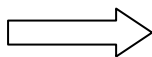


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Coimisiún na Scrúduithe Stáit State Examinations Commission

LEAVING CERTIFICATE EXAMINATION, 2014

BIOLOGY – ORDINARY LEVEL

TUESDAY, 10 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.

Section A

Answer any **five** questions.

Write your answers in the spaces provided.

1. Answer any **five** of parts (a) to (f).

A meal in a fast-food restaurant consists of fish and chips with a glass of water to drink.

(a) Give a **good** source of protein from this meal.

(b) Give **one** function of protein in the human body.
.....

(c) Chips contain starch. What chemical is used to test for the presence of starch?
.....

(d) State the **colour** of the chemical referred to in (c) if starch is present.
.....

(e) Water has many functions in the human body. State any **one** of these functions.
.....

(f) Suggest a reason why eating too much fast food could be bad for your health.
.....

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

Example: Alleles are different forms of the same gene.

T

F

(a) Chromosomes are made up of DNA and protein. T F

(b) A human sperm cell contains 23 chromosomes. T F

(c) Phenotype is the genetic make-up of an organism. T F

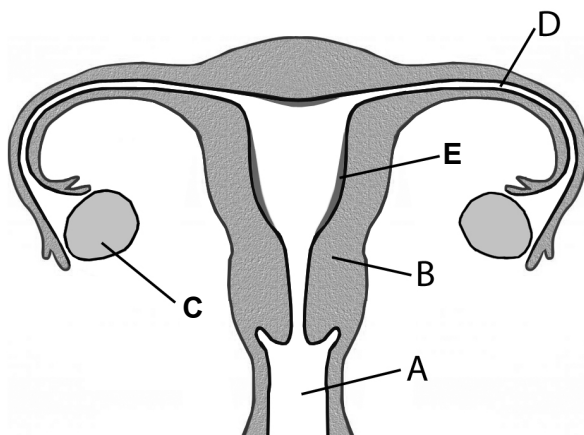
(d) Replication is the copying of DNA. T F

(e) RNA contains the base thymine. T F

(f) Genetic engineering is the manipulation and alteration of genes. T F

(g) The copying of the DNA code into mRNA is called transcription. T F

3. The diagram shows the human female reproductive system.



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

A B

C D

(b) State **one** function of the part labelled C in the diagram.

.....

(c) Give **one** cause of infertility in women.

.....

(d) In cases of infertility, eggs may be fertilised outside the body. Following this procedure, into which part of the reproductive system is the developing embryo then placed?

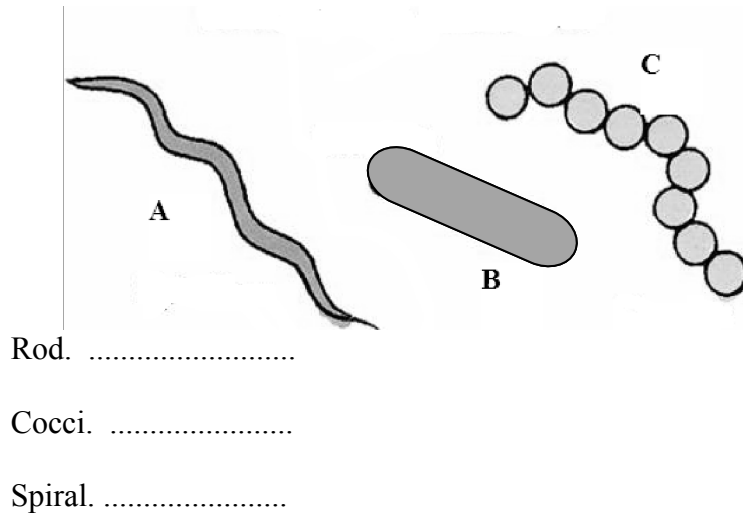
.....

4. 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: Skin graft; Dermal; Organ; Leaf; Tissue; *In vitro* growth.

Column A	Column B
A group of cells with the same function	Tissue
(a) A plant organ	
(b) Cells growing in a test tube	
(c) The heart	
(d) A use of tissue culture	
(e) A plant tissue	

5. (a) The diagram shows three bacterial shapes. Match the correct letter with the name of **each** shape below.



