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# Coimisiún na Scrúduithe Stáit State Examinations Commission

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LEAVING CERTIFICATE EXAMINATION, 2013

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## BIOLOGY – ORDINARY LEVEL

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TUESDAY, 11 JUNE – AFTERNOON, 2.00 – 5.00

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**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.**

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

1. Use your knowledge of nutrients to answer the following questions:

(a) Proteins always contain the elements carbon, hydrogen, oxygen and

.....

(b) Glucose is an example of which type of biomolecule?

.....

(c) An example of a fat-soluble vitamin is

.....

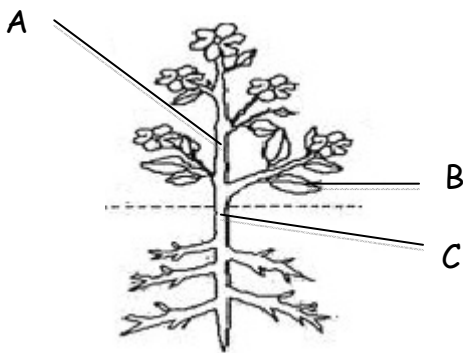
(d) A solution used to test for the presence of glucose is

.....

(e) Calcium and iron are examples of essential

.....

2. The diagram shows the structure of a flowering plant.



(a) Name the parts labelled A, B, and C.

Part A ..... Part B ..... Part C .....

(b) Give **one** main function of each of the parts labelled A, B and C.

Function of part A .....

Function of part B .....

Function of part C .....

(c) Flowers are the organs of which type of reproduction in the plant? .....

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

**Example:** The liver produces bile.

T      F

(a) Metabolism is the sum of all the chemical reactions in the body.      T      F

(b) Anabolism is the breaking down of large molecules.      T      F

(c) Nutrition is the way living organisms get rid of waste.      T      F

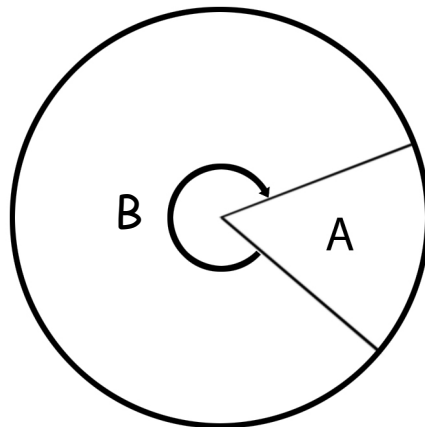
(d) The term *abiotic* refers to the living factors in an ecosystem.      T      F

(e) In science, a hypothesis is an educated guess based on observations.      T      F

(f) In experiments the factor that is changed is called the variable.      T      F

(g) Grazing food chains begin with animals.      T      F

4. The diagram shows the cell cycle.



(a) There are two parts in the cell cycle – cell division and interphase. Match these two parts to the letters in the diagram.

Cell division .....      Interphase .....

(b) Name the **two** types of cell division.

1.....      2.....

(c) Cancer is the uncontrolled multiplication of abnormal cells. Give **two** causes of cancer.

1.....

2.....

(d) Suggest a possible treatment for cancer.....

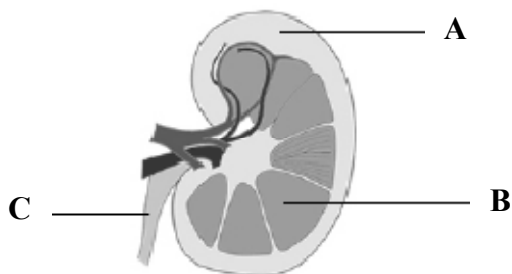
.....

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

List: ~~Amylase~~; Temperature; Substrate; Immobilised; Reusable; Protein.

Column A	Column B
An example of an enzyme.	Amylase
(a) The group of biomolecules to which enzymes belong.	
(b) Enzyme activity is affected by this.	
(c) Enzymes trapped in an inactive material.	
(d) The substance with which an enzyme reacts.	
(e) Advantage of using immobilised enzymes.	

