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Coimisiún na Scrúduithe Stáit
State Examinations Commission

LEAVING CERTIFICATE EXAMINATION, 2012

BIOLOGY – ORDINARY LEVEL

TUESDAY, 12 JUNE – AFTERNOON, 2.00 – 5.00

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 <u>five</u> questions.
Write your answers in the spaces provided.

1. A student brings a tuna and sweetcorn sandwich, an apple and a bag of crisps for her lunch.

   (a) What food in the student's lunch is:

   (i) a **good** source of protein?_____

   (ii) a **good** source of fat? _____

   (b) Vitamins form part of a healthy diet and prevent many disorders.

   (i) Name **one** water-soluble vitamin. _____

   (ii) Suggest **one** food in the lunch that contains the water-soluble vitamin you have named.

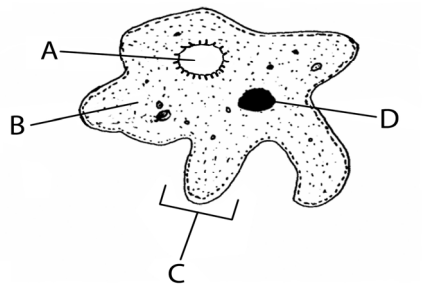
   _____

   (c) Name **one** structural protein in humans. _____

   (d) Give **one** function of fat in the human body. _____

   (e) What term is used to describe all the chemical reactions in the human body? _____

2. *Amoeba* is a tiny, one-celled organism.
   This diagram shows the structure of a freshwater *Amoeba* as seen through a microscope.



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

   A. _____ B. _____

   C. _____ D. _____

   (b) State:
   one function of part A. _____

   one function of part C. _____

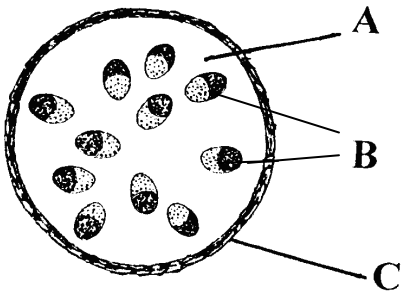
   (c) Give **one** difference between a plant cell and an amoeba.

   _____

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

Example:	**DNA is a double helical shape.**	**(T)**	**F**
(a)	The base Uracil is found in DNA.	T	F
(b)	Chloroplasts contain DNA.	T	F
(c)	The microscope lenses closest to the stage are the eyepiece lenses.	T	F
(d)	Sodium alginate is used to immobilise enzymes.	T	F
(e)	Plant cell walls are fully permeable.	T	F
(f)	Animal cells do not have membranes.	T	F
(g)	An organ is a group of systems.	T	F

4. The diagram below represents a transverse section through part of a plant.



(a) Does the diagram represent a root or a stem? _____

(b) The letters A, B, C in the diagram, represent three different tissue types.
Match each letter with its correct tissue type in the following list:

Ground tissue. _____

Dermal tissue. _____

Vascular tissue. _____

(c) State a function of vascular tissue. _____

_____

(d) Name the **two** types of vascular tissue in plants.

1. _____

2. _____

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

List: **Pollution; ~~Niche~~; Recycle; Burning fuel; Conservation; Smell.**

Column A	**Column B**
The role of the organism in the habitat.	**Niche**
(a) Any harmful addition to the ecosystem.	
(b) A problem associated with waste disposal.	
(c) A way to minimise waste.	
(d) Wise management of an ecosystem.	
(e) A possible cause of pollution.	

6. In pea plants the allele for tall (T) is dominant over the allele for dwarf (t).
A heterozygous tall plant is crossed with a dwarf plant.

Complete the blank spaces below.

Genotypes of parents	(Tt)	×	(tt)	
(a) Possible gametes	( ) ( )	×	( )	
(b) Genotypes of offspring	( )		( )	
(c) Phenotypes of offspring	----------		----------	

Section B

Answer any <u>two</u> 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) Name **one** disorder of the human breathing system. _____

(ii) Give **one** possible treatment for the disorder referred to above. _____

_____

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

Tick the rate you will refer to.

Breathing Rate	
Pulse Rate	

(i) The investigation starts by measuring the resting rate. How did you measure the resting rate?

_____

_____

(ii) After measuring your resting rate, what other steps did you carry out to complete the investigation?

