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Write your Examination Number here

AN ROINN OIDEACHAIS

LEAVING CERTIFICATE EXAMINATION, 1983

BIOLOGY—ORDINARY LEVEL

TUESDAY, 14 JUNE—MORNING, 9.30 to 12.30

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)

Answer **six** questions. Each question carries 20 marks.
Write your answers in the spaces provided.
Keep your answers short.
Write your examination number at top.
Be sure to return this part of the examination paper; enclose it in the answer-book you use for answering Part II.

1. Answer *four* of the following by placing the correct answer (*a*), (*b*), (*c*), or (*d*) in the space provided.

(i) The growth response of a plant stem to light is called

(*a*) geotropism
(*b*) phototropism
(*c*) hydrotropism
(*d*) thigmotropism

Answer .....

(ii) The correct sequence of the vertebrae in the backbone is

(*a*) cervical, lumbar, thoracic, caudal, sacral
(*b*) cervical, thoracic, lumbar, caudal, sacral
(*c*) cervical, thoracic, lumbar, sacral, caudal
(*d*) cervical, sacral, thoracic, lumbar, caudal

Answer .....

(iii) When yeast respires anaerobically, the products are

(*a*) carbon dioxide and water
(*b*) carbon dioxide and ethanol (ethyl alcohol)
(*c*) oxygen and ethanol (ethyl alcohol)
(*d*) carbon dioxide and oxygen

Answer .....

(iv) A characteristic of a soil containing a high proportion of clay is

(*a*) high mineral content
(*b*) good drainage
(*c*) large soil particles
(*d*) warm temperatures

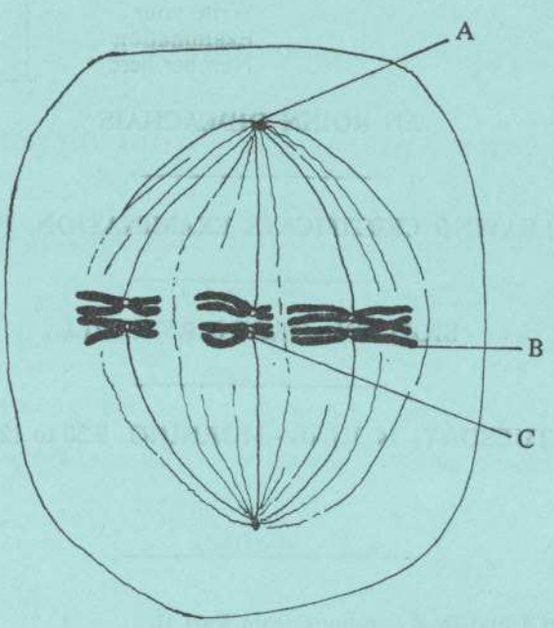
Answer .....

(v) An unfertilised human egg following release from the ovary can live for

(*a*) 28 days
(*b*) 1 day
(*c*) 7 days
(*d*) 14 days

Answer .....

2. The diagram shows an animal cell at one stage of meiosis. The diploid number of chromosomes is 6.



(i) Identify A, B and C by choosing the correct word from the following list:
chromatid centromere nucleolus centriole spindle

A .....

B .....

C .....

(ii) What is the haploid number of chromosomes for the animal? .....

(iii) Name the stage which is shown in the diagram .....

(iv) Describe what happens in the next stage of meiosis.

.....

.....

(v) Name an organ in the mammal where meiosis occurs. .....

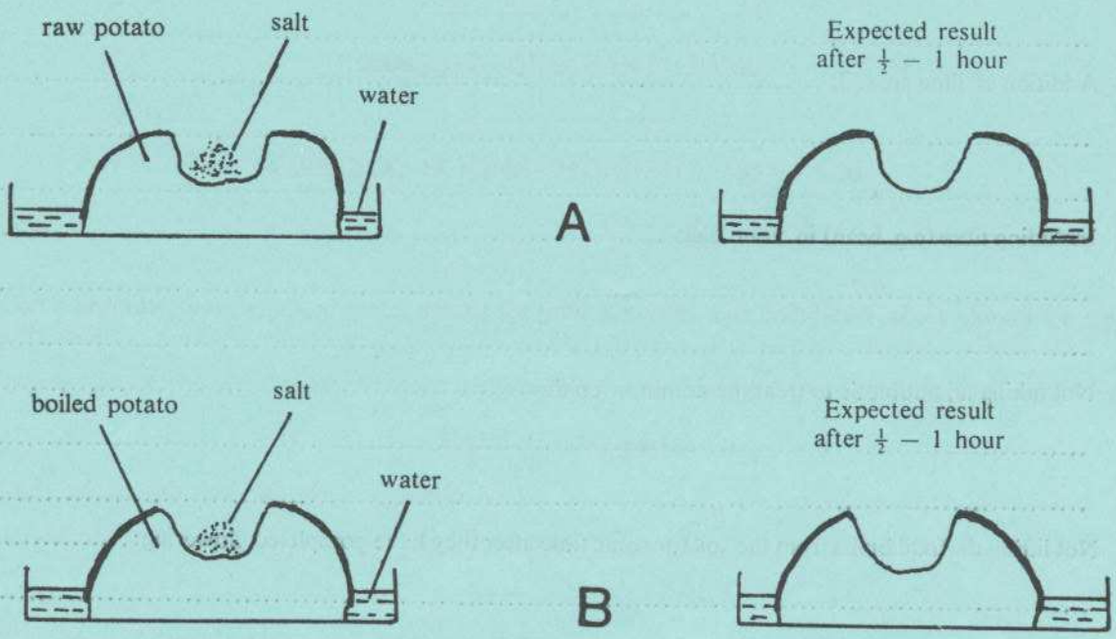
3. Complete the sentences below by writing in the appropriate words from the following list. Each word may be used once only. Read the passage carefully before beginning your answer.

