Coimisiún na Scrúduithe Stáit
State Examinations Commission

Leaving Certificate Examination

Biology

Section C

Ordinary Level

3 hours

180 marks

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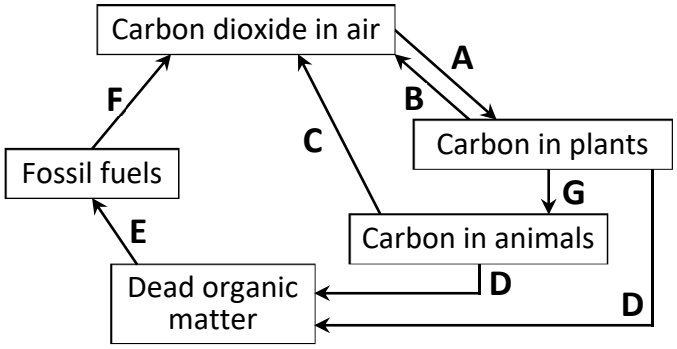
Section C

Answer any three questions.
Write your answers in the answerbook containing Sections A and B.

11. (a) Decay is the breakdown of dead organisms and other organic matter by decomposers.

(i) Name a decomposer.
(ii) Give **two** reasons why decay is important in nature. **(9)**

(b) The diagram outlines part of the carbon cycle.



(i) **In your answerbook**, give the letter from the diagram that represents **each** of the following:

1. Photosynthesis
2. Combustion
3. Plant respiration
4. Decomposition

(ii) What process is represented by the letter **G** in the diagram?
(iii) Which letter represents animal respiration?
(iv) Describe how changes to **two** processes from the carbon cycle could contribute to reducing carbon dioxide levels.
(v) The carbon cycle is one pathway by which nutrients are recycled. Name another cycle you have studied. **(27)**

(c) Read the following passage and answer the questions that follow.

Ireland's waste levels are to reach crisis levels with government sources stating that there will be no more landfill sites available from next year. Landfill sites are unsightly, attract vermin, and cause pollution in surrounding areas. Ireland is simply producing too much waste for a country of its size.

People are being encouraged to recycle paper and plastic, but there is confusion about what exactly can be recycled. An awareness campaign has also been launched to improve people's understanding of acceptable recyclables. Ireland can and must do more to move on from dumping. The public need to reduce, reuse and recycle.

(Adapted from "…*Ireland's plastic waste*…", *The Journal*, 9 January 2018)

(i) Name **one** method of waste disposal that is used in Ireland.
(ii) Give **two** problems associated with waste management.
(iii) What is pollution?
(iv) Name **one** pollutant, other than carbon dioxide, from any **one** of the following areas: **domestic**; **agricultural**; **industrial**.
(v) Describe **three** ways waste can be minimised. **(24)**

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

(i) *Allele*

(ii) *Homozygous*

(iii) *Dominance*. **(9)**

(b) In houseflies, the allele for normal wing (**N**) is dominant to the allele for short wing (**n**).

(i) Give the genotype of each of the following:

1. A housefly that is homozygous for normal wing.
2. A housefly that is heterozygous for normal wing.
3. A short-winged housefly.

(ii) Two houseflies, both heterozygous for normal wing, were crossed.
Using a Punnett square, or otherwise, work out the possible genotypes **and** matching phenotypes of the offspring from this cross.