_____

_____

_____

_____

_____

(iii) What was the result of your investigation?

_____

_____

_____

(iv) Does this investigation give the same result for both fit and non-fit people? _____

(v) Give a reason for your answer.

_____

_____

_____

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8. (a) (i) What is an enzyme? _____

(ii) On what structures in the cytoplasm are enzymes made? _____

(b) Answer the following questions in relation to an investigation that you carried out into the effect of temperature on the rate of activity of an enzyme.

(i) What enzyme did you use? _____

(ii) What substrate did you use? _____

(iii) How did you vary the temperature during the investigation?_____

_____

_____

(iv) How did you measure the rate of enzyme activity? _____

_____

_____

(v) During this investigation pH was kept constant. How did you keep the pH constant?

_____

_____

(vi) What was the result of your investigation?

_____

_____

_____

9. (a) Give **two** reasons why water is important for all living organisms.

(i) _____

(ii) _____

(b) Answer the following questions in relation to food tests that you carried out as part of your practical work.

(i) What chemical did you use to test the food for starch? _____

(ii) Was heat necessary for this test? _____

(iii) How did you know that starch was present?

_____

(iv) What control did you use in this test?

_____

_____

(v) Another food was tested for the presence of protein.
What solution was used to test for protein?

_____

(vi) What was the initial colour of the protein-testing solution before you put it on the food?

_____

(vii) Was heat necessary for this test? _____

(viii) What colour indicated that protein was present in the food?

_____

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

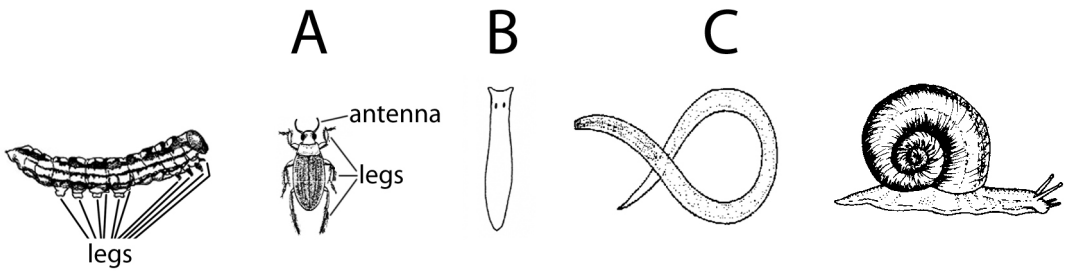
10. (a) Using organisms from the ecosystem you have studied, draw a pyramid of numbers to show at least **three** feeding levels.

(9)

(b) (i) All organisms in an ecosystem are influenced by biotic and abiotic factors.
Explain the underlined words.

(ii) Name any **two** abiotic factors from an ecosystem you have studied and describe how you measured **each** one.

(iii) Keys may be used to identify animals. Use the following key to identify animals A, B and C.
The animals are not drawn to scale.



1. Animal has a shell……... *Helix*.
   Animal does not have a shell……..Go to 2.
2. Animal has legs ……. …Go to 3.
   Animal does not have legs…….....Go to 4.
3. Animal has three pairs of legs……*Tribolium.*
   Animal has more than three pairs of legs……...*Pieris* larva.
4. Animal has long rounded body……...Nematode.
   Animal has flat body with two eye spots……Planarian.

(iv) All organisms are adapted to their own habitat.
1. Name **one** animal from the ecosystem you have studied.
2. Describe **one** way in which it is adapted to its habitat.

(27)

(c) (i) Distinguish between a quantitative and a qualitative survey by writing a sentence about each.

(ii) 1. Name **one** plant from the ecosystem you have studied.
2. Describe how you carried out a quantitative survey to determine its frequency.

(iii) As a result of pollution, a species of plant disappears from an ecosystem.
Suggest **two** possible effects that the disappearance of this plant might have on the other plants and animals living in the area.

(24)

11. (a) (i) In genetics, what is meant by the term *haploid*?
(ii) What is a chromosome?

(9)

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

The rabbit in the photograph has no pigment in its skin, fur or eyes. This is due to an inherited condition known as albinism. Such animals are unable to produce melanin, a protein pigment that gives colour to the skin, eyes, fur or hair. This condition makes an animal more likely to be preyed upon.
Albinism is caused by genetic mutation. The gene that causes albinism (lack of pigment) is a recessive gene. If an animal has one gene for albinism and one gene for pigmentation, it will have enough genetic information to make pigment and the animal will not have this disorder. However, if both genes are recessive the result is albinism. At least 300 species of animal have albino individuals e.g. rabbits, turtles, squirrels, deer and frogs.