amino acids; blood; carbon dioxide; glucose; kidney; liver; lymph; lungs; sweat; urine.

Urea is made in the ..... as a result of the breakdown of excess ..... .

The urea is then carried in the ..... to the ..... where it is filtered out, together with excess water and mineral salts, to form .....

4. In an experiment a small hollow was cut out of two half potatoes of similar size. Each was set up as shown in the diagrams A and B and left for $\frac{1}{2}$ – 1 hour.



(i) What does this experiment demonstrate ? .....

(ii) Complete each diagram on the right hand side to show the results you would expect after $\frac{1}{2}$ – 1 hour.

(iii) Explain the result obtained in A and the result obtained in B.

A .....

.....

B .....

.....

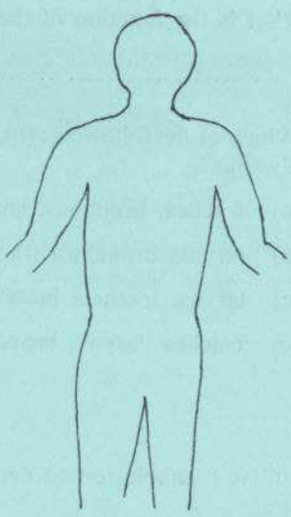
5. (i) What is a hormone?.....

.....

.....

(ii) Using the appropriate letter mark the position of each of the following endocrine glands on the diagram of the human body:

X – Thyroid.
Y – Pituitary.
Z – Pancreas.



(iii) Name a hormone produced by the thyroid gland. .....

(iv) Which of the endocrine glands mentioned above is also an exocrine gland? .....

Give a reason for your answer. .....

.....

6. Give a biological explanation for each of the following.

(i) Wearing glasses with convex lenses: .....

.....

.....

(ii) Addition of lime to soil: .....

.....

.....

(iii) Including fibre (e.g. bran) in your diet: .....

.....

.....

(iv) Not taking an antibiotic to treat the common cold: .....

.....

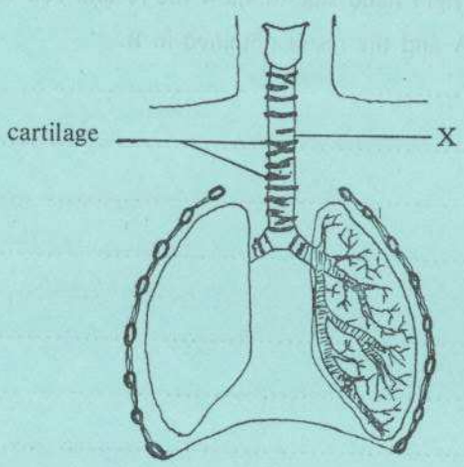
.....

(v) Not lifting daffodil bulbs from the soil for some time after they have completed flowering: .....

.....

.....

7. The diagram illustrates the breathing apparatus in man.



(i) What is the function of the cartilage on the tube X? .....

.....

(ii) Which of the following: (*a*), (*b*), (*c*), or (*d*), is the correct pathway of air as it passes from the nose into an alveolus?

(*a*) trachea, bronchus, larynx, bronchiole, alveolus.

(*b*) larynx, bronchus, trachea, bronchiole, alveolus.

(*c*) larynx, trachea, bronchus, bronchiole, alveolus.

(*d*) trachea, larynx, bronchiole, bronchus, alveolus.

Answer .....

(iii) Outline a simple test to demonstrate the presence of water in expired air:

Method: .....

.....

.....

