

Write your Examination Number here

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AN ROINN OIDEACHAIS

LEAVING CERTIFICATE EXAMINATION, 1975

BIOLOGY—HIGHER LEVEL

THURSDAY, 19 JUNE—AFTERNOON, 2 to 4.45

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 120 minutes for Part II.

PART I (120 marks)

Answer six of the questions (1-7). Each question carries 20 marks.

Write your answers in the spaces provided below. 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 five of the following.

- (a) The study of the relationships of organisms and their environment is called
- (b) Name one place in the body that produces red blood cells.
- (c) Lichens consist of algae and They are an example of a relationship.
- (d) Parthenogenesis is a special form of reproduction in which a new individual is produced from an egg.
- (e) What substance, together with carbon dioxide, is formed during anaerobic respiration of yeast?
- (f) State whether the prothallus of the fern is haploid or diploid.

2. Each of the terms in column 3 is related to one of the terms in column 1. Write in column 2 in each case the term from column 3 that most appropriately matches the term from column 1. Use each term once only. The first one is completed as an example for you.

| Column 1 | Column 2 | Column 3 |
|-------------------|---------------------------|--------------|
| Vitamin D | Rickets | RNA |
| Carotinoids | | Tuberculosis |
| Myelin | <i>Schw</i> | Mitochondria |
| Uracil | <i>RNA</i> | Morula |
| Companion cell | <i>PHLOEM</i> | Chloroplast |
| Thymine | <i>DNA</i> | Protonema |
| Bacterium | <i>Tuberc</i> | Schwann cell |
| Krebs' cycle | <i>Mitoch</i> | Rickets |
| Trophoblast | <i>morul</i> | Nose |
| Moss | <i>phloem</i> | Phloem |
| Elastic cartilage | <i>nose</i> | DNA |

3. In each of the groups of terms below three have something in common which the fourth has not. Underline the "odd term" in each group. State the reason for your choice, including the relationship between the terms not underlined.

Example: crocodile tortoise frog lizard

Reason: The frog is an amphibian. The other three are reptiles.

(a) ovary vagina ureter uterus

Reason:.....
.....

(b) femur humerus tibia fibula

Reason:.....
.....

(c) alveolus villus bronchus trachea

Reason:.....
.....

(d) corm tuber rhizome seed

Reason:.....
.....

4. (a) The diagram shows portion of a section through the testis of a mammal.

Name the cells labelled P.

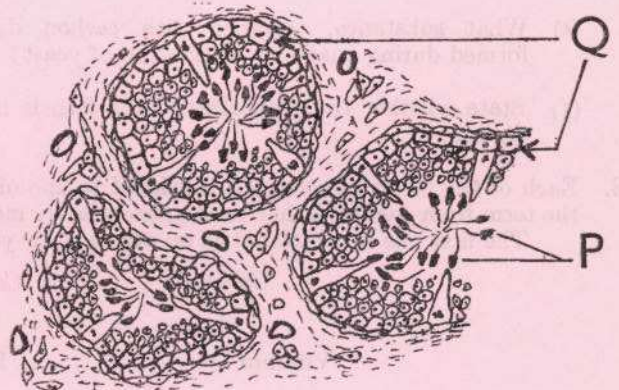
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What is the numerical relationship between the number of chromosomes in the nuclei of the cells labelled Q and the number in the nuclei of the cells P?

.....

This relationship results from the process

of.....



(b) Name the structures labelled L, M, N in the diagram.

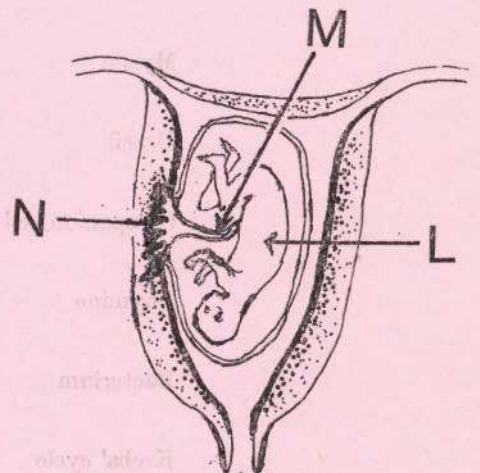
L.....

M.....

N.....

Give one function common to the structures M and N.

.....



5. (a) The diagram shows a section through an earthworm.

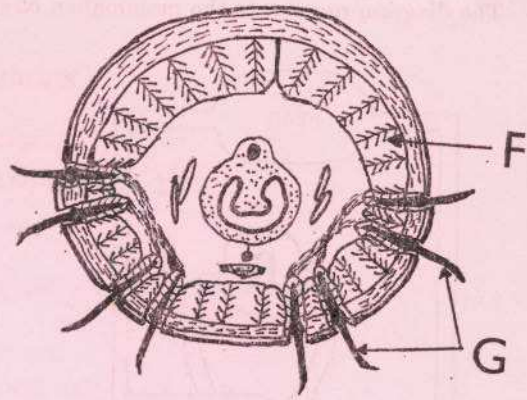
Name the structures labelled F and G.