(iii) What percentage of the offspring would have normal wing? **(27)**

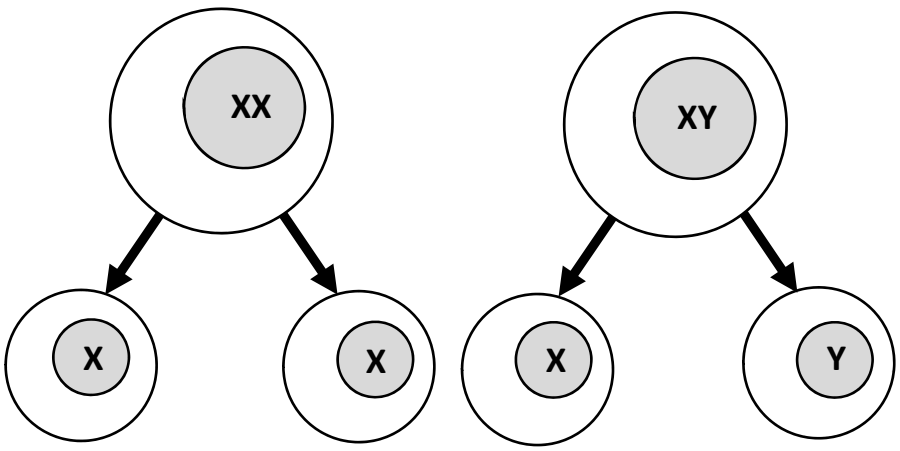
(c) The sex chromosomes in the nuclei of human cells are indicated by the use of the letters **X** and **Y**. The diagram below shows how the sex chromosomes are passed on to gametes.

(i) What term describes the passing on of genetic material (e.g. chromosomes) from one generation to the next?

(ii) Some of the cells in the diagram below are haploid and some are diploid.
Distinguish between the terms, *haploid* **and** *diploid*, by writing a short sentence on **each**.

(iii) Using the letters **X** and **Y**, indicate the sex chromosome(s) present in the nuclei of each of the following human cells:

1. An ordinary body cell (e.g. muscle cell) of a male.
2. An ordinary body cell of a female.
3. A sperm cell.
4. An egg cell.
5. A zygote. **(24)**



13. (a) (i) In relation to the human diet, name a food that contains fibre.

(ii) Give **two** reasons why fibre is important in the human diet.

(9)

(b) The photograph shows the mouth of a carnivore.
This animal demonstrates heterotrophic nutrition.

(i) Explain the underlined terms.

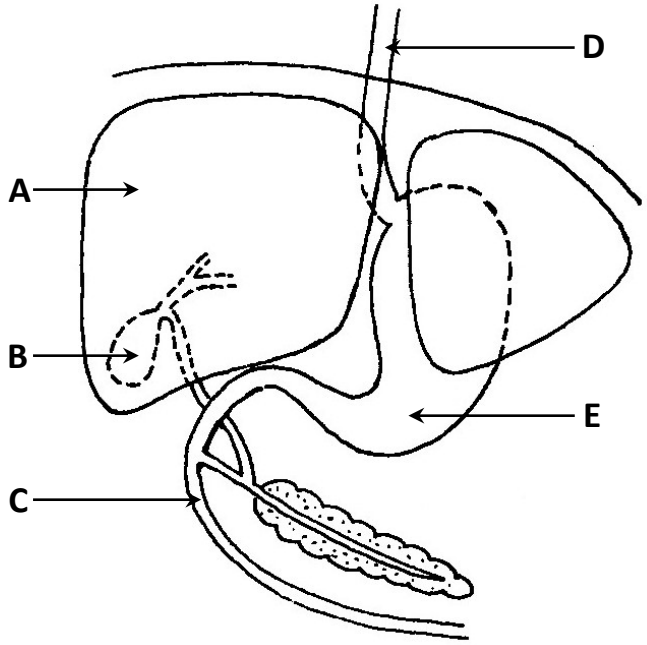
(ii) Name **and** describe **one** other type of heterotrophic nutrition found in animals.

(iii) Nutrition starts with ingestion.
What is ingestion?

(iv) Canine teeth are one type of tooth present in animals.
Name **two** other types of tooth **and** give each of their functions.

(27)

(c) The diagram shows part of the human digestive system.



(i) Name **A**, **B**, **C**, **D** and **E**.

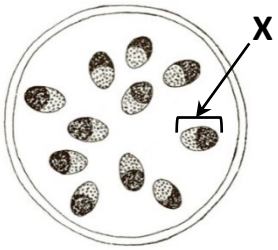
(ii) Protein is a common and important part of the human diet.
Name **one** region on the diagram in which protein digestion occurs.