6. The diagram shows a vertical section through a human kidney.



- (a) Name the parts labelled A, B and C.
- A .....
- B .....
- C .....
- (b) Name the organ that is attached to the kidney by part C.....
- (c) Name **one** substance excreted by the kidneys.....
- (d) Name the site in the kidney where filtration takes place.....
- (e) Suggest **one** possible treatment for kidney failure.....

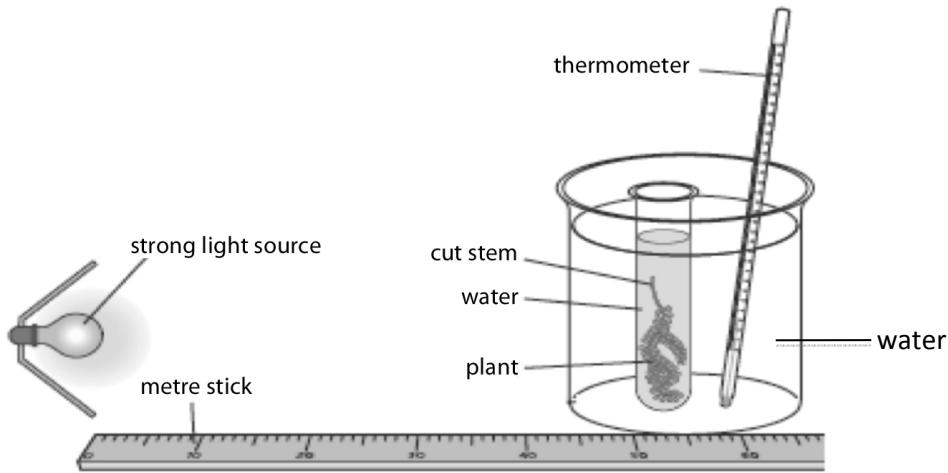
**Section B**

**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) (i) Where in a plant cell does photosynthesis take place?.....
- (ii) Name the gas released during photosynthesis.....
- (b) Answer the following questions in relation to an investigation that you carried out to study the effect of light intensity or carbon dioxide concentration on the rate of photosynthesis.



Tick the factor you will refer to.

Light intensity	<input type="checkbox"/>
CO <sub>2</sub> concentration	<input type="checkbox"/>

- (i) Name the plant that you used.....
- (ii) How did you vary the light intensity **or** the carbon dioxide concentration?  
.....
- (iii) Name **one** factor that you kept constant during the investigation.  
.....
- (iv) How did you keep that factor constant?  
.....
- (v) How did you measure the rate of photosynthesis?  
.....  
.....
- (vi) What was the result of your investigation?  
.....  
.....  
.....

8. (a) (i) Which substance moves through cell membranes by osmosis?

.....

(ii) Name **one** other term used in biology to describe the movement of substances through cell membranes.

.....

(b) Answer the following in relation to an activity you carried out to demonstrate osmosis.

(i) In the space below, draw a labelled diagram of the apparatus you used in your demonstration.

(ii) Suggest a control that you might use in this activity.

.....

.....

(iii) State the result(s) of your investigation.

.....

.....

.....

(iv) Briefly explain the result(s) referred to in part (iii).

.....

.....

(v) What is the purpose of a control in scientific experiments?

.....

.....

9. (a) (i) In ecology, what is meant by the term *conservation*?

.....

(ii) Suggest why conservation is important in an ecosystem.

.....

.....

(b) (i) As part of your ecosystem study, you used various pieces of apparatus to collect animals for identification.

Draw labelled diagrams of **two** pieces of apparatus that you used to collect animals **and** in **each** case name the apparatus and an animal collected.

Name of apparatus 1..... Animal collected.....

