

AN ROINN OIDEACHAIS

LEAVING CERTIFICATE EXAMINATION, 1990

BIOLOGY—ORDINARY LEVEL

WEDNESDAY, 13 JUNE — MORNING, 9.30 to 12.30

Write your Examination Number here

[Empty box for examination number]

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.

- (a) An example of a ball-and-socket joint is.....
- (b) The principal photosynthetic pigment is.....
- (c) The substance given off during transpiration is.....
- (d) A vitamin required for bone growth is.....
- (e) Intercostal muscles function in the process of.....

2. Answer the following by placing a tick (✓) in the appropriate box in each case.

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

- (a) ovulation
- (b) implantation
- (c) parturition
- (d) lactation

(ii) Fertilization of the mammalian ovum normally takes place in the

- (a) oviduct (fallopian tube)
- (b) uterus
- (c) ureter
- (d) ovary

(iii) The tube through which urine leaves the body and passes to the exterior is the

- (a) ureter
- (b) uterus
- (c) urethra
- (d) utriculus

(iv) The sensory cells in the ear which detect sound are situated in the

- (a) pinna
- (b) cochlea
- (c) eardrum
- (d) semi-circular canals

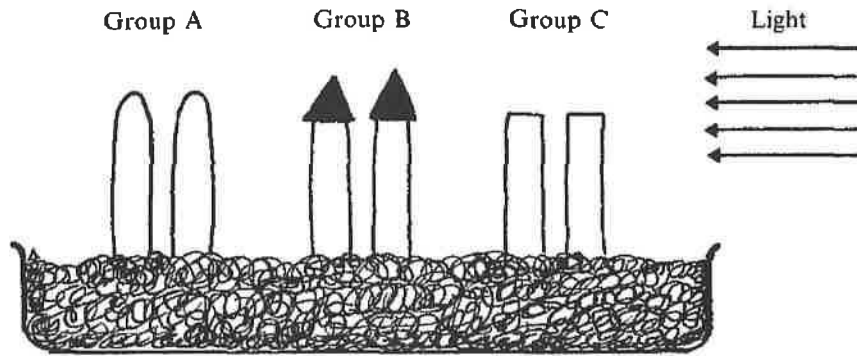
(v) The vitamin made in human skin in sunlight is

- (a) vitamin C
- (b) vitamin K
- (c) vitamin D
- (d) vitamin B

3. Some oat seedlings were grown in the dark and then treated as follows.

- Group A: no treatment, left intact.
- Group B: tips of seedlings covered with metal foil.
- Group C: tips of seedlings cut off.

The seedlings were then exposed to light from one side as shown in the diagram.

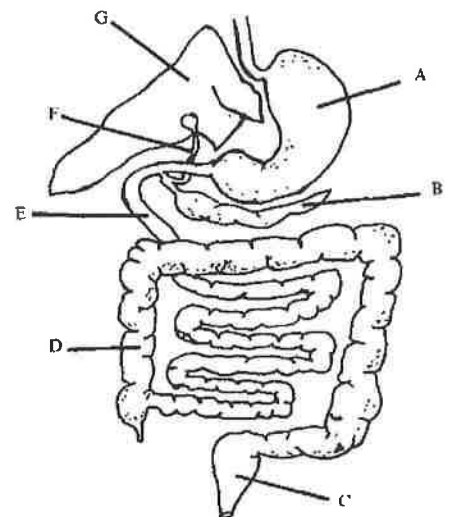


- (i) Which group of seedlings, A, B or C, would you expect to respond to the light?.....
- (ii) What would you expect to observe as the response to the light?.....
- (iii) What is the response called?.....
- (iv) Give an example to show how this response to light may help a plant to survive in its habitat.  
.....
- (v) Name the substance in plants thought to be responsible for causing a stem to respond to light .....
- (vi) What result would you expect if group A were covered with clear polythene caps?  
.....

4. The diagram shows part of the digestive system.

Name the parts labelled A, C, D, E, G.