- (b) Bacteria reproduce by a method known as
- (c) Some bacteria have flagella. What are flagella used for?
- (d) Give **one** harmful effect of bacteria.....
- (e) Give **one** beneficial effect of bacteria.

6. Use your knowledge of ecology to answer the following:

- (a) What do we mean by the word *ecology*?
-

- (b) The following food chain is from a grassland ecosystem:



- (i) Name a secondary consumer from the above food chain.
- (ii) Name a producer from the above foodchain
- (iii) Name a herbivore from the above foodchain
- (iv) In the space below, show the above foodchain as a pyramid of numbers.

- (v) If all the foxes were killed, what would happen to the **number** of rabbits?

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) Why is a dicotyledonous (dicot) plant so called?

.....

- (ii) Give **one** function of vascular tissue in plants.

.....

- (b) Answer the following questions in relation to how you prepared and examined with a microscope a transverse section (T.S.) of a dicotyledonous stem.

- (i) Name the plant that you used.

- (ii) Why did you use a herbaceous (non-woody) stem rather than a woody one?

.....

- (iii) Outline how you made the section of the stem **and** prepared it for examination.

.....

.....

.....

.....

- (iv) Describe how you examined your section of stem with the microscope.

.....

.....

.....

.....

- (v) Draw a labelled diagram to best represent what was seen on your slide.
Label the following on your diagram: ground tissue, xylem, phloem.

8. (a) (i) What is meant by the term *digestion*?

.....

(ii) Name a carbohydrate you would expect to find **stored** in a seed.

.....

(b) Answer the following questions in relation to practical work you carried out to investigate digestive activity in germinating seeds.

(i) What type of agar did you use in this investigation?

.....

(ii) The seeds were divided into two batches. One batch was used untreated.
How did you treat the other batch of seeds before using them in the investigation?

.....

(iii) Why was such treatment necessary?

.....

(iv) Describe how you carried out the investigation **and** indicate clearly how you showed whether or not digestion had occurred.

.....

.....

.....

.....

.....

.....

(v) Give the results of your investigation.

1. Untreated seeds.

.....

.....

2. Treated seeds.

.....

.....

9. (a) (i) What is the purpose of the valves in the heart?

.....

(ii) What structure separates the right side of the heart from the left side?

.....

(b) Answer the following questions in relation to the dissection of a heart.

(i) How did you distinguish between the left side and the right side of the heart?

.....

.....

(ii) What was the main instrument that you used for the actual dissection?

.....

(iii) Describe how you carried out the dissection.

.....

.....

.....

.....

.....

(iv) Name the valves found at the base of both the aorta and the pulmonary artery.

.....

(v) Based on your dissection, draw a diagram to show and label the following parts:
bicuspid valve, left atrium, left ventricle.

Section C

Answer any four questions.

Write your answers in the answer book.

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

- (i) *Heterozygous.*
- (ii) *Sex chromosome.*
- (iii) *Diploid.*

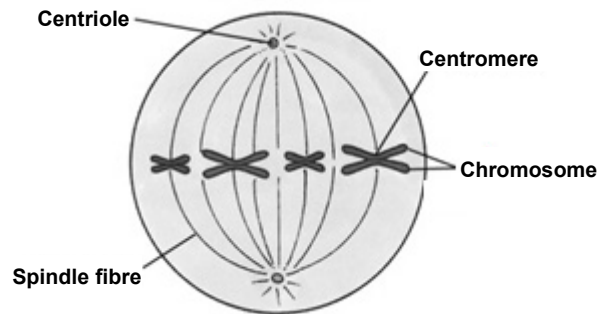
(9)

(b) In cats, black coat colour (B) is dominant to white coat colour (b).
If a white cat is crossed with a cat heterozygous for coat colour, state:

- (i) The genotype of each parent cat.
- (ii) The genotype(s) of the gametes produced by each parent.
- (iii) The genotypes and the matching phenotypes of the kittens produced by the cross.

(27)

(c) The diagram shows a cell undergoing division.