(iii) Why is it necessary to digest protein?

(iv) Give **one** function of **B**.

(24)

14. (a) The diagram shows a section through the stem of a monocotyledonous (monocot) plant.

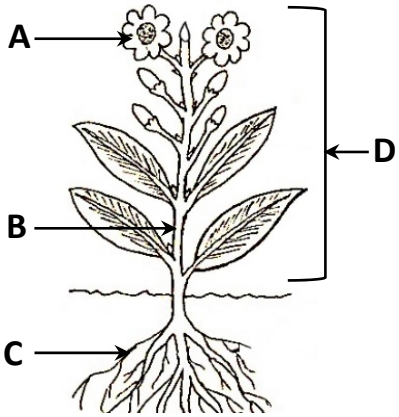


(i) Name the structure labelled **X**.

(ii) Explain the term *monocotyledonous*.

(iii) What feature shown in the diagram indicates it is a monocot? **(9)**

(b) The diagram shows the external structure of a typical plant.



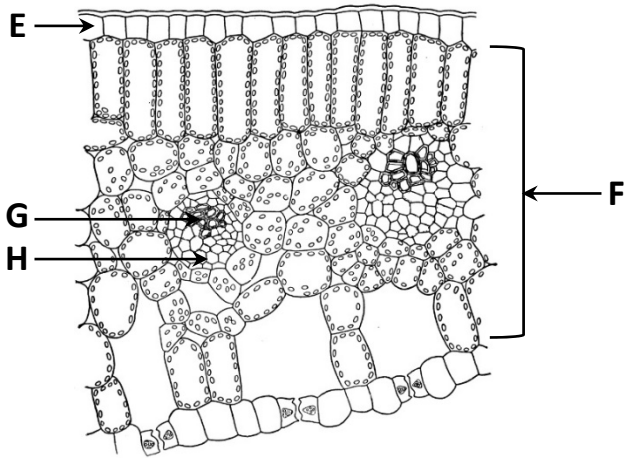
(i) Name the parts labelled **A**, **B**, **C and** give **one** function for **each** named part.

(ii) What is the name given to the part of the plant above soil level, indicated by the label **D** in the diagram?

(iii) The meristem is a type of tissue in plants. What is the meristem?

(iv) Give **one** specific location in plants for a meristem. **(27)**

(c) The diagram shows the cross section of a leaf as seen under a light microscope.



(i) Name the layer of cells, **E**, on the top surface of a leaf **and** give **one** function for this layer.

(ii) Name the group of cells, **F**, that make up the bulk of the internal part of a leaf.

(iii) Water is transported through a plant by specialised cells labelled **G** on the diagram. Name these cells.

(iv) Give **two** features of the cells named at part (c) (iii) above that enable them to transport water.

(v) Food is transported through a plant by specialised cells labelled **H** on the diagram. Name these cells.

(vi) Which **two** letters on the diagram together make up the veins of a leaf? **(24)**

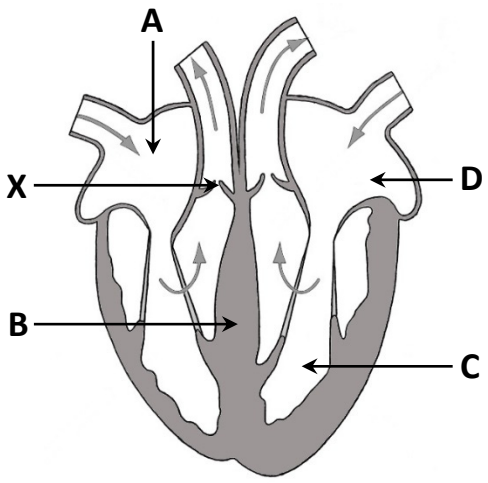
15. (a) (i) Name the liquid component of blood.

(ii) Name the cells in the blood that fight infection.

