Coimisiún na Scrúduithe Stáit
State Examinations Commission

Leaving Certificate Examination 2019

Biology

Section C
Ordinary Level

Tuesday 11 June – Afternoon 2:00 – 5:00

240 marks

Sections A and B are supplied in a separate examination booklet

You must return the examination booklet for Sections A and B with the answerbook used to answer the questions in Section C

Instructions

There are three sections in this examination.
Section **A** and Section **B** are in a separate examination booklet.
Section **C** is in this question paper.

This examination carries 400 marks in total.

It is recommended that you spend not more than 30 minutes on Section A and 30 minutes on Section B, leaving 120 minutes for Section C.

Section **C**: Answer any **four** questions from this section.
Each question carries 60 marks.
Write your answers in the **special answerbook** which the Superintendent will give you.
Do **not** write your answers to Section C on this question paper.

The special answerbook for Section C will be scanned and your work will be presented to an examiner on screen.

Write your answers in blue or black pen. You may use pencil for graphs and diagrams only.

You must return the examination booklet for Sections A and B with the answerbook used to answer the questions in Section C.

Section C

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

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

(i) *Habitat*

(ii) *Biosphere*

(iii) *Conservation*. **(9)**

(b) Read the paragraph below and answer the questions that follow.

From a pollinator's point of view, a good hedge has flowers in early spring to feast on after hibernation. The hedgerow will produce another crop of flowers in late autumn that the pollinators can use to stock up on calories for a long winter sleep. Hedgerows also have suitable banks, nooks and crevices in which the pollinators can nest.
Hedgerows also provide crucial habitats for many mammals, and are home to wild flowers such as purple violet, primrose, and wild dog rose, to name but a few. Our hedgerows are essentially ribbons of native woodland across the landscape. They connect species that would otherwise be isolated, supporting community diversity. They help rainwater to drain away quickly, protect soils, and filter pollutants. They shelter livestock from harsh weather and the hot summer sun.
Adapted from 'The Importance of a Good Hedgerow', The Irish Times, 26th July, 2018

(i) Give an example of a pollinator.
(ii) How do pollinators benefit from hedgerows?
(iii) Give **two** other ways hedgerows provide benefit in nature.
(iv) Name **two** plants that are found in hedgerows.
(v) Name **two** mammals that are found in hedgerows.
(vi) How does a plant benefit by producing flowers in early spring?

(27)

(c) (i) What is meant by the term *carnivore*?
(ii) Name a carnivore from an ecosystem other than the hedgerow.
(iii) Describe an adaptation that helps this animal to survive.

In 2009 a study of the badger population was carried out in the south-east of the country. The badgers were captured, marked, and released in the same area. Some time later badgers were again captured and the number of recaptures was recorded. The following data were produced.

Badgers caught and marked in session 1	Badgers caught in session 2	Badgers caught in session 2, marked from session 1
180	150	40

(iv) Suggest how the badgers should have been marked.
(v) Using the data above, calculate the total population of badgers in the study area. **(24)**

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

(i) *Dominant*

(ii) *Recessive*

(iii) *Gene expression*. **(9)**

(b) In sheep, the gene for white wool (W) is dominant to the gene for black wool (w).

If a heterozygous white sheep is crossed with a black sheep state:

(i) The genotype of the black sheep.

(ii) The genotype of the white sheep.

(iii) The genotypes of the gametes that can be produced by the white sheep.

(iv) The genotype of the gametes that can be produced by the black sheep.

(v) The genotypes **and** matching phenotypes of the possible offspring. **(27)**

(c) (i) What is meant by the term *species*?

(ii) Give an example of an inherited characteristic from a named species.

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

(iv) Give a source of evidence that evolution has occurred.

(v) Explain what you understand by the theory of natural selection. **(24)**

12. (a) Explain the following terms used in human nutrition:

(i) *Heterotroph*

(ii) *Omnivore*

(iii) *Peristalsis*. **(9)**

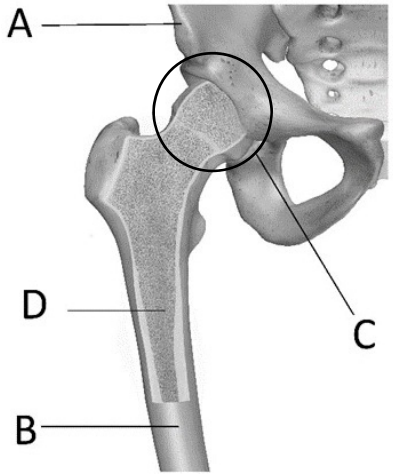
(b) The passage of food through the human digestive tract involves the following steps:

Absorption Digestion Egestion Ingestion

(i) **In your answer book**, rewrite these steps, placing them in the correct order.