(i) What are the main characteristics of albinism?

(ii) What is meant by the term *recessive* gene?

(iii) What is a mutation?

(iv) Mutations can lead to variation in organisms. Variations that make an organism better adapted to its environment can lead to evolution.

1. What is meant by *evolution*?
2. Name **one** of the scientists who first explained how evolution occurs by natural selection.
3. Give **one** source of evidence for evolution.

(v) People with albinism should always apply a high-factor sunscreen when going outdoors and must avoid strong sunshine. Suggest a reason for these precautions.

(27)

(c) (i) Genetic engineering is regularly used in animals, plants and micro-organisms.
What is meant by genetic engineering?

(ii) List **three** of the main procedures used in genetic engineering.

(iii) Give **two** examples of how genetic engineering is used.

(24)

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12. (a) (i) Name the **two** main types of reproduction.

(ii) Explain the term *fertilisation*. **(9)**

(b) The flower is the organ of reproduction in many plants.

(i) What part of the flower produces pollen?

(ii) After fertilisation, what part of the flower becomes the fruit?

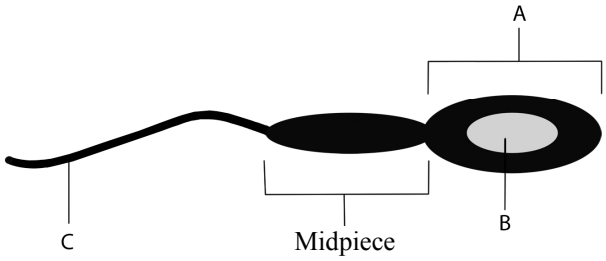
(iii) Give **two** methods of seed dispersal in plants.

(iv) Why is it necessary for plants to disperse their seeds?

(v) What is the advantage of dormancy to seeds?

(vi) Give **three** conditions necessary for seeds to germinate. **(27)**

(c) The diagram shows a human sperm cell.



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

(ii) What is the function of the midpiece of the sperm?

(iii) Name the hormone responsible for sperm production.

(iv) Give **one** cause of infertility in men.

(v) Explain the term *contraception*.

(vi) Name **two** methods of contraception. **(24)**

13. (a) All organisms may be classified (grouped) into five kingdoms.

(i) Suggest **one** advantage of classifying organisms.

(ii) Name the kingdom to which bacteria belong.

(iii) Give **one** example of the economic importance of bacteria. **(9)**

(b) (i) Draw a large labelled diagram of a typical bacterial cell.

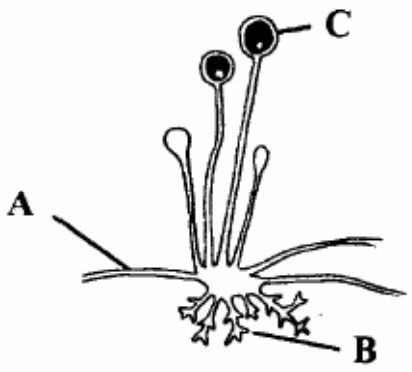
(ii) Bacteria may be classified by their shape.
Name any **two** bacterial shapes.

(iii) Name the method by which bacteria reproduce.

(iv) What are *pathogenic* bacteria?

(v) State **two** factors affecting the growth of bacteria. **(27)**

(c) The diagram shows part of the fungus *Rhizopus.*



(i) Name the parts labelled A and B.

(ii) Give **two** functions of structure B.

(iii) Describe the role of part C in the reproduction of *Rhizopus.*

(iv) What is meant by *saprophytic* nutrition?

(v) Give **one** beneficial use of fungi. **(24)**

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

(a) (i) What is meant by *aerobic respiration*?
(ii) Aerobic respiration takes place in two stages.
1. Where **in a cell** does stage 1 occur?
2. Where **in a cell** does stage 2 occur?

(iii) Which type of respiration, aerobic or anaerobic, produces more energy?
(iv) In yeast cells, alcohol is produced by fermentation.
Draw a labelled diagram showing how alcohol may be produced in the laboratory.
Answer the following questions in relation to the activity:
1. Name another substance that is produced during the fermentation process.
2. How would you detect this other substance?
3. How would you know when fermentation had finished?

