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# Coimisiún na Scrúduithe Stáit State Examinations Commission

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LEAVING CERTIFICATE EXAMINATION, 2007

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## BIOLOGY - ORDINARY LEVEL

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TUESDAY, 12 JUNE - AFTERNOON, 2.00 to 5.00

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**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. Complete any **four** of the following.
  - (a) A carbohydrate is composed of carbon, hydrogen and .....
  - (b) An example of a water-soluble vitamin is .....
  - (c) A chemical that is used to show the presence of starch is .....
  - (d) The liquid in which chemical reactions take place in the cell is .....
  - (e) Fats are made from fatty acids and .....

2. Choose a term that is used in ecology from the following list and place it in column A to match the description in column B. The first one has been completed as an example.

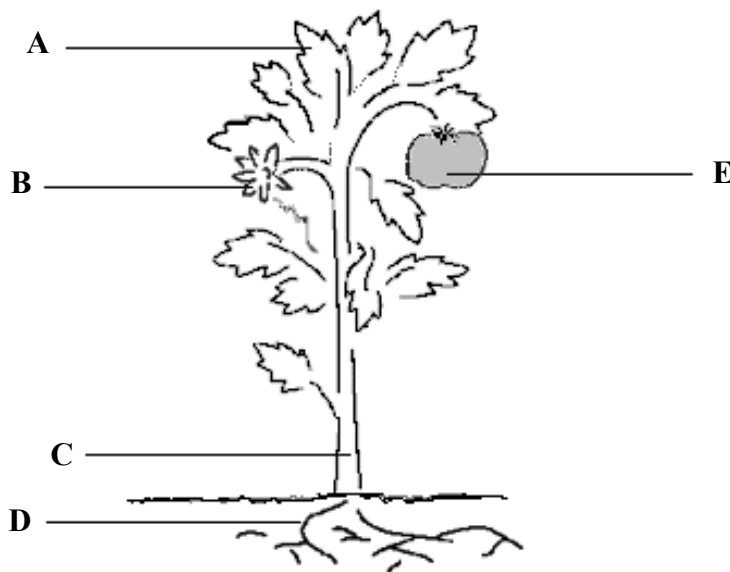
predator, habitat, biosphere, niche, ecosystem

Column A	Column B
Predator	Kills and eats other animals
	All parts of the earth and its atmosphere where life exists
	A community of organisms and their environment
	The role of an organism in an ecosystem
	Place where an organism lives

3. Indicate whether the following are true (T) or false (F) by drawing a circle around T or F.

- Example:** The pulmonary artery carries blood to the lungs (T) F
- (a) If the eyepiece lens of a microscope is marked X10 and the objective lens is marked X4, the total magnification is X14 T F
  - (b) Plant cells have chloroplasts, animal cells do not have chloroplasts T F
  - (c) Humans receive oxygen from the air they inhale T F
  - (d) Cell membranes let only some molecules pass through T F
  - (e) Human chromosomes are found in the nucleus T F

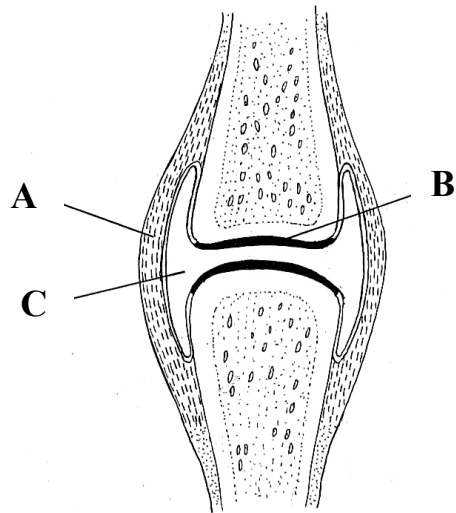
4. Complete the following sentences by adding the missing word **or** symbols **or** number.
- (a) Genetics is the study of .....
  - (b) In a woman the sex chromosomes are XX; in a man they are .....
  - (c) If the diploid number in a cell is 46, the haploid number is .....
  - (d) In order to make proteins, DNA is first transcribed as messenger .....
  - (e) A change in the genetic material of an organism is called a .....
5. The diagram represents a tomato plant.



- (a) Name the parts labelled B, C, and E.
  - Name of part B .....
  - Name of part C .....
  - Name of part E .....
- (b) Give one main function each for the parts labelled A and D:
  - Function for part A .....
  - Function for part D .....
- (c) What is the role of part E?
  - Role of part E .....
- (d) Name the tube-like tissue found in part C in which water moves through the plant.
  - .....

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6. Study the diagram of a synovial joint and then answer the following questions.



- (a) Name tissue A .....  
.....
- (b) Give a function of A .....  
.....
- (c) Name tissue B .....  
.....
- (d) Name the fluid in C .....  
.....
- (e) Give a function of the fluid in C .....  
.....