(iii) Name the chemical present in red blood cells that transports oxygen.

(9)

(b) The diagram is of the human heart which is part of the human circulatory system.



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

(ii) Name the structure located in the wall of chamber **A** that controls the heartbeat.

(iii) Name an activity that causes the heart to beat faster.

(iv) Explain why chamber **C** has a thicker muscular wall than the other chambers.

(v) Name **and** give the function of the structure labelled **X**.

(27)

(c) There is a two-circuit circulatory system in the human body.

(i) Name the circuit that carries blood from the heart around the body.

(ii) Describe **two** differences between an artery and a vein.

(iii) Name the small blood vessels that provide food and oxygen to body cells.

(iv) The lymphatic system is another type of circulatory system.

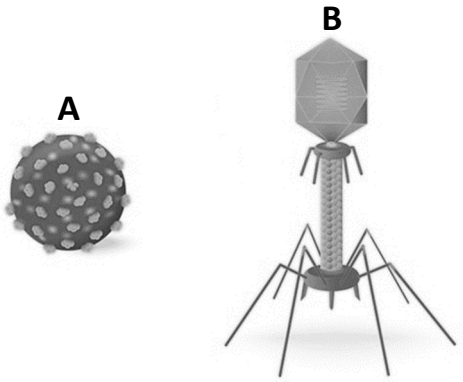
1. Name **two** parts of the lymphatic system.
2. Give **two** functions of the lymphatic system.

(24)

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

(a) (i) It is difficult to describe viruses as living organisms.
Give **one** reason why.

(ii) Viruses can be classified based on shape. Match **each** virus in the picture to the following shapes:
1. Complex
2. Round.

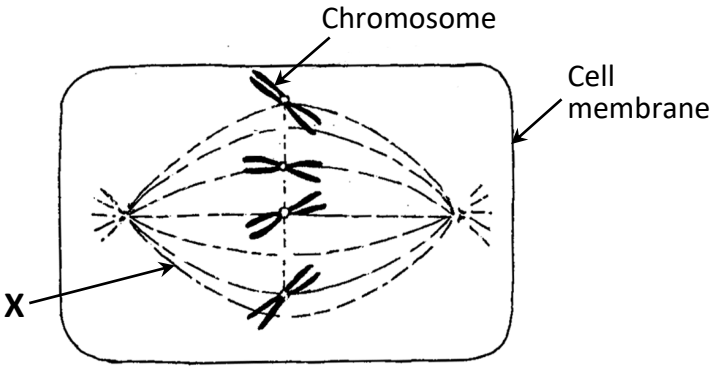


(iii) Name **two** harmful viruses.

(iv) Bacteria are living organisms that are present in every habitat. They can also be classified based on shape. Name the **three** types of bacterial shapes.

(v) Give **two** examples of beneficial bacteria.

(b) Cell continuity is important for all life. The diagram shows a stage of mitosis.



(i) Name structure **X**.

(ii) Explain the term *chromosome*.

(iii) Mitosis is where the cell is dividing. What name is given to the stage of the cell cycle where the cell is not dividing?

(iv) Describe what is happening at the stage of mitosis shown in the diagram.

(v) What happens to the chromosomes during the stage that immediately follows the one shown in the diagram?

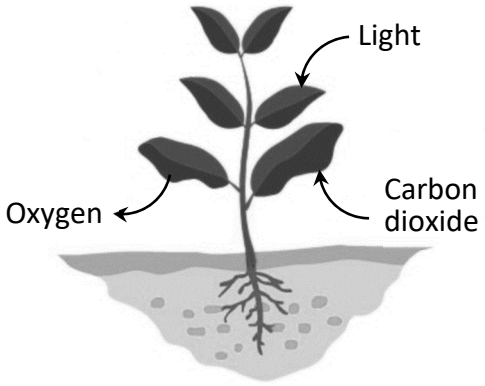
(vi) Describe the function of mitosis in:
1. a single-celled organism.
2. a multicellular organism.

