WARNING: You must return this section with your answer book otherwise marks will be lost.

Write Your Examination Number Here

AN ROINN OIDEACHAIS AGUS EOLAÍOCHTA

LEAVING CERTIFICATE EXAMINATION, 2001

BIOLOGY — ORDINARY LEVEL

WEDNESDAY, 13 JUNE — AFTERNOON 2.00 to 5.00

Answer **six** questions from Part I and **four** questions from Part II.
You should not spend more than 45 minutes on Part I, leaving about 135 minutes for Part II.

PART I (120 marks)

Questions 1 – 7

Answer **six** questions. Each question carries 20 marks.
Write your answers in the spaces provided.
Keep your answers short.
Write your examination number at the top of this page.

Be sure to return this part of the examination paper; enclose it inside the answer book you use for Part II.

PART I (120 marks)

1. Answer *four* of the following:

(*a*) Photosynthesis occurs in a cell structure called a .....

(*b*) The gizzard in earthworms is used for .....

(*c*) The adrenal gland produces a hormone called .....

(*d*) Geotropism is the growth response of a plant to .....

(*e*) A common test for carbon dioxide is to pass it into a solution of .....

2. Indicate whether each of the following statements is true or false by putting a circle around the letter T or F.

Example: *Amoeba* is a protozoan	(T)	F
(a) During inhaling the diaphragm moves upwards	T	F
(b) Haemoglobin is found in the red blood corpuscles	T	F
(c) A bulb is a modified underground root	T	F
(d) A herbivore is an animal that feeds on plant matter	T	F
(e) A sensory neuron carries an impulse from a receptor to the central nervous system	T	F
(f) All viruses are parasites	T	F
(g) Mushrooms are saprophytes	T	F
(h) Bryophytes such as mosses are found mainly in dry habitats	T	F
(i) Fertilisation normally takes place in the uterus in the human	T	F
(j) A fruit contains one or more fertilised ovules	T	F

3. In an experiment to show that chlorophyll is necessary for photosynthesis a variegated leaf was boiled in water for a few minutes, then soaked in warm alcohol, rinsed in warm water and finally covered with iodine solution.

What is a variegated leaf?.....

.....

Why was the leaf boiled for a few minutes?.....

.....

Why was the leaf soaked in warm alcohol? .....

.....

Why was the leaf rinsed after being soaked in alcohol? .....

.....

Why was the leaf covered with iodine solution? .....

.....

What results would you expect to get from the iodine test on the variegated leaf? .....

.....

.....

4. Put a tick (✓) in the box opposite the correct answer in each of the following.

(a) Which one of the following is **not** a hormone?

thyroxine ☐
oestrogen ☐
trypsin ☐
insulin ☐

(b) How many chromosomes are normally present in a human skin cell?

46 ☐
69 ☐
23 ☐
92 ☐

(c) Which one of the following is caused by lack of vitamin D?

scurvy ☐
rickets ☐
night blindness ☐
beri-beri ☐

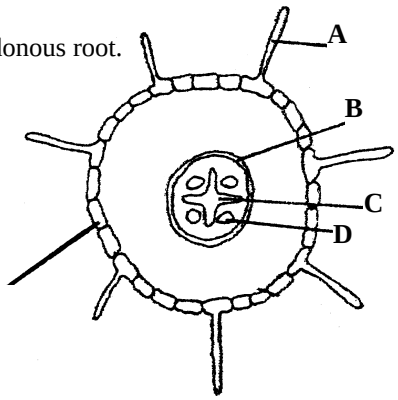
(d) Which one of the following allows a joint to move more smoothly?

dermis ☐
blood ☐
synovial fluid ☐
lymph ☐

(e) The production of milk by the female mammal is called

ovulation ☐
implantation ☐
parturition ☐
lactation ☐

5. Name the parts labelled A, B, C, D, E on the diagram of a typical dicotyledonous root.



A .....

B.....

C.....