(ii) Describe what happens during **each** of the steps, **and** say where **each** step occurs. **(27)**

(c) The diagram shows part of the human skeleton.



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

1. Femur 2. Joint 3. Pelvis 4. Bone marrow

(ii) What is meant by the term *antagonistic pair* in reference to muscles?

(iii) Describe the role of **each** of the following:

1. Compact bone
2. Bone marrow.

(iv) Give a treatment for a named disorder of the musculoskeletal system. **(24)**

13. (a) Explain the following terms used in cell metabolism:

(i) *Enzyme*

(ii) *Aerobic*

(iii) *Fermentation*. **(9)**

(b) The equation below represents aerobic respiration.

Glucose + X ⟶ Water + Y + energy

(i) Name the gas X.

(ii) Name a process that produces gas X.

(iii) Name the gas Y.

(iv) Name a process, other than aerobic respiration, that produces gas Y.

Aerobic respiration is a two-stage process by which organisms break down food molecules to get chemical energy.

(v) Name the locations in the cell for stage 1 **and** for stage 2.

(vi) Which stage produces the larger amount of energy?

(vii) Which stage requires gas X from the equation above?

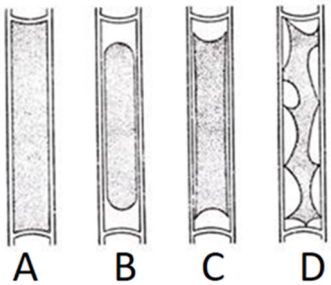
(viii) Give a role for the energy produced by the cell. **(27)**

(c) (i) Name **two** selectively permeable membranes in cells.

(ii) 1. What is meant by the term *diffusion*?

2. What is meant by the term *osmosis*?

The diagram shows how a plant cell changes when it is left in a highly concentrated salt solution.



(iii) Which letter A, B, C, or D, shows the cell when *turgid*?

(iv) What process has caused the appearance of the cell at D?

(v) Certain foods are treated with high salt or high sugar concentrations.

1. Why are these foods treated in this way?

2. How does this treatment work? **(24)**

14. Answer any **two** of (a), (b), (c). **(30, 30)**

(a) (i) Draw a labelled diagram of a typical virus.

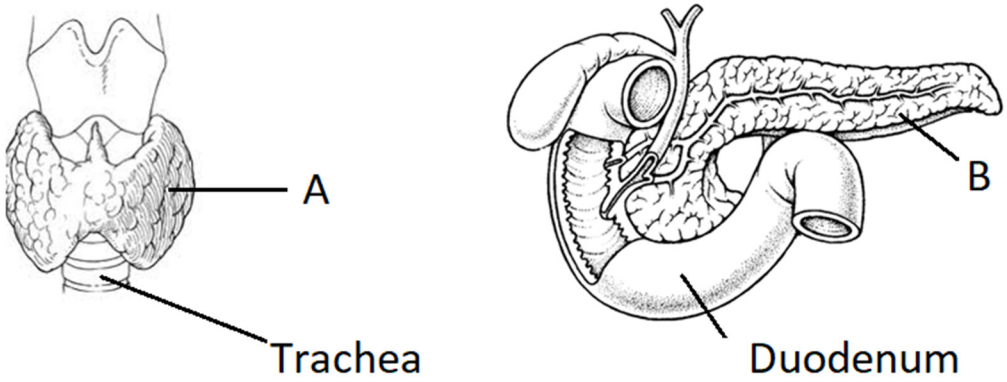
(ii) Give a reason why a virus is considered to be non-living.

(iii) Name **two** diseases in humans caused by viruses.

(iv) Name the method of reproduction used by bacteria.

(v) Name the **three** main bacterial shapes.

(b) Two human endocrine glands, labelled A and B, are shown below.



(i) What is meant by the term *endocrine*?

(ii) Name the endocrine glands labelled A and B in the diagram.

(iii) What is a hormone?

