of *Rhizopus* and label **three** parts.
- (iii) Describe, using labelled diagrams, sexual reproduction in *Rhizopus*.
- (iv) Give an example of a beneficial organism and of a harmful organism that belong to the same kingdom as *Rhizopus*.