(b) (i) In leaf cells, which chemical traps light energy for photosynthesis?
(ii) Water for photosynthesis enters the roots of plants by osmosis.
What is meant by *osmosis*?
(iii) During photosynthesis water is split into three products.
1. Name **each** of these **three** products.
2. Name the stage of photosynthesis during which water molecules are split.

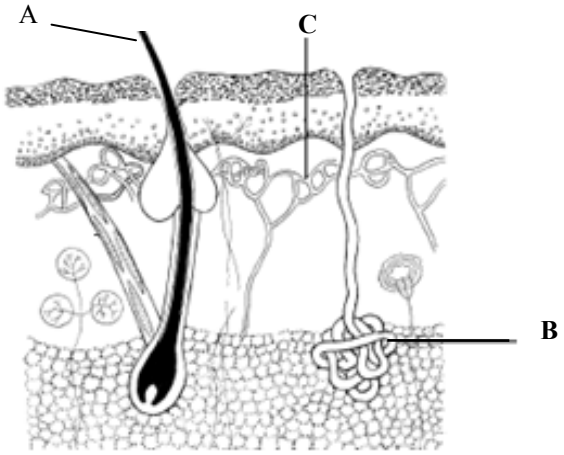
(iv) Carbon dioxide (CO_2) is also needed for photosynthesis.
Where does CO_2 enter the leaf?
(v) A market gardener wants to increase the vegetable yield in his greenhouses.
Suggest **two** ways he may achieve this.

(c) Tissue culture can be used to grow new tissues in the laboratory.

(i) What is a tissue?
(ii) Name a gas that would be needed for the growth of tissue in the laboratory.
(iii) Why are sterile conditions needed to grow the tissue?
(iv) What type of cell division, mitosis or meiosis, is involved in tissue culture?
(v) What medical term is used to describe the disease caused by uncontrolled mitosis in human cells?
(vi) Give **two** causes of this uncontrolled cell division.
(vii) Draw a labelled diagram to show the normal cell cycle.
(viii) What is the function of meiosis?

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

(a) The diagram shows a section through human skin.

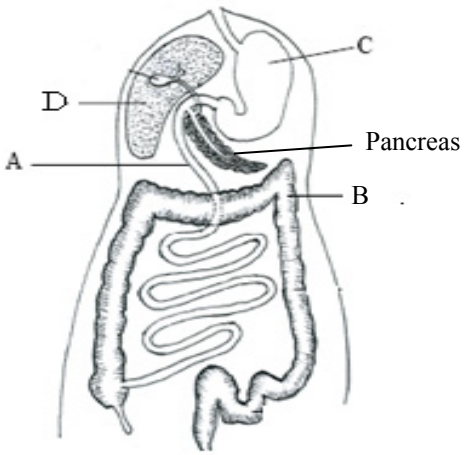


(i) Name the parts labelled A, B, and C.
(ii) The skin is one of the excretory organs in humans.
Name **one** substance excreted by the skin.
(iii) List **two** other functions of the skin.
(iv) Name another organ of excretion **and** state **one** substance it excretes.
(v) What is meant by the term *homeostasis*?
(vi) The human being is an endotherm. What does this mean?

(b) (i) In relation to plant responses:
1. What name is given to a plant's response to light?
2. Name **one** growth regulator produced in plants.
3. Where in a plant are growth regulators produced?
4. Give **one** way by which plants can protect themselves from attack.

(ii) In relation to animal responses:
1. Name the **two** main parts of the central nervous system in humans.
2. Messages are carried around the body by neurons (nerve cells).
Name any t**wo** types of neuron.
3. What name is given to the area where one neuron ends and another begins?
4. Name the type of chemical that carries messages between two neurons.
5. What happens to this chemical once the messages have been transmitted?

(c) The diagram shows the human digestive system.
(i) Name the parts labelled A, B and C.
(ii) Explain the term *digestion*?
(iii) Name **one** human tooth type **and** give its function.
(iv) Part C secretes hydrochloric acid onto the ingested food.
Give **one** function of this acid.
(v) Give **one digestive** function of part D.
(vi) Give **one** digestive function **and one** non-digestive function of the pancreas.



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