- (i) On which structure in the diagram are the genes located?
- (ii) This type of cell division is called mitosis.
 - 1. How many cells are formed when a cell divides by mitosis?
 - 2. Name the other type of cell division.
- (iii)
 - 1. What is the purpose of mitosis in single-celled organisms?
 - 2. Name a single-celled organism.
- (iv) Which genetic structure changes when a mutation occurs?
- (v) What is meant by *genetic screening*?

(24)

11. (a) In relation to ecology, explain the terms

- (i) *Abiotic*.
- (ii) *Edaphic*.
- (iii) *Habitat*.

(9)

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



In the wild, meerkats live in South Africa and Namibia, in dry, open plains and scrubland. They are mainly insectivores – but also eat lizards, snakes, spiders, eggs, small mammals, millipedes, centipedes, birds and plant roots. They are also very fond of a fungus called the desert truffle. They have no excess body fat stores and must forage for food every day. A colony of meerkats lives in a network of burrows with many entrance and exit holes. Meerkats memorise the locations of holes within their territory, so they can run to the closest one at a moment's notice to avoid a predator. Each member of the group takes on a specific task – from baby-sitting and teaching youngsters how to survive, to sentry duty and foraging for food. When resting, they sunbathe or sleep in the shade. Meerkats have a high immunity to snake venom and scorpion stings. They usually bite off the scorpion's sting and then eat its body.

[*Meerkats at Dublin Zoo* (series 4, 2013) adapted from RTE programme website notes and other sources].

- (i) Name **one** country where meerkats live in the wild.
- (ii) Where do colonies of meerkats make their home?
- (iii) Explain the term *predator*.
- (iv) What evidence is in the passage to suggest that meerkats are omnivores?
- (v) Meerkats have a high immunity to the sting of which animal?
- (vi) Name the three kingdoms of organisms represented in the passage above.
- (vii) Give **two** reasons suggested by the photograph why meerkats make good sentries.

(27)

(c) (i) Give **two** problems associated with waste disposal.

(ii) Mention **two** ways of minimising the amount of waste produced.

(iii) A quantitative survey was carried out to show the effect of poor waste management on the plants in an ecosystem. What is meant by the term *quantitative*?

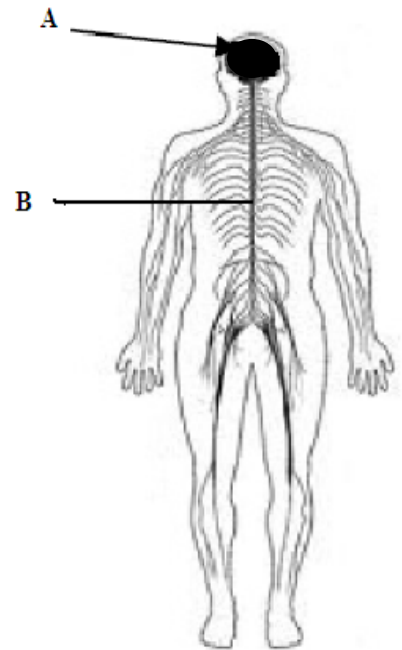
(iv) Describe how you carried out a quantitative survey on a species of plant in its habitat.

(24)

12. (a) (i) Plants and animals respond to some outside stimuli.
Name **two** stimuli to which plants respond.
- (ii) Give **one** example of a plant response to such a stimulus. (9)

(b) The diagram shows the human nervous system.

- (i) Name the parts labelled A and B.
- (ii) Nerve impulses are carried around the body by neurons.
Name any **two** types of neuron.
- (iii) Tiny gaps are found where one neuron ends and the next one begins.
1. What are these gaps called?
 2. What substances carry nerve impulses across the gaps?
- (iv)
 1. Name **one** disorder of the human nervous system.
 2. Give **one** cause of the disorder.
 3. Suggest a means of treating the disorder.