- A.....
- C.....
- D.....
- E.....
- G.....



State one function for organ B.

.....

What substance would you expect to find in F?

.....

5. The diagram shows part of the epidermis of a root.

State a function of the root hair.

.....

Osmosis occurs between the root hair and the moist soil.  
What is osmosis?

.....

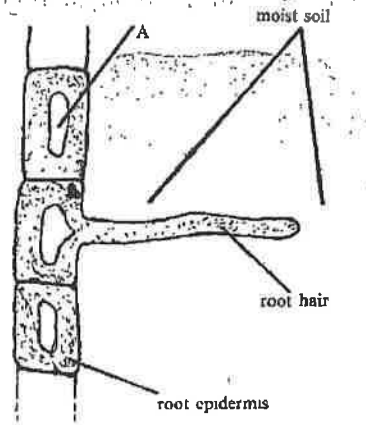
Name the cell structure labelled A.

.....

What is plasmolysis?

State what you would expect to observe if cells similar to those in the diagram had become plasmolysed.

.....



6. Name the parts labelled A, B, C, D, in the diagram.

A.....

B.....

C.....

D.....

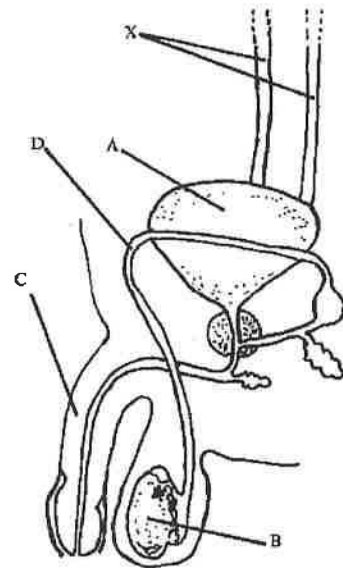
Spermatazoa are produced by the part labelled .....

This part also has an endocrine gland function. State this function.

.....

To what organ do the tubes labelled X connect the part labelled A?

.....



7. For each of the following, distinguish between the members of the pairs of terms by writing a brief explanatory note on each term.

(i) ligament and tendon.....

.....  
.....

(ii) vaccine and antibiotic.....

.....  
.....

(iii) bark and wood.....

.....  
.....

(iv) collenchyma and parenchyma.....

.....  
.....

(v) potometer and clinostat.....

.....  
.....

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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.

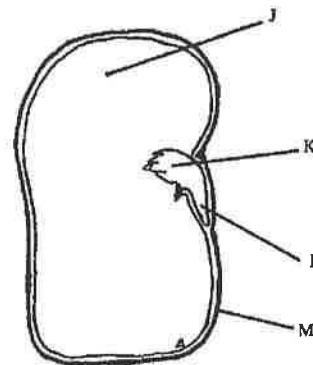
Answer four questions. Each question carries 70 marks.

8. (a) The diagram is of a section through a broad bean seed.

(i) Name the parts labelled J, K, L, M, and give one function for each of the parts J and K.

(ii) If you were given 100 bean seeds describe an experiment you would carry out to find the best temperature for their germination.

(36)



(b) Give the meaning of the terms perennation *and* vegetative propagation.

Describe one method of vegetative propagation.

Suggest a reason why plant growers sometimes prefer to propagate a particular plant by means of vegetative propagation rather than by seeds.

(34)