(iv) Name a hormone produced by gland A, **and** a hormone produced by gland B.

(v) Give an example of a hormone used in medical treatment.

(c) Vegetative propagation is a form of asexual reproduction in plants.

(i) What is meant by the term *asexual reproduction*?

(ii) 1. Give **two** examples of natural vegetative propagation.

2. State whether **each** of your examples involves a stem, a root, a bud, or a leaf.

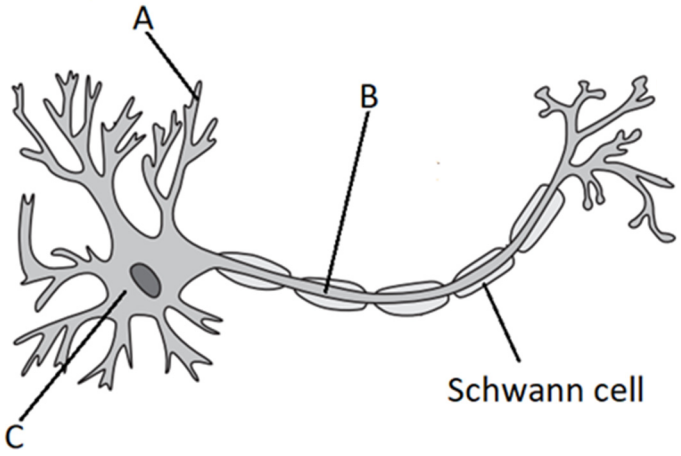
(iii) Name **two** methods gardeners use to artificially propagate plants.

(iv) Give **two** advantages to the plant of vegetative propagation.

(v) Give a disadvantage to the plant of vegetative propagation.

15. Answer any **two** of (a), (b), (c). **(30, 30)**

(a) The diagram shows a motor neuron.



(i) Name the parts labelled A, B, C.

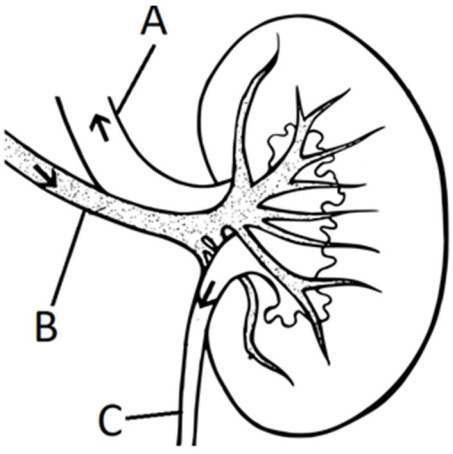
(ii) Which part of the motor neuron receives impulses?

(iii) Name the substance produced by the Schwann cells, which helps to speed up the nerve impulse.

(iv) Name **two** other types of nerve cells found in the body.

(v) Name **both** parts of the central nervous system.

(b) The diagram shows a human kidney and some attached structures.



(i) Name the structures labelled A, B, C.

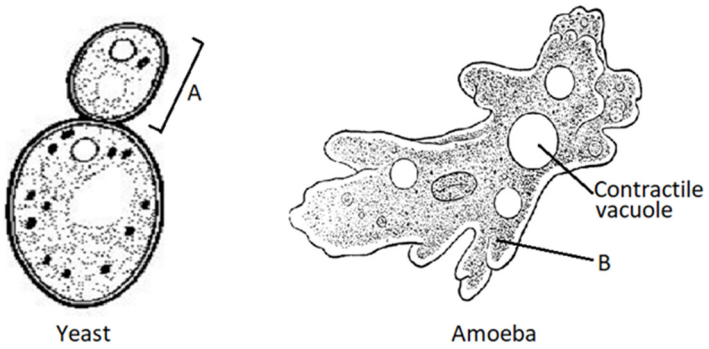
(ii) Which letter shows the structure that would contain urine?

(iii) Which other structure is attached to the kidney by part C?

(iv) The kidney is an organ of excretion. What is meant by the term *excretion*?

(v) Name **two** other excretory organs in the human body.

(c) Two single-celled organisms are shown below.



Yeast Amoeba

(i) Name the kingdom to which **each** belongs.

(ii) Name structure A and structure B**.**

(iii) Name a structure that is present in both cells.

(iv) Give an example of the economic importance of yeast.

(v) 1. What is meant by the term *saprophyte*?

2. What is meant by the term *parasite*?

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