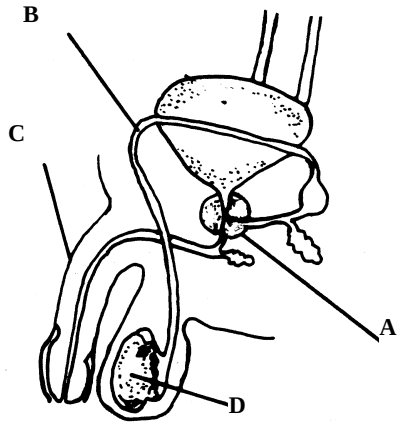
D .....

E.....

State **one** function of A.....
.....

State **one** function of D.....
.....

6. The diagram shows the human male reproductive system.
Name the parts labelled A, B, C, D.



A .....

B.....

C.....

D .....

Name the structure where sperms are formed .....

State **one** function of the seminal vesicle .....

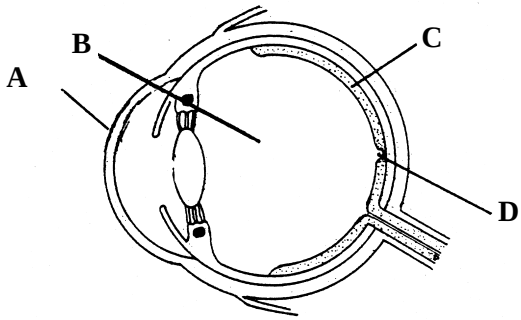
.....

State **one** function of testosterone .....

.....

7. The diagram shows a vertical section through the human eye.

Name A, B, C, D.



A .....

B.....

C.....

D .....

Name **one** type of cell found in C.....

What is the function of the iris?.....

What type of lens is used to correct shortsightedness in humans? .....

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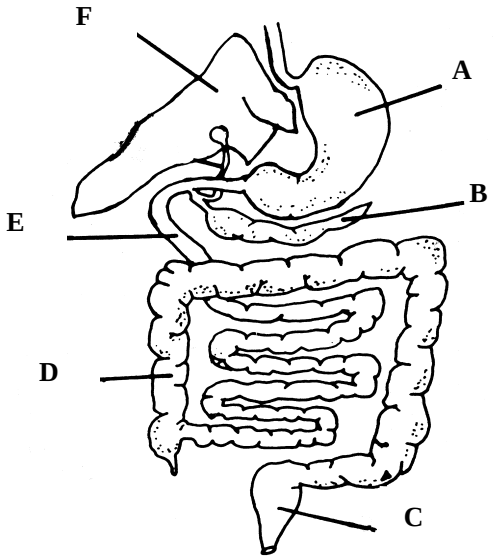
Part I is on a separate sheet which provides spaces for your answers. The completed sheet should be enclosed in your answer book.

PART II (280 marks)

Write your answers to this part in your answer book.

Answer **four** questions. Each question carries 70 marks.

8. The diagram shows a typical human digestive system.



(*a*) (i) Name the parts labelled A, B, C, D, E, F on the diagram.

State the function of the part labelled D.

(ii) Draw and label a diagram of a vertical section of a human tooth. (34)

(*b*) A test is carried out to find out if a food sample contains glucose. A solution of the food sample is placed in a test tube and a reagent(s) is added. The test tube is then placed in a bath of warm water.

(i) Name the reagent(s) added to the test tube.

(ii) If glucose is present what colour change would result?

(iii) What would you use as a control in this experiment? (18)

(c) The human diet includes carbohydrate, vitamins and minerals.
Name **three** other parts of the diet and give **one** function of each. (18)

9. (*a*) Explain the following terms as they apply in ecology: producer, predator, competition. (18)

(*b*) Answer the following questions with reference to a habitat you have studied.

(i) Name the habitat.

(ii) Draw a labelled sketch map of the named habitat.

(iii) Name **four** plants in the habitat.

(iv) Name **four** animals in the habitat.

(v) Give **one** food chain consisting of at least **three** organisms found in the habitat.