## 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) Is an enzyme a lipid, a protein or a carbohydrate? .....
- (ii) Where in a cell are enzymes produced? .....
- (b) As part of your practical activities you investigated the effect of temperature on the rate of activity of an enzyme.
- (i) Name the enzyme that you used .....
- (ii) Name the substrate with which the enzyme reacts .....
- (iii) How did you vary the temperature? .....
- .....
- .....
- .....
- (iv) How did you keep a constant pH during the investigation? .....
- .....
- .....
- (v) How did you measure the rate of activity of the enzyme? .....
- .....
- .....
- .....
- .....
- (vi) What was the result of your investigation? .....
- .....
- .....
- .....
- .....

8. (a) (i) State **one** reason that your body needs protein.....

.....

(ii) Name the element, other than carbon, hydrogen and oxygen, which is always found in protein.

.....

(b) Answer the following questions in relation to tests that you carried out for protein.

(i) Name **two** foods in which you found protein.

1. ....

2. ....

(ii) What reagent or chemicals did you use to test for protein?

.....

.....

(iii) Was heat necessary in the test that you carried out?.....

(iv) What was the initial colour of the reagent or chemicals? .....

(v) What colour change occurred if protein was present?.....

.....

.....

.....

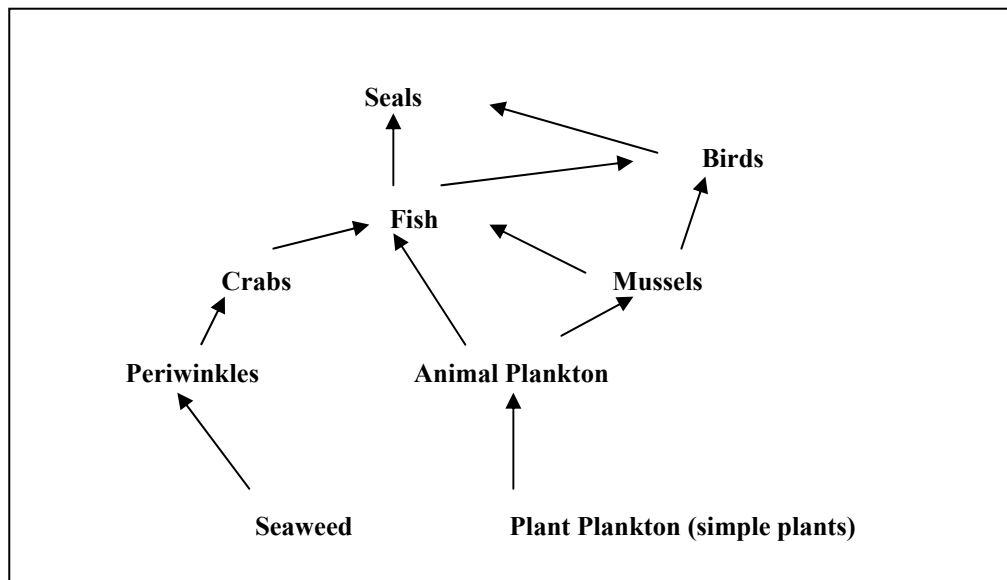
(vi) Was there a colour change in the control? .....

9. (a) (i) What is meant in ecology by a quantitative survey? .....
- .....
- .....
- (ii) What is a quadrat frame? .....
- .....
- .....
- (b) Answer the following questions in relation to a quantitative survey of plants that you carried out.
- (i) How did you use the quadrat frame to carry out the survey?.....
- .....
- .....
- .....
- .....
- .....
- .....
- .....
- (ii) Why did you use a number of quadrats or use the quadrat frame a number of times?
- .....
- .....
- .....
- (iii) How did you identify the plants? .....
- .....
- .....
- (iv) How did you present your results? .....
- .....
- .....
- .....
- (v) Is the quadrat method suitable for animal populations? .....
- Explain your answer .....
- .....
- .....

## Section C

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

10. (a) (i) What is the principal source of energy for the Earth's ecosystems?  
(ii) Name the process that converts this energy into chemical energy in plants. (9)
- (b) Answer the following questions in relation to the food web shown in the diagram.  
(i) Name a producer.  
(ii) What does the animal plankton feed on?  
(iii) What feeds on the animal plankton?  
(iv) Why are periwinkles referred to as primary consumers?  
(v) Starting with a producer, complete a food chain with **four** trophic (feeding) levels, naming each organism involved. (24)



- (c) Answer the following questions in relation to a named ecosystem you have investigated.  
(i) Name the ecosystem.  
(ii) Describe how you collected a **named** animal.  
(iii) State one way in which a **named** organism was adapted to the ecosystem.  
(iv) What is meant by an abiotic factor?  
(v) Give **two** abiotic factors that you investigated.  
(vi) In relation to the abiotic factors you have named, describe how you measured each one.