9. The diagram represents the blood circulatory system of a mammal.

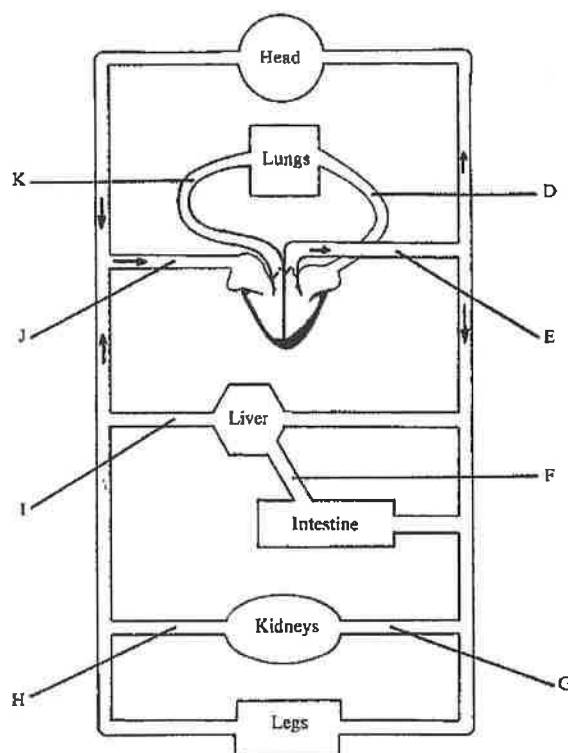
(i) Give the appropriate letter to indicate the location of each of the following on the diagram: aorta, hepatic portal vein, renal artery, pulmonary vein, vena cava.

Give one major change in the composition of the blood as it passes through (a) the lungs, (b) the liver. (c) the kidneys. (24)

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

Veins have valves and arteries do not. Suggest a reason for this. (25)

(iii) Describe an experiment you could carry out to show the effect of exercise on heart rate. (21)



10. (a) Explain the terms (i) chromosome, (ii) alleles.

In humans the diploid chromosome number is 46. State the number of chromosomes present in each of the following: (i) stomach cell, (ii) sperm cell, (iii) mature red blood corpuscle, (iv) cells produced by mitosis. (24)

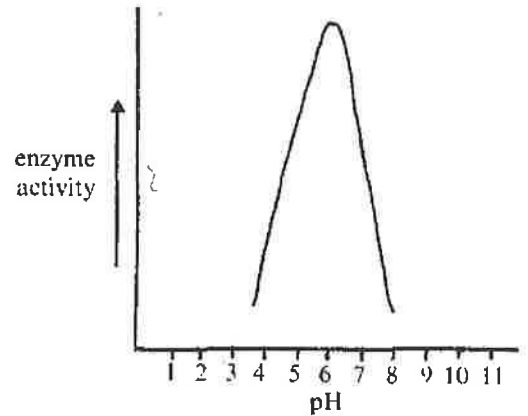
(b) In a variety of pea plants the character tall (T) is dominant to short (t) with regard to plant height. Yellow (Y) is dominant to green (y) with regard to seed colour.

- (i) Give the genotype of a pea plant that is heterozygous for height and seed colour. State the genotype of the gametes that this plant could produce.
- (ii) Give the genotype of a pea plant that is homozygous for height and produces green seeds. State the genotype of the gametes that this plant could produce.
- (iii) State the phenotype(s) and genotype(s) of the progeny that could result from a cross between the plants described in (i) and (ii) above. (46)

11. (a) What is an enzyme?

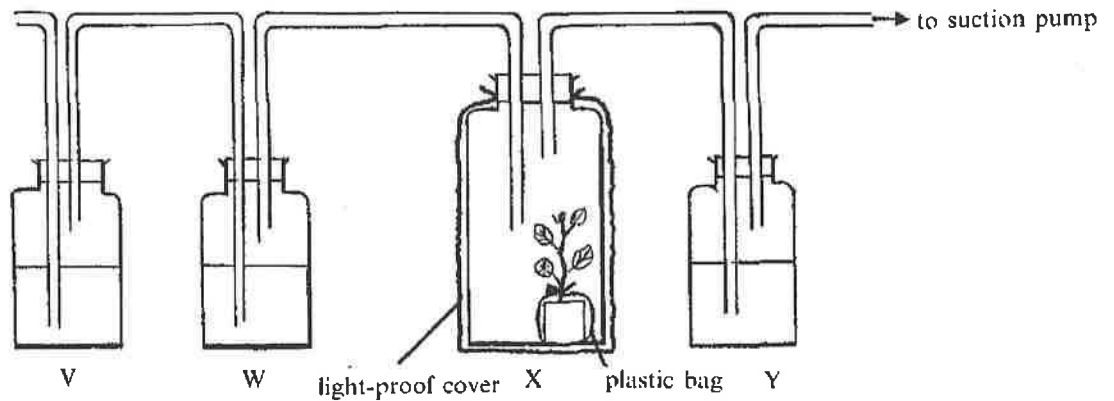
In an experiment the rate of a digestive enzyme's activity was measured at different pH values. The results were plotted as a graph as shown.

