

Write your Examination Number here 



# Coimisiún na Scrúduithe Stáit State Examinations Commission

LEAVING CERTIFICATE EXAMINATION, 2015

## BIOLOGY – ORDINARY LEVEL

TUESDAY, 9 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. Use your knowledge of nutrition to answer the following questions.

(a) Carbohydrates are composed of carbon, hydrogen and.....

(b) Vitamins B and C are ..... soluble vitamins.

(c) Give **one** difference between fats and oils at room temperature.

.....

(d) In food tests, Benedict's/Fehling's solution is used to test for the presence of

.....

(e) Name **one** mineral needed by plants. ....

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

**Example:** A tissue is a group of cells which carry out the same function

**T**

**F**

(a) Tissues are made of organs.

T

F

(b) Tissue culture is the growth of tissue in test tubes or Petri dishes.

T

F

(c) Human skin tissue will grow best at 10 °C.

T

F

(d) Cells will grow **only** in a sterile medium.

T

F

(e) Tissue culture is used in micropropagation.

T

F

(f) Cancer is the controlled growth of cells.

T

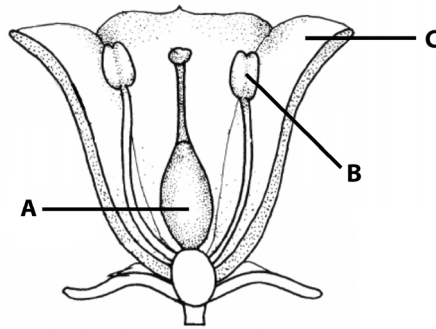
F

(g) Chemotherapy is used as a cancer treatment.

T

F

3. The diagram shows a vertical section through a flower.



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

A .....

B .....

C .....

(b) Is the flower an organ for asexual or sexual reproduction?.....

(c) What part of the flower produces pollen?.....

(d) How do the parts labelled C help the flower in reproduction? .....

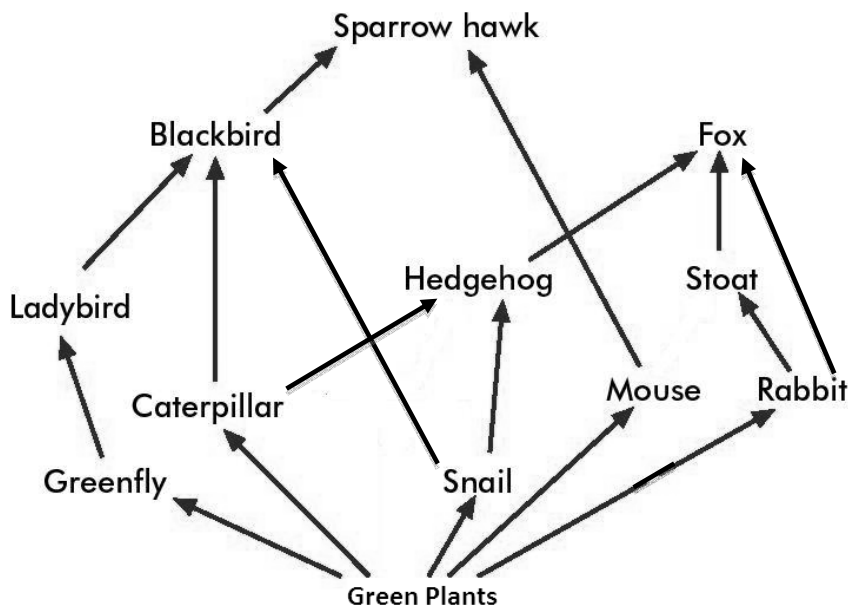
(e) In which labelled part does fertilisation take place?.....

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:** Homeostasis, Rabbit, ~~Fluid balance~~, Lizard, Endotherm, Skin

Column A	Column B
A function of the kidney	Fluid balance
(a) An <b>example of an animal</b> whose body temperature changes with its environment	
(b) A <b>term</b> for maintaining a constant internal environment in the body	
(c) An <b>organ</b> that has a role in maintaining a constant internal environment in the body	
(d) A <b>term</b> for an animal that generates its own body heat	
(e) An <b>example of an animal</b> that generates its own body heat	

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



- (a) What name is given to the above diagram? .....
- (b) What do the arrows on the diagram mean? .....
- (c) Green plants are producers. What does this mean?  
.....
- (d) Name **two** primary consumers from the above diagram.  
(i)..... (ii).....
- (e) Name a carnivore from the above diagram. ....
- (f) To which trophic level does the hedgehog belong? .....