(vii) Name a disorder in which cells lose normal control of mitosis.

(viii) Give **one** possible cause of the disorder you named at part (b) (vii) above.

(ix) Give **one** difference between the products of mitosis and meiosis.

(c) The diagram shows a plant photosynthesising.



(i) State a source for **each** of the following, which are essential for photosynthesis:
1. Light
2. Water.

(ii) Name the green pigment in leaves that traps light energy for photosynthesis.

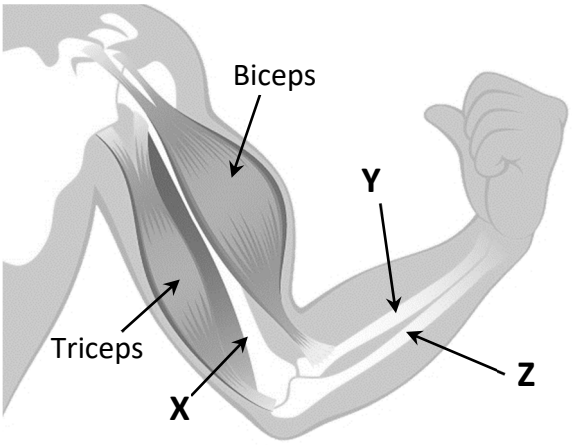
(iii) Light energy is used to split water into three products.
Name these **three** products.

(iv) Give the fate of any **one** of the named products in part (c) (iii) above.

(v) Using the information given, complete a word equation for photosynthesis.

(vi) Suggest a reason for pumping carbon dioxide into greenhouses.

(d) The diagram shows some of the bones and muscles found in the human arm.



(i) Name the bones **X**, **Y**, **Z**.

(ii) The diagram shows a pair of antagonistic muscles.
Explain what is meant by antagonistic muscles.

(iii) What is the name of the structure that connects the biceps muscle to bone **Y**?

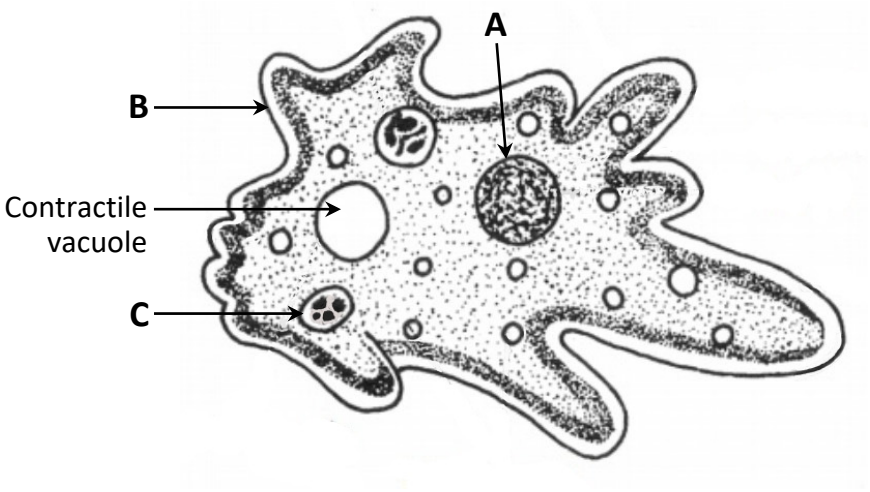
(iv) Give **two** functions of the human skeleton.

(v) Name a disorder of the musculoskeletal system.

(vi) Give **one** cause **and one** treatment of the disorder named in part (d) (v) above.

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

(a) The diagram shows an *Amoeba*.



(i) To which kingdom does *Amoeba* belong?
Give **one** reason for including *Amoeba* in this kingdom.

(ii) Name the parts labelled **A**, **B**, **C and** give **one** function of **each** part.

(iii) Describe how the contractile vacuole carries out its function.

(b) (i) Draw a diagram of the female reproductive system.
Label the following parts.