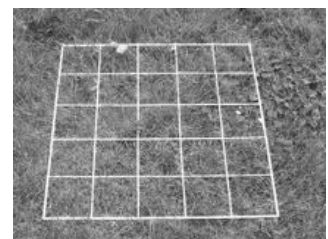
Labelled diagram of apparatus 1.

Name of apparatus 2 ..... Animal collected .....

Labelled diagram of apparatus 2.

(ii) Name the piece of apparatus shown.

.....



(iii) What is this piece of apparatus used for in your ecology studies?

.....

.....

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

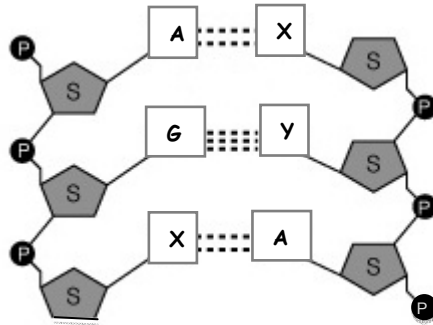
10. (a) Explain the following terms used in genetics:

- (i) Gene.
- (ii) Allele.
- (iii) Genotype.

(9)

(b) There are four bases in DNA structure.

These are adenine (A), cytosine (C), thymine (T) and guanine (G).



- (i) Name the bases at positions X and Y in the diagram.
- (ii) Where in a human cell would you expect to find most DNA?
- (iii) Proteins are made in the ribosomes using a code from DNA. Name the molecule that carries the DNA code to the ribosomes.
- (iv) What is meant by DNA profiling?
- (v) In DNA profiling, what is used to cut the DNA strands into fragments?
- (vi) Give **two** applications of DNA profiling.

(27)

(c) In humans, sex is determined by genes located on pairs of chromosomes called sex chromosomes.

Using a Punnett square or otherwise, show that there is an equal chance of a child being male or female.

In your answer give:

- (i) The genotypes and matching phenotypes of the parents.
- (ii) The possible genotypes of the gametes that can be produced by **each** parent.
- (iii) The genotypes of the offspring.

(24)



11. (a) Explain the following terms as used in ecology:

- (i) Producer.
- (ii) Niche.
- (iii) Habitat.

(9)

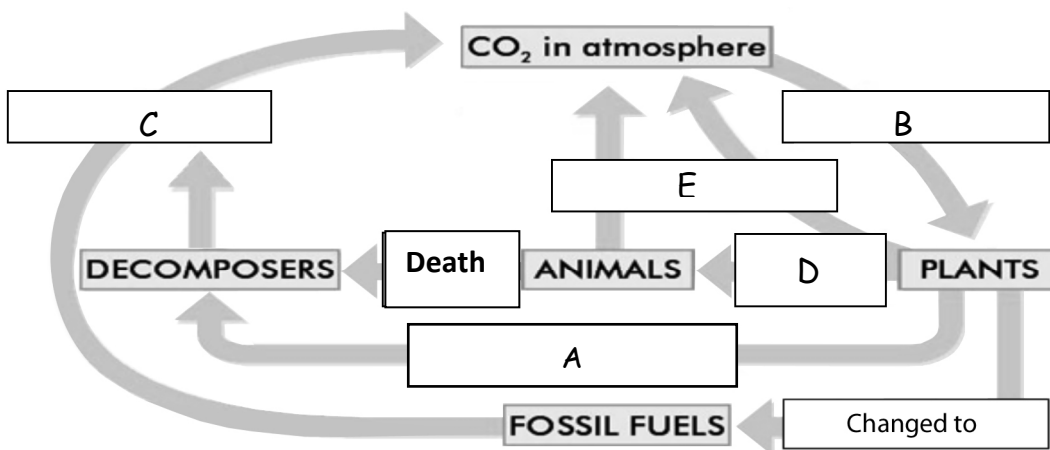
(b) Climate Change

There is now widespread evidence that the emission of greenhouse gases into the earth's atmosphere is causing global climate change. Major changes are expected in terms of temperature and rainfall. One of the main greenhouse gases is carbon dioxide, released when fossil fuels are burned. Another is methane gas released by cattle. These gases cause pollution of the air. They are called greenhouse gases as they have an effect similar to that of a greenhouse - they prevent some of the sun's heat escaping back into space.