Positive result: .....

.....

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Part 1 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.

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8. Describe, with the aid of labelled diagrams, the life cycle of a named moss *or* fern.
Give a natural habitat of the moss *or* fern you have described and outline two ways in which the moss *or* fern is adapted to life in that habitat.

9. (*a*) Explain what is meant by food preservation and state why it is necessary.
Give the scientific basis for each of *three* of the following methods of preserving food: (i) canning, (ii) freezing, (iii) drying, (iv) pickling.

(*b*) Describe an experiment to show the presence of bacteria in the air. You should include in your answer a diagram of the apparatus, the method of carrying out the experiment (include a suitable control), the precautions you would take to avoid contamination and the observations you would expect to make.

10. (*a*) Explain the terms: (i) sex chromosomes, (ii) locus, (iii) allele.

(*b*) In guinea pigs black coat colour (**B**) is dominant to white coat colour (**b**) and short hair (**S**) is dominant to long hair (**s**).
A black-coated short-haired guinea pig, heterozygous for both characteristics, is mated with a white-coated long-haired guinea pig.
Show using diagrams

(i) the genotype of each parent;

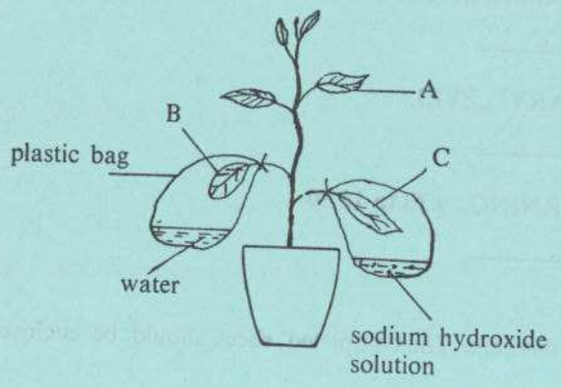
(ii) the gamete type(s) produced by each parent;

(iii) the genotype and phenotype of the possible offspring.

11. (*a*) Explain the following terms giving an example in each case: biosphere, community, competition.
From the habitat you have studied give the name of (i) a plant, (ii) a herbivore which feeds on that plant and (iii) a carnivore which feeds on the herbivore you have named. What term is used to describe the relationships between these organisms?
Outline how the herbivore and the carnivore you mention are adapted to survive in the habitat.
State briefly what might happen if the carnivores were removed from the habitat.

(*b*) Briefly describe *three* of the following (in words or by labelled diagrams) and write a note on their use in any habitat: (i) pooter, (ii) line transect or belt transect, (iii) quadrat, (iv) Tullgren funnel or Baermann funnel, (v) beating tray, (vi) pitfall trap.

12. The apparatus shown was set up using a plant with destarched leaves. The plant was then placed in bright light for 8 hours.



Results of starch test after 8 hours	
	Starch Test
Leaf A	Positive
Leaf B	Weakly positive
Leaf C	Negative

Examine the diagram and the table and answer the following questions.

(i) What hypothesis is being tested?

(ii) Describe the colour of each of the leaves A, B, C, after the iodine test for starch.

(iii) (*a*) Why were the original leaves destarched?

(*b*) How would you have destarched the leaves?

(*c*) What is the function of the sodium hydroxide solution?

(iv) Name the process by which starch is produced in a leaf. Write an equation (words or symbols) for that process.

(v) Give one explanation for the weakly positive result in leaf B.

(vi) State which leaf is used as the control. Give a reason for your choice.

13. (*a*) Describe the composition of human blood.

(*b*) The digestion of food substances in the alimentary canal can be considered as the breakdown of complex molecules to produce smaller molecules.

(i) State why the formation of smaller molecules is essential.

(ii) Name *three* enzymes involved in protein digestion in humans.

(iii) Name the products formed by the complete digestion of a molecule of protein.

(iv) Outline the pathway taken by the products of protein digestion from the time they enter the bloodstream through the villi of the small intestine until they reach a muscle in the leg.

14. (*a*) List the characteristics of living things and outline how *Amoeba* demonstrates any three of these.

(*b*) State the phylum to which each of the following belongs: *Amoeba*, earthworm. Give *two* reasons for your classification in each case.

(*c*) How do earthworms assist in improving soil fertility?
Describe a simple experiment to show the activities of earthworms in the soil.

15. The sunflower and French bean seed undergo epigeal germination, whereas the broad bean and the pea seed undergo hypogeal germination.

(i) Explain the words underlined.

(ii) By means of a minimum of 4 well-labelled diagrams describe the complete process of germination in any *one* of the seeds mentioned above.
List the factors necessary for germination.
Describe an experiment to show that any one of the factors you mention is necessary.