



Coimisiún na Scrúduithe Stáit
State Examinations Commission

Leaving Certificate Examination 2020

Biology

Section C
Ordinary Level

240 marks

Do not hand this question paper up

Section C

Answer **any four** questions.

Write your answer in the answerbook containing Sections **A** and **B**.

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

- (i) *Competition*
- (ii) *Producer*
- (iii) *Niche*.

(9)

(b) Read the following article and answer the questions that follow it.

In the countryside foxes mostly feed on small mammals such as rabbits found in hedges and tall grass. In recent years foxes can often be found in urban areas because of the easy availability of food, such as thrown away takeaway meals and increasing amounts of household wastes.



Although foxes can live until they are 10, they rarely survive that long and are either killed on the road, hunted or die from disease. Extinct wolves were once foxes' natural predators; however, foxes now have a new predator since the reintroduction of the white-tailed eagle.

(Based on an article in RTE.ie Sunday 25th February 2018)

- (i) Why are foxes often found in towns and cities?
- (ii) Why are most foxes younger than 10 years old?
- (iii) Name a producer from the article above.
- (iv) Name a primary consumer from the article above.
- (v) Draw a food chain that includes **four** organisms from the article above.
- (vi) State an adaptation a fox has that increases its chance of survival.
- (vii) Mention **two** ways households could minimise the amount of waste produced.

(27)

(c) A group of students collected information on the animals found in an ecosystem close to their school. During the survey the students used the following pieces of equipment:

1. Pooter 2. Pitfall Trap 3. Sweep Net

- (i) Draw a diagram of each piece of equipment and describe how each was used to collect organisms for examination.
- (ii) What did the students use to identify the animals they found?
- (iii) State any **one** abiotic factor that could influence the number of animals in the ecosystem.

(24)

11. (a) (i) Explain the terms *haploid* and *diploid*.
(ii) Name the type of cell division that halves the chromosome number. (9)
- (b) (i) Chromosomes contain DNA. Name another substance found in chromosomes.
(ii) Sections of DNA are called genes. What is the function of a gene?
(iii) Describe the shape of a DNA molecule.
(iv) Name the base that combines with adenine in DNA.
(v) Name the base that combines with guanine in DNA.
(vi) The stages involved in preparing a DNA profile are numbered below.
In your answer book, rewrite these stages (1-4), by numbering them in the correct order in which they occur;
1. The pattern of fragment distribution is analysed.
 2. Fragments are separated on the basis of size.
 3. Cells are broken down to release DNA.
 4. DNA strands are cut into fragments.
- (vii) Where in cells is most DNA located?
(viii) What is used to cut the DNA strand into fragments?
(ix) Suggest a reason for creating a genetic profile. (27)

- (c) The cross between two dogs with different coat colours is displayed below.
Examine the cross and answer the questions that follow, **in your answer book**.

Parents	Black Dog	X	White Dog
Genotypes	Bb	X	bb
Gametes	(B), (b)	X	(b)

Gametes	b	
B		Offspring
b	bb (white)	

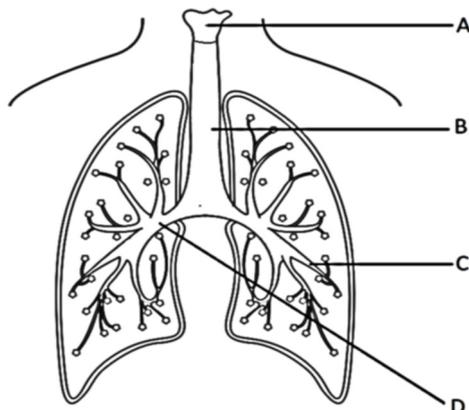


- (i) Name the dominant allele in this cross.
- (ii) Name the recessive allele in this cross.
- (iii) How many alleles for coat colour may be found in a single gamete?
- (iv) What word is used to describe identical alleles in a genotype?
- (v) **In your answer book**, state the genotype and phenotype for the offspring missing from the shaded box above.
- (vi) If the black dog is male, using **X** and **Y**, give the sex chromosomes of the black dog and the sex chromosomes of the white dog. (24)

12. (a) (i) Oxygen enters the blood in the lungs by diffusion. What is diffusion?
(ii) Name the blood vessel that transports oxygenated blood from the lungs to the heart.
(iii) Name the chamber of the heart that receives oxygenated blood from the lungs.