- (i) Name **one** greenhouse gas.
- (ii) Why are greenhouse gases so called?
- (iii) What is meant by the term *pollution*?
- (iv) Suggest **one** way to reduce the levels of greenhouse gases in the air.
- (v) The diagram below shows the carbon cycle.

**In your answer book** match the terms from the list below to the letters A, B, C, D and E in the diagram.

**List: Photosynthesis; Respiration; Eaten by; Combustion; Decay.**



(27)

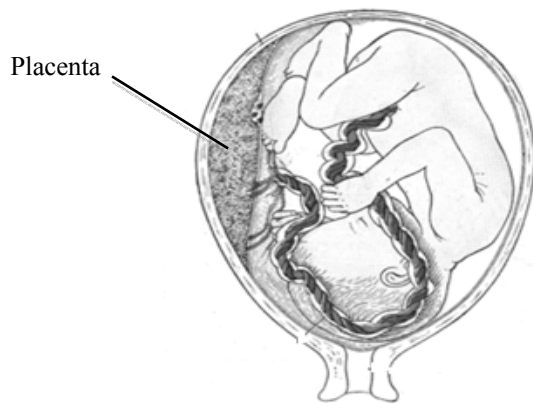
(c) Improper waste disposal may cause pollution.

- (i) State any **two** types of pollution associated with waste disposal.
- (ii) 1. Give **one** example of a waste associated with agriculture **or** forestry **or** fisheries.  
2. State how the named waste is managed.
- (iii) Give **three** ways to minimise waste.
- (iv) Give **one** example of the use of micro-organisms in waste management.

(24)

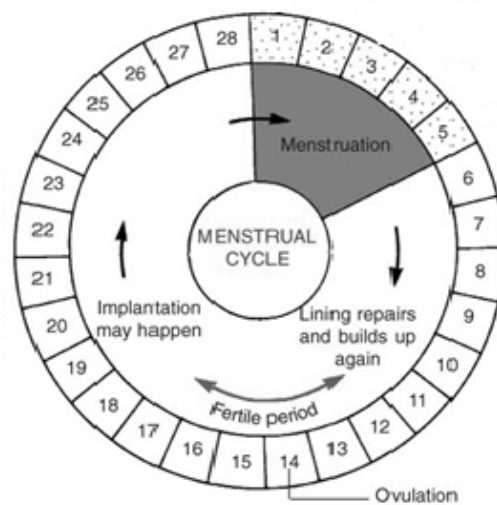
12. (a) (i) Explain the term *secondary sexual characteristics*.  
 (ii) Give **two** examples of secondary sexual characteristics in males. (9)

(b) The diagram shows the foetus in the womb.



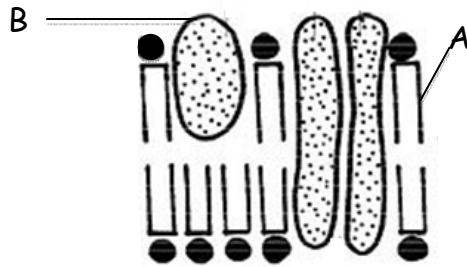
- (i) Give **two** functions of the placenta.  
 (ii) Give the **three** stages of childbirth.  
 (iii) Many babies are breast fed after birth. Give **two** biological benefits of breastfeeding.  
 (iv) What is meant by the term *infertility*?  
 (v) *In vitro* fertilisation is a method used to treat infertility.  
 What is meant by *in vitro* fertilisation? (27)

(c) The diagram shows a regular female menstrual cycle.