(vi) Describe how you would estimate the number of plants of a particular species using a quadrat. (34)

(*c*) Describe an experiment to find out the percentage volume of air in a sample of soil. (18)

10. (*a*) Explain the following terms as they apply in genetics: locus, heterozygous, diploid. (18)

(*b*) Fruit flies that have full wings carry an allele (**F**) that is dominant over the allele (**f**) for small wings. A fruit fly that is homozygous for full wings (**FF**) is crossed with a fruit fly that is homozygous for small wings (**ff**) (cross 1). The offspring that result are then crossed with each other to produce the F2 generation (cross 2).

Copy the following into your answer book and complete the spaces (genotype in brackets, phenotype on line)

Cross 1

(i) The genotypes of the original parents (FF) x (ff)

(ii) The gamete produced by each parent ( ) x ( )

(iii) The genotype of the offspring (F1) ( )

(iv) The phenotype of the offspring (F1) _____

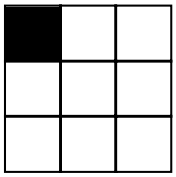
Cross 2

(i) The genotypes of the parents (remember the offspring of cross 1 become the parents of cross 2) ( ) x ( )

(ii) The gametes produced by these parents ( ) ( ) x ( ) ( )

(iii) The genotypes of the offspring (F2)

To solve this use the Punnet square as shown



(iv) The phenotypes of the offspring (F2) _____ _____ (32)

(*c*) Mitosis is the division of a nucleus into two identical nuclei. If a nucleus has four chromosomes, draw and label

(i) a diagram showing prophase,

(ii) a diagram showing anaphase. (20)

11. (*a*) (i) Draw and label a diagram of *Rhizopus* (the bread mould).

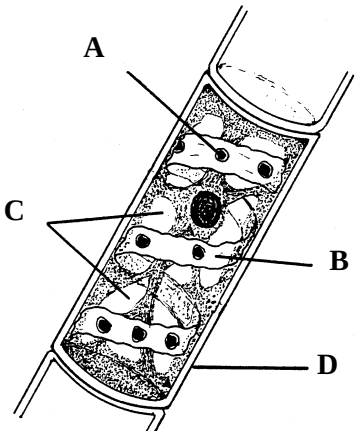
(ii) Describe how *Rhizopus* gets its food.

(iii) Describe asexual reproduction in *Rhizopus*. (40)

(*b*) *Rhizopus* belongs to a group of organisms known as Fungi.
State **three** beneficial and **three** harmful effects of Fungi. (18)

(*c*) The human body has immunity against disease. Explain, by giving an example in each case, the terms natural immunity and acquired immunity. (12)

12. (*a*) The diagram shows a *Spirogyra* cell.



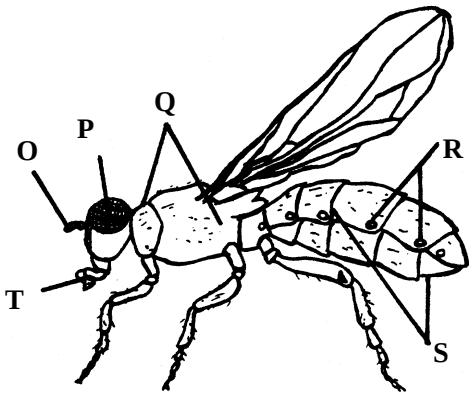
(i) Name the parts labelled A, B, C, D.

(ii) State **one** function of the part labelled D.

(iii) State **two** differences between a *Spirogyra* cell and an *Amoeba*.

(iv) Name the group of plants to which *Spirogyra* belongs. (24)

(*b*) The diagram shows a typical insect. As insects develop ecdysis occurs and they undergo complete or incomplete metamorphosis.



(i) Name the phylum to which the insect belongs.

(ii) Name the parts labelled on the diagram. (Q and S are body regions)

(iii) State **one** function of each of the parts labelled O and R.