(27)

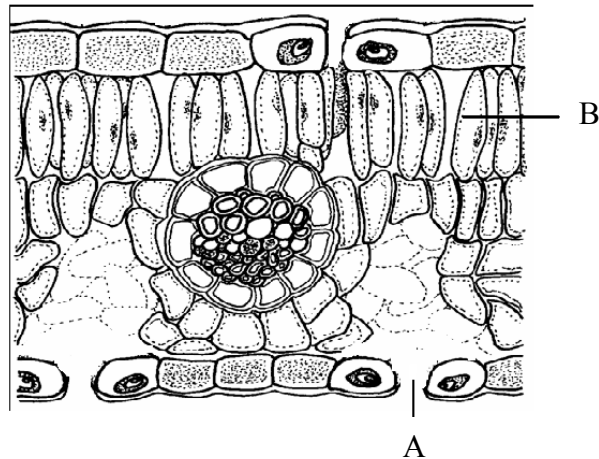
(c) Obesity is an excessive level of body fat. It is generally caused by over-eating and lack of exercise. Obesity may contribute to the development of type II diabetes. Type II diabetes is caused by the resistance of certain body cells to the hormone insulin. Diabetes may also be caused by a lack of insulin in the body. Insulin is produced by the pancreas, which is an endocrine gland. Symptoms of diabetes include thirst and fatigue.

- (i) What is meant by the term *obesity*?
- (ii) What is meant by the term *endocrine*?
- (iii) Where in the human body is the pancreas located?
- (iv) How are hormones carried around the body?
- (v)
 1. Give **one** cause of diabetes.
 2. Give **two** symptoms of diabetes.
 3. Suggest **one** treatment for a person who suffers from diabetes.

(24)

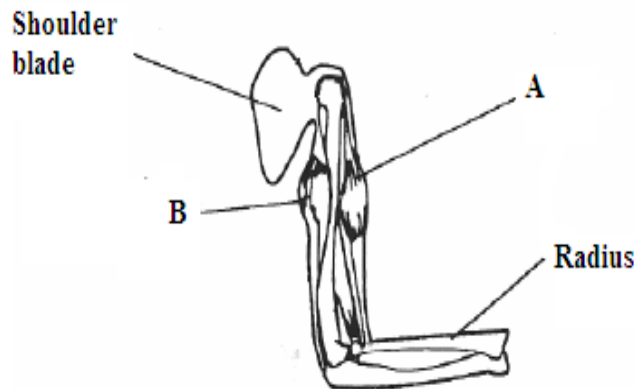
13. (a) (i) Catabolism and anabolism are two types of metabolism.
State whether **each** of the following is an example of catabolism or anabolism:
1. Photosynthesis.
 2. Respiration.
- (ii) What is the main source of energy for photosynthesis? (9)

(b) The diagram shows a section through a leaf.



- (i) Name the green pigment present in leaves that is essential for photosynthesis.
 - (ii) Name the cell structures, present in large numbers in part B, that are needed for photosynthesis.
 - (iii) Name the opening labelled A that is used for gas exchange.
 - (iv) Name the gas in the air needed for photosynthesis.
 - (v) In photosynthesis, water is split into three products.
Name these **three** products.
 - (vi) From your knowledge of photosynthesis, suggest **two** ways of improving the rate of photosynthesis of plants in a greenhouse. (27)
- (c) (i) What is meant by the term *respiration*?
- (ii) Name the **two** types of respiration.
 - (iii) Which type of respiration results in the production of acid in our muscles?
 - (iv) In the type of respiration referred to in (iii), is a little or a lot of energy produced?
 - (v) What is the name of the acid produced in the muscles?
 - (vi) Suggest what might happen to this acid in the muscles afterwards. (24)

(a) The diagram shows muscles and bones in a human arm.