- (i) What happens in the womb during menstruation (days 1 – 5)?  
 (ii) Explain the term *ovulation*.  
 (iii) What is meant by the *fertile period*?  
 (iv) Where does fertilisation occur in the female body?  
 (v) Explain the term *implantation*.  
 (vi) Name **two** female hormones that have a role in the menstrual cycle.  
 (vii) What happens to the menstrual cycle when a woman reaches the menopause? (24)

13. (a) (i) Draw a labelled diagram of an animal cell as seen using a light microscope. (9)
- (ii) Name another type of microscope that gives greater detail than a light microscope.
- (b) The diagram below shows the ultrastructure of a section of cell membrane.

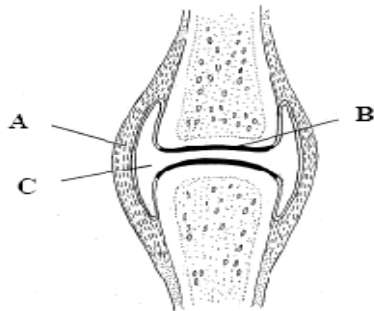


- (i) Give **two** functions of the cell membrane.
- (ii) Name the parts labelled A and B.
- (iii) Which organelle is known as “the powerhouse of the cell”?
- (iv) Why does the nucleus of a cell have many pores?
- (v) List **two** differences between a plant cell and an animal cell.
- (vi) What is the primary source of energy for plant cells? (27)
- (b) Answer the following questions in relation to an investigation you carried out into fermentation by yeast cells.
- (i) Explain what is meant by *anaerobic respiration*.
- (ii) Where in the cell does anaerobic respiration occur?
- (iii) Describe, with the aid of a diagram, how you kept the yeast under anaerobic conditions during the investigation.
- (iv) Name the **two** substances produced by the yeast in the process of fermentation.
- (v) How did you know that fermentation had ceased? (24)

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

(30, 30)

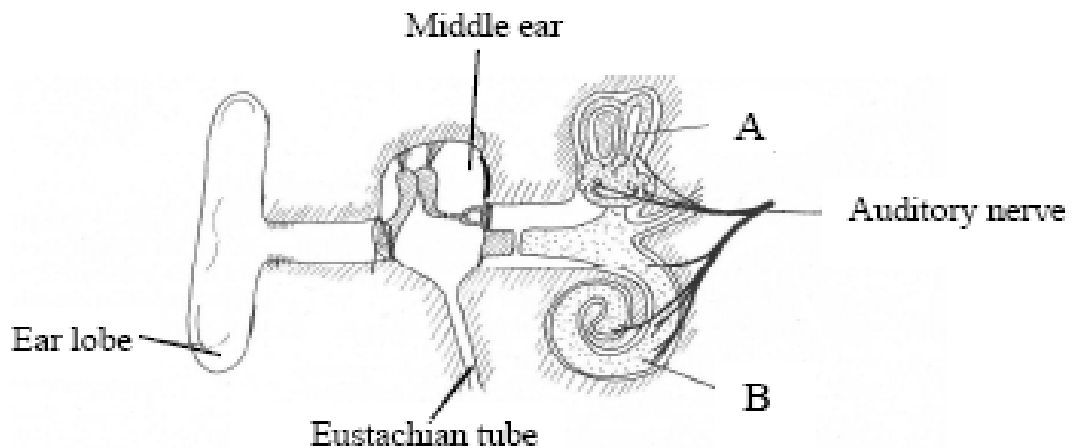
(a) The diagram shows a synovial joint.



- (i) Name the parts labelled A, B and C.
- (ii) Give **two** functions of the human skeleton.
- (iii) Vertebrae in the neck are called the cervical vertebrae.  
Name **and** give the exact location of **two** other types of vertebrae.
- (iv) Name **one** disorder of the musculoskeletal system.