(9)

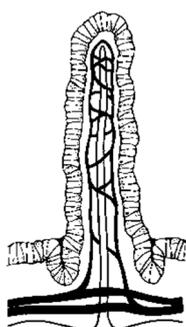
- (b) The diagram shows the human breathing system.



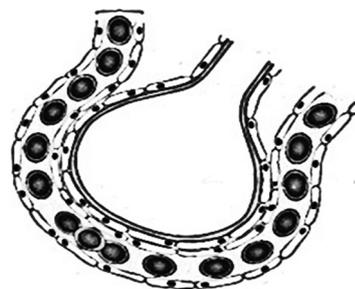
- (i) Identify the structures labelled A, B, C, D in the diagram.
(ii) What prevents structure B from collapsing?
(iii) Name a muscle that contracts during inhalation.
(iv) Describe the change in air pressure inside the chest during inhalation.
(v) Inhalation is an active process and exhalation is a passive process.
Explain the terms *active* **and** *passive*.

(27)

- (c) The human body absorbs material into the bloodstream for transport to body cells. The diagrams below show two structures involved in the exchange of materials in the human body.



A



B

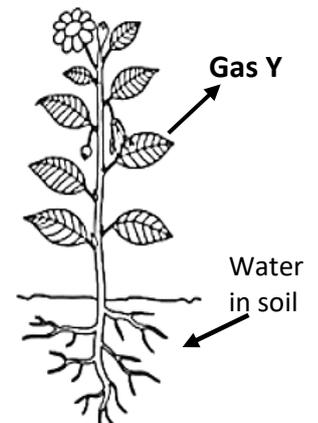
- (i) Name each structure A and B.
(ii) State the exact location where each structure is found in the body.
(iii) State **two** features, common to both structures, which are an adaptation to efficient exchange of materials.
(iv) Name a disorder of the breathing system **and** describe a treatment for that disorder.

(24)

13. (a) (i) What role does chlorophyll play in photosynthesis?
(ii) Where is chlorophyll located in a plant cell?
(iii) Name the carbohydrate produced during photosynthesis.

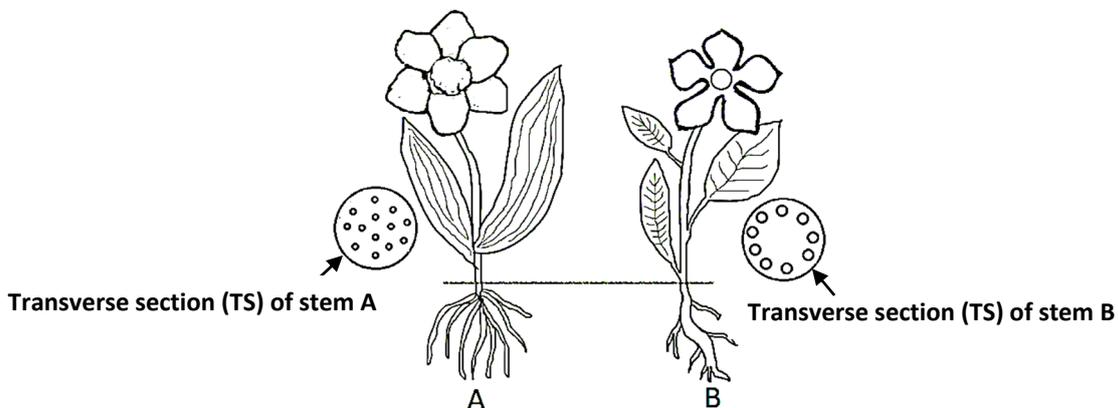
(9)