(27)



11. (a) (i) What is a tissue?  
 (ii) Name **two** tissues found in animals. (9)

- (b) Tissue culture is used to make a skin graft for patients who have been severely burned.  
 (i) What is meant by tissue culture?  
 (ii) Name the gas needed to release energy to make a skin graft.  
 (iii) Suggest the most suitable temperature to make skin cells grow.  
 (iv) Suggest a reason why sterile conditions are needed in tissue culture.  
 (v) What type of cell division, mitosis or meiosis, is involved in tissue culture?  
 (vi) Give **one** other application of tissue culture apart from skin grafting. (24)

- (c) (i) Explain briefly what is meant by a gene.  
 (ii) Where in the nucleus would you find genes?  
 (iii) The allele for brown eye (**B**) is dominant to the allele for blue eye (**b**). Explain each of the underlined terms.  
 (iv) Use a Punnet square to find the possible genotypes of children of parents who are both heterozygous for brown eye. State the eye colour resulting from each of these genotypes. (27)

12. (a) (i) Explain briefly what is meant by respiration.  
 (ii) Distinguish between aerobic and anaerobic respiration. (9)

- (b) (i) Copy the table below into your answer book and complete the final column.

Type of respiration	Energy Source	End products
Aerobic respiration	Glucose	
Anaerobic respiration in muscle	Glucose	
Anaerobic respiration in yeast	Glucose	

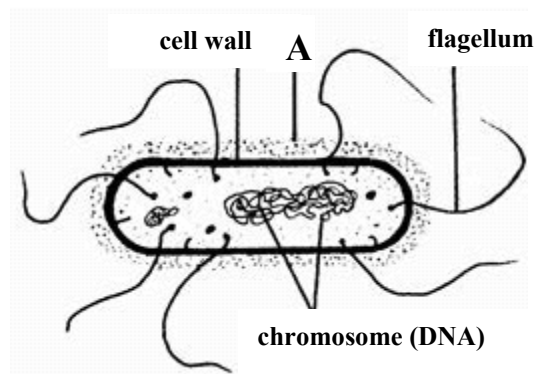
- (ii) In stage 1 of respiration, glucose is partly broken down. Where in the cell does this happen?  
 (iii) Name the cell component shown in the diagram in which stage 2 of respiration takes place.



- (iv) Which stage of respiration releases more energy? (24)

- (c) (i) Draw a labelled diagram of the apparatus in which you used yeast to produce alcohol.  
 (ii) The water that you used in the apparatus was previously boiled and cooled. Why was this?  
 (iii) In your investigation it was necessary to exclude air. How was this done?  
 (iv) Describe briefly a test to show that alcohol had been produced. (27)

13. (a) The diagram shows a typical bacterial cell.



- (i) Some bacteria have a layer outside the cell wall (labelled A in diagram). Name this layer and state its function
- (ii) Name a structure, other than A, which is not found in all bacteria.

(9)

(b) The table below shows ways in which bacteria obtain their food. Study the table and then answer the questions that follow.

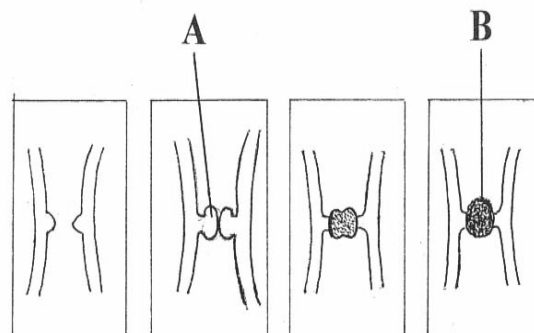
Autotrophic	Heterotrophic
Photosynthetic	Parasitic
Chemosynthetic	Saprophytic

- (i) Distinguish between autotrophic and heterotrophic nutrition.
- (ii) What is saprophytic nutrition?
- (iii) Why are saprophytic bacteria important in nature?
- (iv) Briefly explain chemosynthesis.
- (v) What term is used for the organism from which a parasite obtains its food?
- (vi) Give examples of **two** harmful bacteria.

(24)

- (c) (i) Draw a labelled diagram to show the structure of *Rhizopus*.
- (ii) *Rhizopus* uses both sexual and asexual reproduction. Give a brief account of its asexual reproduction, using diagrams.
- (iii) The diagrams show stages of sexual reproduction of *Rhizopus*. Name the parts labelled A and B.
- (iv) What is the function of B?