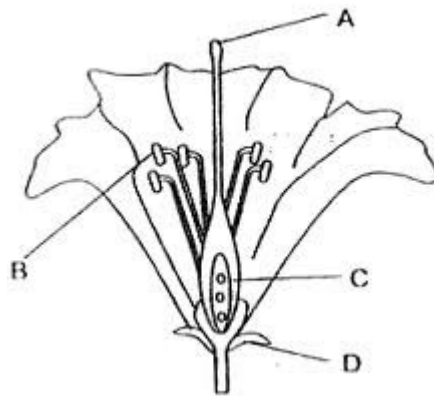
- (b) (i) Blood is made up of plasma and blood cells. What is plasma?
- (ii) What is the function of white blood cells?
- (iii) Where in the body are white blood cells produced?
- (iv) Some people may have the blood group B Positive (B+).  
What factor is present in their blood that makes it positive?
- (v) The heart pumps blood around the body.
  - 1. Name the structure in the heart that controls the heartbeat.
  - 2. Where is this structure located in the heart?
- (vi) What causes the sound of a heartbeat?
- (vii) Name the blood vessels that supply the heart cells with blood.
- (viii) Mention **two** ways to maintain a healthy heart.

(c) The diagram shows the human ear.



- (i) Name the parts labelled A and B.
- (ii) What is the function of part A?
- (iii) What is the function of part B?
- (iv) What is connected to the middle ear by the Eustachian tube?
- (v) What surrounds the bones in the middle ear?
- (vi) The ear is an example of a sense organ.  
Name **two** sense organs, other than the ear and the eye, in the human body.
- (vii) Name **one** disorder of the ear **or** of the eye **and** give a corrective measure for the disorder referred to.

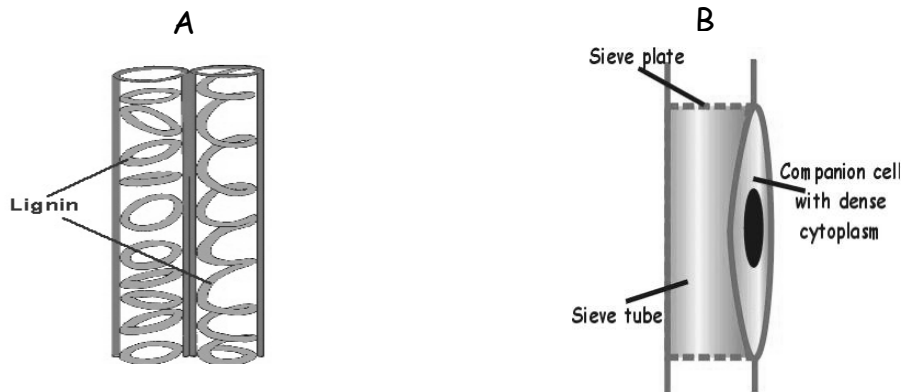
(a) The diagram shows the structure of a flower.



- (i) Name the parts labelled A, B, C and D.
- (ii) What is meant by the term *pollination*?
- (iii) Give **two** methods of pollination in plants.
- (iv) What is the next step after pollination in the lifecycle of the plant?
- (v) Suggest a substance that flowers produce that may cause hay fever in some people.

- (b) (i) What is meant by the term *vegetative propagation*?
- (ii) Give **one** example of vegetative propagation in plants **and** state whether it involve a stem, a root, a leaf or a bud.
- (iii) State **two** ways that vegetative propagation differs from reproduction by seed.
- (iv) Artificial propagation is widely used in horticulture. Give **two** example of artificial propagation carried out by gardeners or horticulturists.
- (v) Give **one** advantage **and one** disadvantage of artificial propagation.

(c) The diagrams show two types of vascular tissue in plants.



- (i) Name the tissues A and B.
- (ii) Which of the above tissues transports water from the roots?
- (iii) Which of the above tissues transports food from the leaves?
- (iv) Is tissue A living or dead?
- (v) Suggest a role of the lignin in tissue A.
- (vi) Name **one** process that causes water to move upwards through a plant.
- (vii) Name the structures in the leaves through which water exits the plant.
- (viii) Vascular tissue is one type of plant tissue. Name **two** other plant tissues.

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