Ovary **Fallopian tube** **Uterus**

(ii) Indicate on your diagram the location of the following events:
1. Ovulation
2. Fertilisation
3. Implantation.

(iii) The ovary is an endocrine gland and secretes hormones.
Name **one** hormone secreted by the ovary **and** give **one** function for the named hormone.

(iv) Give **two** methods of contraception.

(c) (i) What is excretion?

(ii) Name the organ that produces:

1. Urine
2. Sweat.

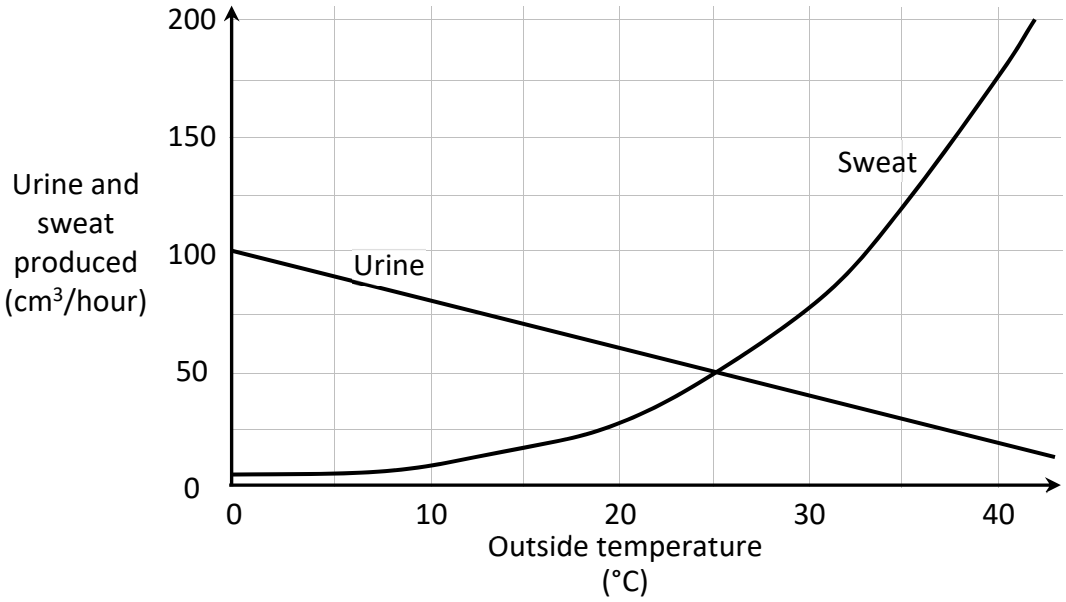
(iii) Name a waste product that is found in both urine and sweat.

(iv) Name another organ of excretion.

(v) Name an excretory substance released by the organ referred to in part (c) (iv) above.

(vi) The graph below shows how the volumes of sweat and urine produced by the body vary with temperature.

1. Using the information from the graph, state the temperature at which the volumes of sweat and urine the same.
2. What happens to the volume of sweat produced as the temperature rises? Give a reason for your answer.



(d) The <u>evolution</u> of birds has occurred over 10 million years and has led to increased variation and the development of 10,000 <u>species</u> of birds on Earth today.

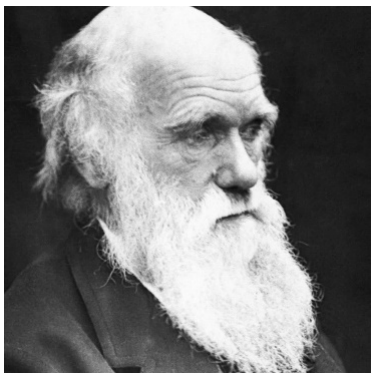
(i) Explain briefly the underlined terms.

(ii) Give **two** causes of variation in species.

(iii) Name **one** scientist who is responsible for the theory of natural selection.

(iv) Give a broad outline of the theory of natural selection.

(v) Describe in detail **one** source of evidence for the theory of natural selection.



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