- (b) (i) Name the basic source of energy for all organisms on earth.
(ii) Name **gas Y** released by leaves during photosynthesis.
(iii) Name the openings in leaves that allow gas exchange.
(iv) Describe how water travels from the soil to the leaf.
(v) When water reaches the site of photosynthesis in the leaf the water molecules is split into three products. Name these **three** products.
(vi) Name **one** method used by gardeners to increase the growth of crops in greenhouses.



(27)

- (c) Flowering plants can be classified as either monocotyledonous (monocot) or dicotyledonous (dicot). Examine the two plants in the diagram and answer the questions that follow.



- (i) Identify which plant is a monocotyledon, A or B.
(ii) State **one** feature that identifies a plant as a monocotyledon.
(iii) Identify which plant is a dicotyledon, A or B.
(iv) State **one** feature that identifies a plant as a dicotyledon.
(v) The roots of plants absorb water. State **one** other function of plant roots.
(vi) Plants contain the following three tissue types:
A. Dermal **B. Ground** **C. Vascular**
Match the correct plant tissue type with each of the following functions:
1. Transport **2. Protection** **3. Food storage**

(24)

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

(30, 30)

(a) A student is carrying out an experiment, using the equipment below, to investigate the products of anaerobic respiration (fermentation).

(i) Name an organism, represented by X in the diagram, involved in the fermentation process.

(ii) Name the product that is collected in test tube B.

(iii) What effect does this product have on the limewater in test tube B?

(iv) Name the other product which forms during fermentation and remains in test tube A.

(v) How do you know when fermentation has finished?

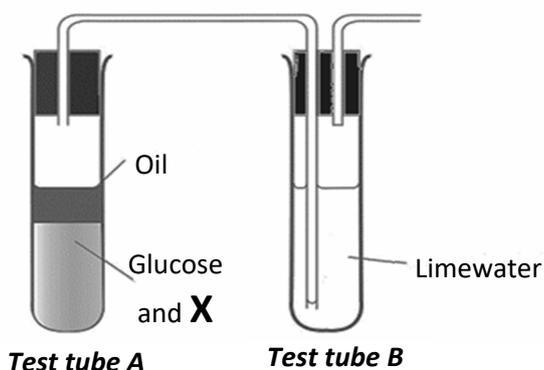
(vi) What test can be used to show that the product, named in (iv), is present in test tube A at the end.

(vii) What colour indicates a positive test for the product?

(viii) What substance is produced as a result of anaerobic respiration in human muscle?

(ix) What effect does this substance have on human muscle?

(x) Give **one** other example of modern-day bioprocessing.



(b) (i) What is added to a cell sample to make structures more visible when viewed with a microscope?

(ii) Identify the parts A, B, C, D in the diagram of a plant cell.

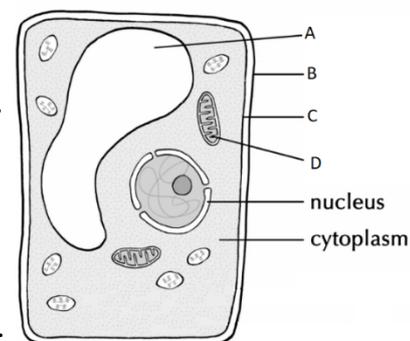
(iii) What is the function of the part labelled B?

(iv) What is the function of the part labelled D?

(v) What is a tissue?

(vi) What is tissue culture?

(vii) Describe **one** example of an application of tissue culture.



(c) *Rhizopus* is a harmful heterotrophic fungus.

(i) Where would you find *Rhizopus*?

(iii) What is meant by the term *heterotrophic*?