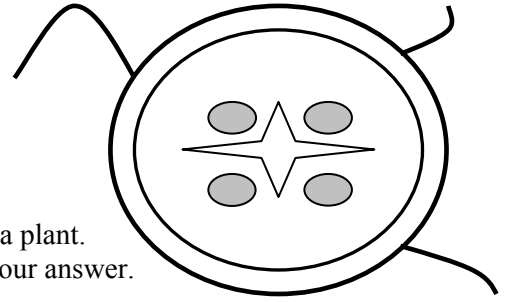
(27)



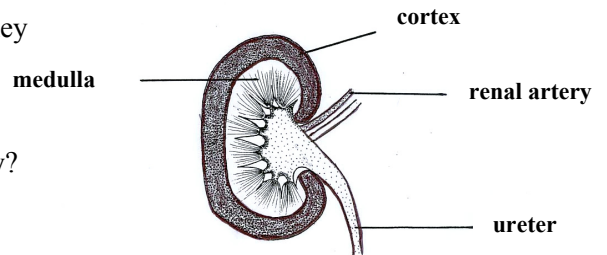
14. Answer **any two** of (a), (b), (c).

(30, 30)

- (a) (i) What is meant by ground tissue?  
 (ii) Give a function of ground tissue.  
 (iii) What is a meristem?  
 (iv) Give a location for a meristem.  
 (v) The diagram shows a transverse section through part of a plant. Is this part the root or the stem? Give **two** reasons for your answer.  
 (vi) Copy the diagram into your answer book. Place an X where you would find vascular tissue and place a Y where you would find ground tissue.



- (b) (i) What is meant by excretion?  
 (ii) Name **two** products excreted by the human.  
 (iii) Name **one** organ of excretion, other than the kidney, in the human body.  
 (iv) What is meant by osmoregulation?  
 (v) Study the diagram of a section through the kidney and answer the following questions.  
 1. Where does filtration of blood take place?  
 2. Where does reabsorption of salt take place?  
 3. To what organ does the ureter link the kidney?  
 4. To which main blood vessel does the renal artery link the kidney?



- (vi) Name the fluid present in the ureter.

- (c) (i) In the table below, which letter gives the correct order of events in the life cycle of a flowering plant – A, B, C, D or E?

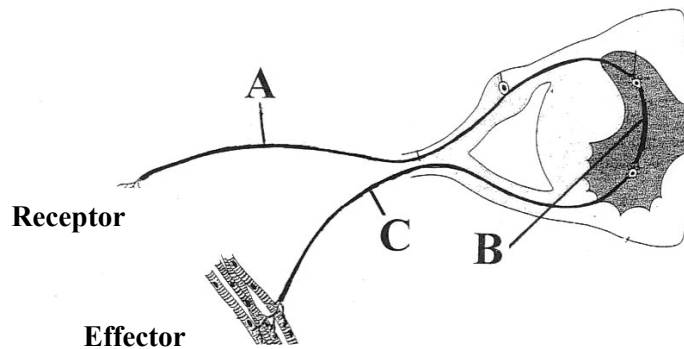
<b>A</b>	germination seed and fruit formation growth pollination fertilisation dispersal
<b>B</b>	germination fertilisation seed and fruit formation growth dispersal pollination
<b>C</b>	germination fertilisation growth seed and fruit formation pollination dispersal
<b>D</b>	germination growth pollination fertilisation seed and fruit formation dispersal
<b>E</b>	germination seed and fruit formation growth fertilisation dispersal pollination

- (ii) Distinguish clearly between pollination and fertilisation.  
 (iii) State a location in the seed where food is stored.  
 (iv) What is germination?  
 (v) State **three** factors necessary for the germination of a seed.

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

(30, 30)

(a) The diagram shows part of a reflex arc.



- (i) Name neurons A, B and C.
- (ii) In which direction is the impulse transmitted  $A \rightarrow B \rightarrow C$  or  $C \rightarrow B \rightarrow A$ ?
- (iii) Name the small gaps between neurons.
- (iv) Neurons produce neurotransmitter substances. What is their function?
- (v) Give an example of a reflex action in humans.
- (vi) Why are reflex actions important in humans?

- (b) (i) Draw a diagram of a section through a leaf. Label a stoma and a guard cell.
- (ii) Give a function of the guard cell.
- (iii) Name **two** gases that enter or leave the leaf.
- (iv) Name the process by which the gases move in or out of the leaf.

(c) (i) Copy the following table into your answer book. Complete the table by inserting the correct terms from the following list:

molar teeth, symbiotic bacteria, peristalsis, bile salts, lipase, stomach

	an organ for churning of food to chyme
	waves of contractions passing along the gut
	grind food into smaller pieces
	an enzyme that turns fats to fatty acids and glycerol
	emulsify fats
	produce vitamins

(ii) Copy the following passage into your answer book and fill in the blank spaces.

“The passage of the products of digestion from the intestine to the blood is called .....  
 Folds in the lining of the intestine, called ....., increase the surface area for this passage.  
 Amino acids from the digestion of ..... and monosaccharides from the digestion of  
 ..... enter the blood in this process.”

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