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

- (a) Is energy released or absorbed during photosynthesis? .....
- (b) Name the green pigment found in plants that is necessary for photosynthesis.  
.....
- (c) Where is this pigment found in plant **cells**? .....
- (d) Name **two** other factors a plant needs for photosynthesis.  
(i) ..... (ii) .....
- (e) What gas is released during photosynthesis? .....
- (f) What substance is split into electrons, oxygen and protons during photosynthesis?.....

**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) What term is used to describe asexual reproduction in yeast? .....
- (ii) Explain the term *sterile* as it applies in microbiology .....
- .....
- (b) Answer the following questions in relation to your investigation into the growth of leaf yeast.
- (i) From the leaves of which plant did you obtain the yeast?
- .....
- (ii) When collecting the leaves, what did you do to try to keep them free from contamination?
- .....
- .....
- .....
- (iii) Name the nutrient medium on which you grew the yeast.
- .....
- (iv) Outline the steps you followed in the laboratory to show the presence of the yeast.
- .....
- .....
- .....
- .....
- (v) How did you conclude that yeast was present?
- .....
- (vi) At the end of the investigation, how exactly should any remaining material be treated before disposal?
- .....

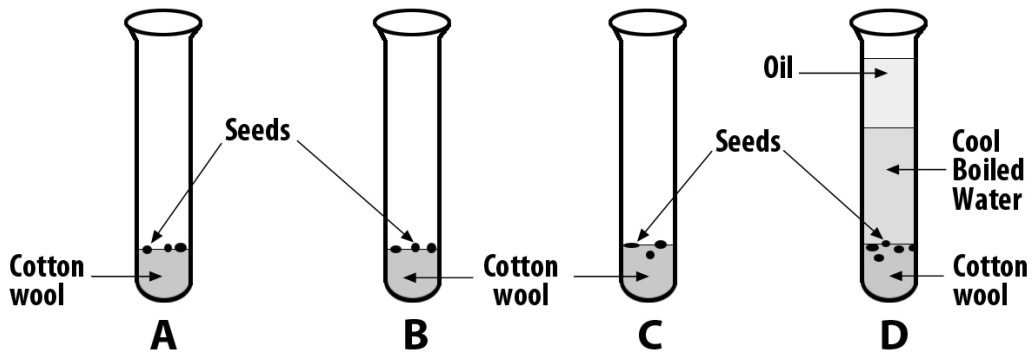
8. (a) (i) Explain the term *germination*.

.....  
.....

(ii) What part of the germinated seed becomes the root?

.....

(b) Answer the following questions in relation to practical work you carried out to investigate the conditions necessary for seed germination.



(i) Tube A has all the factors needed for germination. Tubes B, C and D lack one essential factor each. Name the **three** factors that are present in tube A.

1. .... 2. .... 3. ....

(ii) What is the purpose of the oil in tube D?

.....

(iii) Why were many seeds added to each tube rather than using just one seed in each tube?

.....  
.....

(iv) Which tube acted as a control? .....

(v) State the results of your investigation:

Tube A .....

Tube B .....

Tube C .....

Tube D .....

9. (a) (i) Give any **one** base **pair** found in DNA. ....
- (ii) Mutations are changes in DNA or chromosomes.  
State **one** cause of mutation.  
.....

(b) Answer the following in relation to practical work you carried out to isolate DNA from plant tissue.

- (i) Name a suitable plant for this activity. ....
- (ii) Below is a list of some of the steps carried out during the practical work but they are not in the correct order.
- A. Pour freezer-cold ethanol down the inside of the test tube containing the filtered plant extract.
  - B. Add the mixture of the plant tissue, salt and washing up liquid to a blender.
  - C. Chop the plant tissue into small pieces.
  - D. Add 2 – 3 drops of protease to the filtered plant extract.

Indicate below, using the letters A, B, C and D, the correct order of the above steps.

Step 1 .....

Step 2 .....

Step 3 .....

Step 4 .....

- (iii) Why was the protease added to the filtered plant extract?