(iii) Draw a diagram to show the structure of *Rhizopus*. On your diagram include the following labels: **rhizoids**, **sporangiophores** and **sporangium**.

(iv) Label **M** on your diagram where mitosis occurs.

(v) Which form of reproduction results in the formation of a zygospore?

(vi) Name another harmful fungus.

(vii) Name a beneficial fungus **and** give an example of its economic importance.

(viii) What can be used to treat fungal infections but is of no use against viral infections?

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

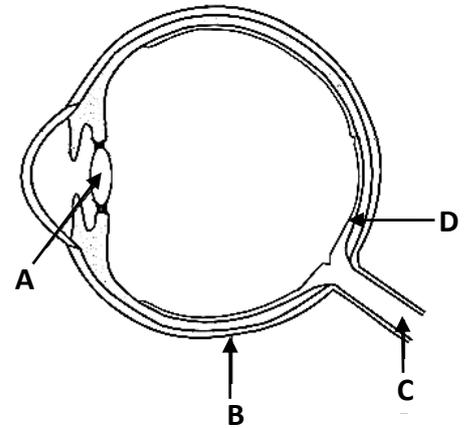
(30, 30)

The diagram shows a section through the human eye.

(a) (i) **In your answer book**, state which letter represents each of the following parts:

1. Sclera
2. Lens
3. Optic Nerve
4. Retina.

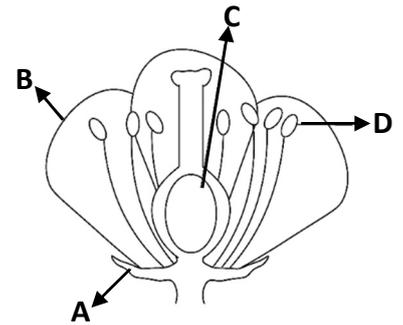
- (ii) Explain the role of the pupil in the eye.
- (iii) Name the two types of receptor cells located in the retina that respond to light.
- (iv) Name a disorder of either the eye **or** the ear **and** give a corrective measure for the stated disorder.
- (v) To which organ is the structure labelled C connected?



(b) (i) **In your answer book**, state which letter represents the parts of the flower that carry out the following functions:

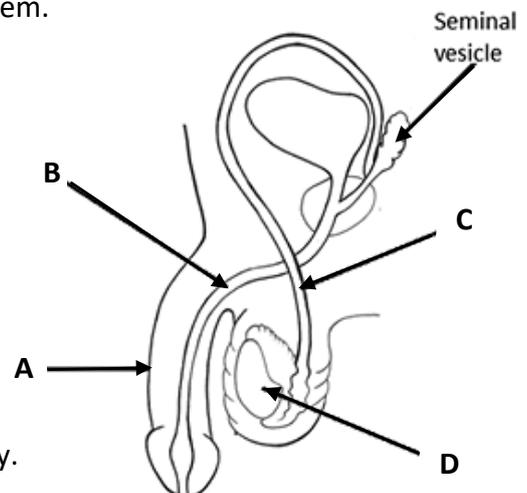
1. Produces pollen
2. Attracts insects for pollination
3. Protects the flower as a bud
4. Produces eggs.

- (ii) What is meant by pollination?
- (iii) Name the method of pollination that occurs in the flower shown in the diagram **and** give a reason for your answer.
- (iv) What is meant by dormancy **and** how does it give an advantage to the seed?



(c) The diagram shows the human male reproductive system.

- (i) Name the parts labelled A, B, C, D.
- (ii) In which labelled structure are sperm cells produced?
- (iii) What is the function of part labelled C?
- (iv) Give **one** function for the fluid produced by the seminal vesicle.
- (v) Name the sex hormone produced by the structure labelled D.
- (vi) Name **one** male secondary sexual characteristic.
- (vii) Give **one** disorder which results in male infertility.



The Leaving Certificate – Ordinary Level

Biology

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