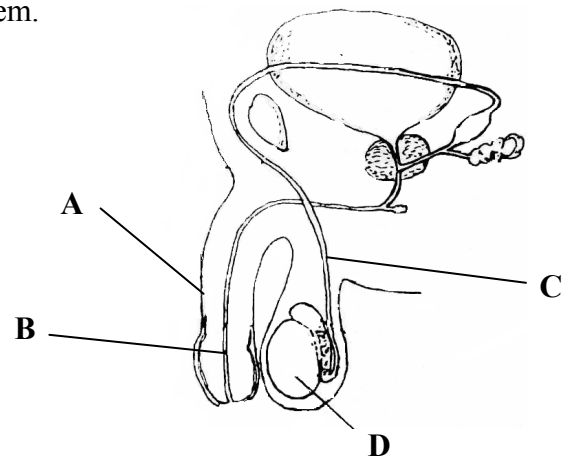


- (i) Name the muscles labelled A and B.
- (ii) These two muscles are an *antagonistic pair*. What does this mean?
- (iii) Name the structures that attach muscles to bones.
- (iv) Describe the roles of the muscles A **and** B in raising the forearm.
- (v) What general name is given to places in the body where two or more bones meet?
- (vi)
 1. Name **one** disorder of the human musculoskeletal system.
 2. Suggest **one** cause **and** one treatment for the disorder referred to in (vi) 1. above.

- (b)
 - (i) What term is used to describe organisms that cause disease?
 - (ii) The general defence system tries to prevent disease-causing organisms entering the body. List **two** parts of the general defence system in the body.
 - (iii)
 1. Distinguish between *active immunity* and *passive immunity* by defining **each**.
 2. Which of these produces the longest-lasting immunity?
 - (iv) Viruses cause disease in plants, humans, and other animals. Name any **two** diseases caused by viruses.
 - (v) Some people receive vaccinations to protect them from disease. What is meant by the term *vaccination*?

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

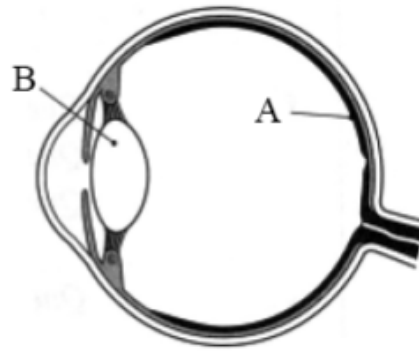
- (i) Name the parts A, B, C.
- (ii) Name **one** male sex hormone.
- (iii) What is the function of the prostate gland?
- (iv) Suggest a reason why the structure containing part D must be kept below body temperature.
- (v) In which labelled part does meiosis occur?
- (vi) What is meant by the term *contraception*?
- (vii) List **two** methods of contraception.



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

(30, 30)

(a) The diagram shows a section through the human eye.

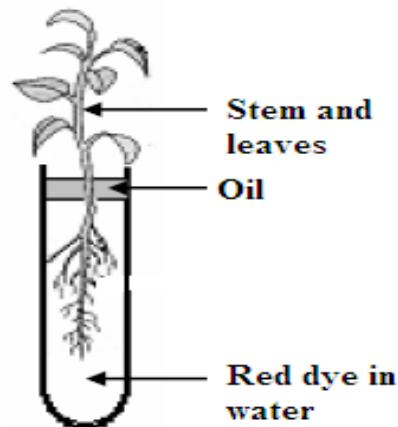


- (i) Name the parts labelled A and B.
- (ii) Name **and** give a function of the coloured part of the eye.
- (iii) The eye is filled with fluid. What is the function of this fluid?
- (iv) Explain in detail how the eye works.

(b) Answer the following questions in relation to the human breathing system.

- (i) When we breathe we inhale air. What gas in the air is essential for respiration?
- (ii) One large muscle and one set of muscles are involved in inhalation. Name **both**.
- (iii) Describe in detail how we inhale air.
- (iv)
 1. Name **one** disorder of the human breathing system.
 2. Suggest a possible cause of the disorder.
 3. Suggest a treatment for the disorder.

(c) Water is vital for the survival of plants.



- (i)
 1. What would you expect to notice after a few hours about the stem and leaves of a plant in an experiment such as the one shown above?
 2. Suggest a reason why a layer of oil was placed on top of the water.
- (ii) Through which microscopic **structures** does water enter a plant from the soil?
- (iii) By what **process** does water enter a plant?
- (iv) Explain the term *transpiration*.
- (v)
 1. What are growth regulators in plants?
 2. Give **two** examples of the use of plant growth regulators.
- (vi) Plants have evolved certain adaptations that protect them from adverse conditions. List **two** such adaptations.