.....  
.....

- (iv) What was the purpose of adding washing up liquid to the mixture?

.....  
.....

- (v) What was the purpose of the freezer-cold ethanol?

.....  
.....

## Section C

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

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

- (i) Chromosome.
- (ii) Homozygous.
- (iii) Phenotype.

**(9)**

(b) (i) Genetic engineering involves the following steps:

Transformation,      Cutting,      Isolation,      Expression.

Rewrite these steps, placing them in the correct order.

(ii) In the process of genetic engineering the DNA has to be cut.  
What is used to cut the DNA?

(iii) During the isolation step, what is taken out of the cell?

(iv) Give **two** examples of the use of genetic engineering.

**(27)**

(c) In snapdragon plants, the allele for red flower (R) is incompletely dominant to the allele for white flower (W). Heterozygous plants have pink flowers.

A pink-flowered snapdragon is crossed with a white-flowered snapdragon.

**Copy the following into your answer book and fill in the blank spaces appropriately:**

Genotypes of parents	Pink (    )	×	White ( WW )
Possible gametes	(    ) (    )	×	(    )
Genotypes of offspring	(    )		(    )
Matching phenotypes of offspring	_____		_____

**(24)**



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

- (i) Biosphere.
- (ii) Omnivore.
- (iii) Niche.

(9)

(b) During your study of ecology you carried out a quantitative survey to estimate the population of a particular animal in an ecosystem.

- (i) Name **one** animal from the ecosystem you have studied **and** state a suitable method of collecting that animal.
- (ii) Say 50 animals were collected on the first day. These animals were then marked. How did you mark the animals before you released them?
- (iii) On another day you collected animals in the same location. How many animals might you have collected on that second day?
- (iv) You noted that 20 of the animals you collected on the second day were already marked. Using the formula below and the numbers from parts (iii) and (iv), calculate the animal population.

$$\frac{50 \times A}{B} = \text{Number of animals in the population}$$

- (v) It is important to try to protect animal and plant populations in their natural environments. What term is used in ecology for the wise management of our natural environments?
- (vi) Suggest **one** way in which our environment could be damaged or harmed.

(27)

(c) Read the passage below and answer the questions that follow:

The barn owl is a species whose numbers have greatly decreased in Ireland over the last number of years. This bird is easily recognised by its feathers which are honey coloured above and white below. They can usually be seen at night when they hunt for mice or rats. Many of them nest in barns or old buildings. Barn owls tend to pair for life and lay their eggs in late spring. Their numbers have decreased for a variety of reasons including a lack of nesting sites, a lack of food and poisoning from pesticides.

[Adapted from an article *Irish Owls* from ENFO Ireland]

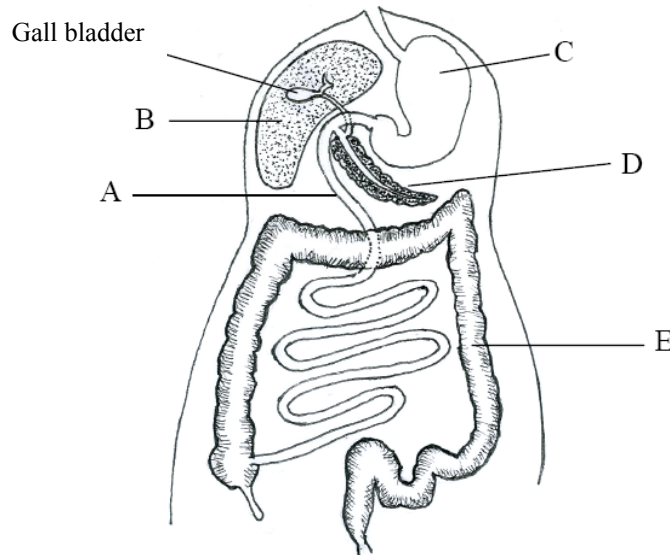
- (i) What colours are the barn owl feathers?
- (ii) What does the barn owl eat?
- (iii) Name **one** site where the owl will nest.
- (iv) Give **two** reasons why barn owl numbers have decreased in recent years.
- (v) What is a pesticide?
- (vi) Suggest how owls might be poisoned by pesticides?