- (i) What is meant by pH?
- (ii) What does the graph tell you about the action of the enzyme?
- (iii) Suggest two parts of the digestive tract where an enzyme with a similar pH optimum is to be found.
- (iv) Give a factor, other than pH, which might affect the rate of action of an enzyme. (42)



(b) Draw a diagram of a vertical section through a tooth and label the parts. State briefly the function of each of the following teeth: (i) molars, (ii) incisors. (28)

12. The diagram shows the apparatus used in an experiment to show that a plant produces carbon dioxide gas during respiration.



- (i) What chemical was put into jar W?
- (ii) Why was sodium hydroxide solution placed in jar V?
- (iii) Why was a light-proof cover put around jar X?
- (iv) Why was the plant pot placed in a plastic bag?
- (v) What chemical was put into jar Y?
- (vi) What changes, if any, would you expect to observe in jar W and in jar Y at the end of the experiment? (28)

Would you expect to find any starch in the leaves of the plant if it was left in the apparatus for several days? Give a reason for your answer.

Describe how you would test the leaves of the plant for the presence of starch. (42)

13. (a) Scientists classify all living organisms into very large groups and then divide these groups into smaller groups.

Write the following group names in correct sequence starting with kingdom: species, phylum, genus, class.

Insects are the largest group of animals and are in the Phylum Arthropoda. State (i) two characteristics of the phylum and (ii) two characteristics which would enable you to distinguish an insect from other members of the phylum.

Draw a large labelled diagram of a named insect.

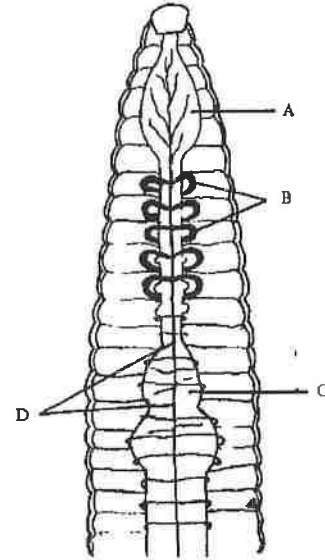
(39)

- (b) Name the parts labelled A, B, C, D, on the diagram of a dissected earthworm.

Give one function for each of the parts A and B.

State how earthworms bring about soil improvement.

(31)



14. (a) Define the term ecology.

State the type of information that each of the following gives us about a particular ecosystem: food web, pyramid of numbers.

Give the meaning of the term saprophyte and state the importance of saprophytes in an ecosystem. (34)

- (b) Describe, with the aid of diagrams where appropriate, any four of the following and explain briefly how you would use each of the four in the study of an ecosystem: (i) Tullgren or Baerman funnel, (ii) transect (state type), (iii) capture-recapture technique, (iv) quadrat, (v) pitfall trap, (vi) one method not listed here. (36)

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

- (a) Give a labelled diagram of a vertical section through a green leaf.

Outline four ways in which the structure of the leaf is adapted to perform its functions.

- (b) Draw a large diagram of a vertical section through a human eye and label the following parts: cornea, iris, pupil, lens, suspensory ligament, retina, optic nerve, blind spot.

State why the blind spot is so called.

- (c) Name four elements other than carbon, hydrogen, and oxygen, necessary for normal plant growth.

Outline an experiment to demonstrate the effect of a deficiency of a named mineral on the growth of a plant.

- (d) Draw a labelled diagram of a cell from a filament of *Spirogyra*. Outline how *Spirogyra* reproduces sexually.