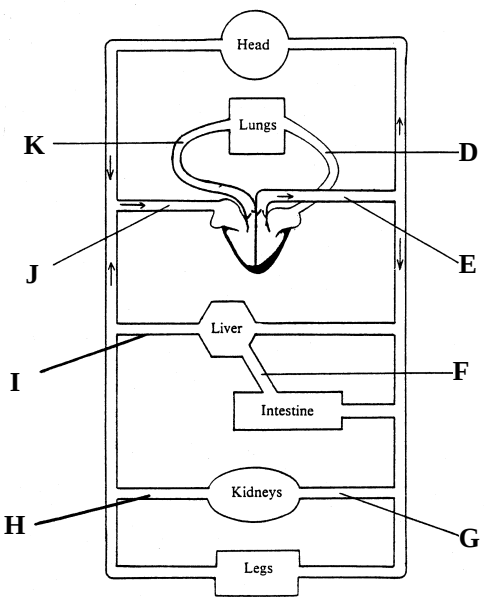
(iv) Explain the terms underlined above.

(v) Name an insect that undergoes complete metamorphosis.

(vi) Some insects have been shown to be vectors (carriers). Name **one** such insect and a disease which it transmits.

(vii) Give **one** example of how an insect can be of economic benefit. (46)

13. The diagram shows the blood circulatory system of a mammal.



(*a*) State which letter represents each of the following parts.
(i) aorta, (ii) hepatic portal vein, (iii) pulmonary vein, (iv) renal artery, (v) vena cava.

State what changes occur in the blood as it passes through
(i) the lungs, (ii) the kidney. (21)

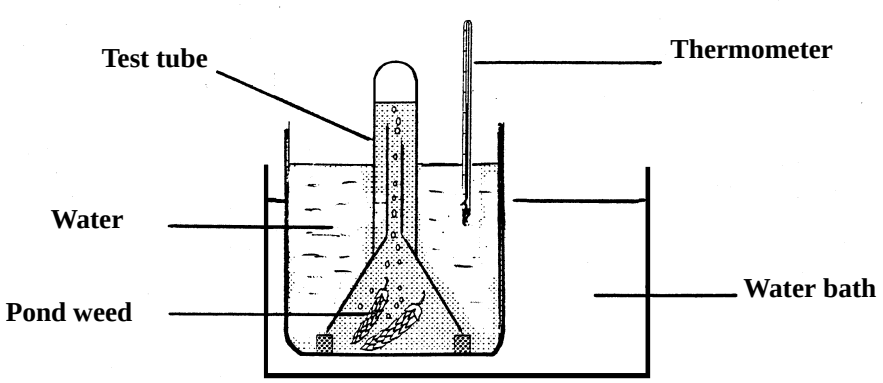
(*b*) Draw simple labelled diagrams to show a transverse section through,
(i) an artery, (ii) a vein.

Veins have valves and arteries do not. Suggest **one** reason for this. (28)

(*c*) Describe an experiment to show the effect of exercise on heart rate. (21)

14. (*a*) Write down the summary equation for photosynthesis in words or formulae.

The apparatus shown was used in an experiment to show the effect of temperature on the rate of photosynthesis.



(i) What is the purpose of the water bath?

(ii) What is the purpose of the thermometer?

(iii) How can the rate of photosynthesis be determined?

(iv) State **two** other factors that affect the rate of photosynthesis. (24)

(*b*) Draw a large diagram of a transverse section through a leaf and label the following parts:

cuticle, epidermis, palisade cells, spongy mesophyll, stomata. (22)

(*c*) Describe how you would show that there are several pigments in a chloroplast extract. Name **two** of these pigments. (24)

15. Answer *two* of the following: (35,35)

(*a*) You are given a thistle funnel, some Visking tubing (semi-permeable membrane), a beaker, distilled water and some glucose.

(i) What is osmosis?

(ii) How would you use the above to demonstrate osmosis?

(iii) List **five** ways in which water is important to living things.

(*b*) (i) Draw a large diagram of a named flower. Label **six** parts of the flower.

(ii) Give **two** reasons why seed dispersal is important for plants. State **two** methods of seed dispersal, and give an example of a plant in each case.

(*c*) (i) Temperature affects the rate of action of enzymes. List **three** other factors which affect their rate of action.

(ii) Describe briefly how you could carry out an experiment to show the effect of **one** of these factors on the rate of action of a named enzyme.

(*d*) (i) A wormery is used to study the result of earthworm activity. Draw and label a typical wormery.

(ii) List **five** ways in which earthworms are beneficial to soil.

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