(24)

12. (a) (i) Explain the term *digestion*.  
(ii) Mechanical digestion and chemical digestion are two types of digestion. State whether **each** of the following is involved in mechanical or chemical digestion.
1. Enzymes.
  2. Teeth.

(9)

- (b) The diagram shows the human digestive system.



- (i) Name the parts labelled A, B, C, D and E.
- (ii) Part C releases an acid. Name that acid.
- (iii) Name **and** give **one** function of the liquid stored in the gall bladder.
- (iv) Amylase is an enzyme. Name **one** part of the digestive system where amylase is produced.

(27)

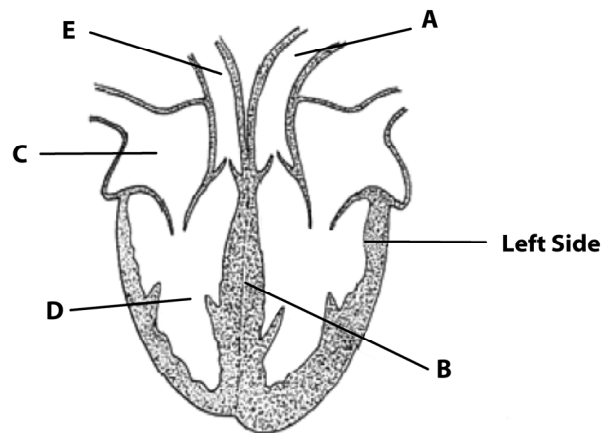
- (c) Irritable bowel syndrome or IBS is a common problem associated with the digestive system. Some symptoms include abdominal pain, constipation and diarrhoea. The cause of IBS is unknown. One explanation is that some individuals with IBS might have abnormal bacteria present in the large intestine, which may cause inflammation and affect bowel movements. Although there is no cure for IBS, there are treatments to relieve symptoms including medication and changing the diet.

- (i) Give **two** symptoms of irritable bowel syndrome.
- (ii) Constipation may result from reabsorbing too much of which liquid into the bloodstream?
- (iii) Give **two** treatments for irritable bowel syndrome.
- (iv) Peristalsis occurs in the digestive system. Explain the term *peristalsis*.
- (v) Give **one** beneficial effect of the bacteria found in the large intestine.

(24)

13. (a) (i) Heart disease is a major problem in Ireland. State **two** ways to keep your heart healthy.  
 (ii) Why is the muscle of the left side of the heart thicker than the muscle of the right side? **(9)**

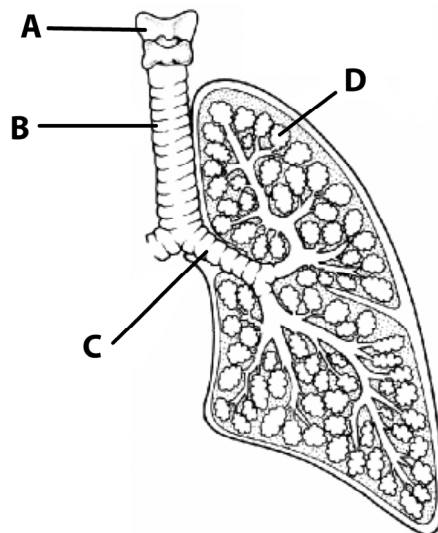
(b) The diagram shows a human heart.



- (i) Name the parts labelled A, B and C.  
 (ii) To which organs does blood vessel E carry blood?  
 (iii) Is the blood in blood vessel A oxygenated or deoxygenated?  
 (iv) Name the arteries that supply the muscle in the heart wall with blood.  
 (v) The pacemaker controls heartbeat. In which labelled part is the pacemaker located?  
 (vi) What is the average number of heartbeats per minute in a resting adult?  
 (vii) What causes the sound of the heartbeat?

**(27)**

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



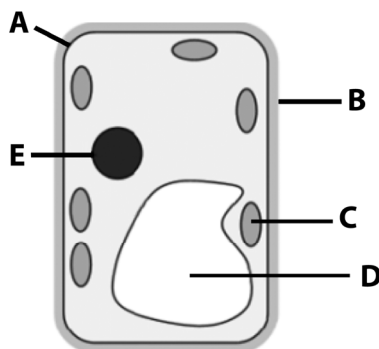
- (i) Name the parts labelled A, B, C and D.  
 (ii) In which labelled part does gas exchange take place?  
 (iii) What is the function of part A?  
 (iv) B and C have rings of cartilage. Suggest a function of these rings.  
 (v) Suggest a reason why smoking cigarettes is bad for your lungs.

**(24)**

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

(30, 30)

(a) The diagram shows a cell.



- (i) Name the parts labelled A, B, C and D in the diagram.
- (ii) 1. Does the diagram shown above represent a plant cell or an animal cell?  
2. Give a reason for your answer.
- (iii) Name **one** substance usually found in part D.
- (iv) Name the carbohydrate found in part B.
- (v) Part A is said to be selectively permeable or semi-permeable. What does this mean?
- (vi) Ribosomes are also found in cells. What is their function?
- (b) (i) What is an enzyme?  
(ii) Name **one** enzyme, other than amylase, **and** name its substrate.  
(iii) From which biomolecule are enzymes made?  
(iv) Enzymes are sometimes immobilised for use in industry. What is meant by the term *immobilised* in relation to enzymes?  
(v) Name **one** substance used to immobilise enzymes.  
(vi) Give **one** advantage of using immobilised enzymes.  
(vii) Suggest **one** reason why enzymes are sometimes used in washing powders.
- (c) (i) Draw a diagram of a plant. Label the root, stem and leaf on the diagram.  
(ii) Where in a plant does photosynthesis usually occur?  
(iii) Give **two** functions of the root.  
(iv) Plants contain vascular tissue. Explain the term *vascular*.  
(v) Name the **two** types of vascular tissue found in plants.  
(vi) Explain the term *meristem* **and** give **one** location in a plant where meristematic tissue can be found.

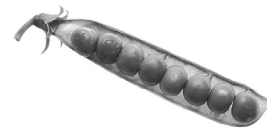
(a)



**Blackberries**



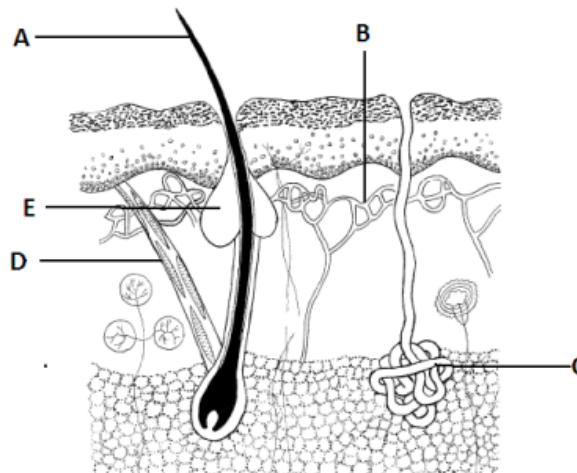
**Sycamore fruit**



**Peas**

- (i) Plants need to disperse their seeds. The diagram above shows three different fruits. Indicate how **each** of the above fruits disperses its seeds.
- (ii) After dispersal, some seeds undergo a period of dormancy. What is meant by the term *dormancy*?
- (iii) Give **one** advantage of dormancy to plants.
- (iv) Seedless fruits, e.g. grapes, are available in shops. Give **one** way to produce seedless fruits.
- (v) Artificial propagation of plants does not require seeds or fruits. Give **two** methods of artificial propagation used by gardeners.
- (vi) Give **one** advantage **and one** disadvantage of artificial propagation.

(b) The diagram shows the human skin.



- (i) Name the parts labelled A, B, C and D.
  - (ii) Which labelled part plays a role in excretion?
  - (iii) Name **one** other excretory organ in the body.
  - (iv) Give **two** other functions of the skin.
  - (v) What happens to the structure labelled A when the body is very cold?
  - (vi) E is the sebaceous gland. Name a liquid produced by this gland.
- (c)
- (i) Draw a diagram of *Rhizopus*. Label a rhizoid, a sporangium and a stolon on the diagram.
  - (ii) What term is used to describe the nutrition of *Rhizopus*?
  - (iii) Explain the importance of this type of nutrition in nature.
  - (iv) To which kingdom does *Rhizopus* belong?
  - (v) Name **one** economically harmful member **and one** economically beneficial member of the kingdom to which *Rhizopus* belongs.
  - (vi) In *Rhizopus*, which type of reproduction results in the formation of a zygospore?

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