F.....

G.....

Give one function common to F and G.

.....



(b) Name the plant structure shown in section in the diagram.

.....

Name the parts labelled W, X, Y, Z.

W.....

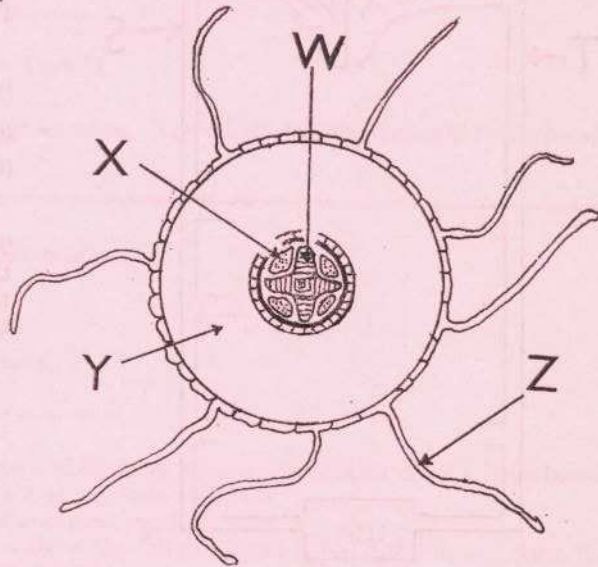
X.....

Y.....

Z.....

What is the function of the structure Z?

.....



6. In an experiment two similar leafy shoots were each set up as shown in the diagram. Both were exposed to the same environmental conditions except that one was in a windy position while the other was in still air.

(i) What process is being investigated in this experiment?

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(ii) How would the water level in the two containers differ after 2-3 days in the given environmental conditions?

.....

.....

(iii) How would you answer (ii) above if the upper and lower surfaces of the leaves of the shoot in the windy position had been coated with petroleum jelly at the beginning of the experiment?

.....

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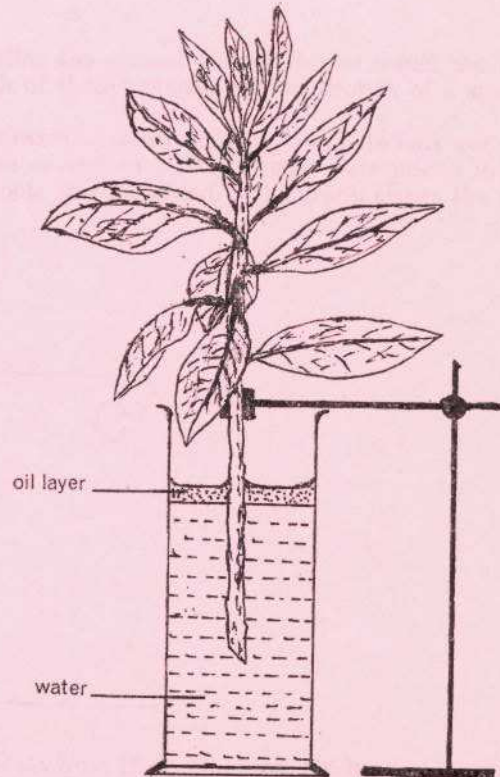
Give the reason for your answer to (iii).

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(iv) State the purpose of the oil layer shown in the diagram.

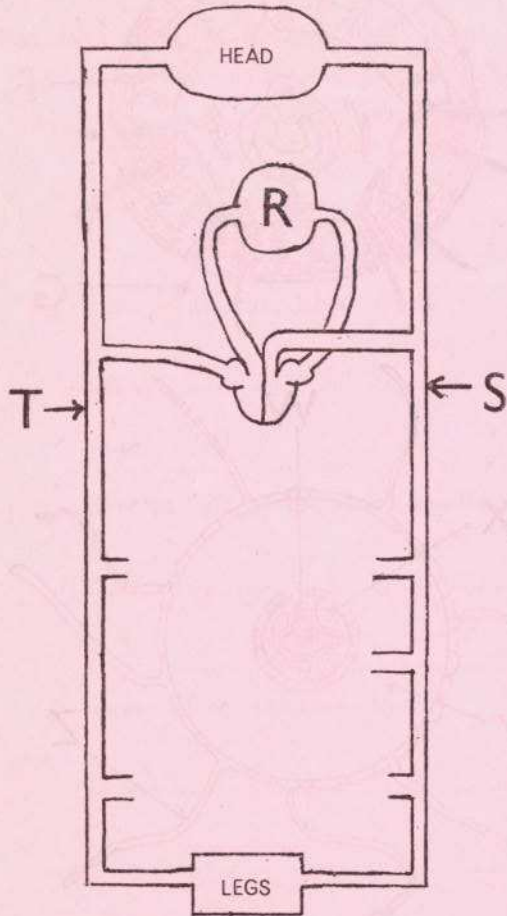
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7. The diagram represents the mammalian circulatory system.



Name the parts labelled R, S, T.

R

S

T

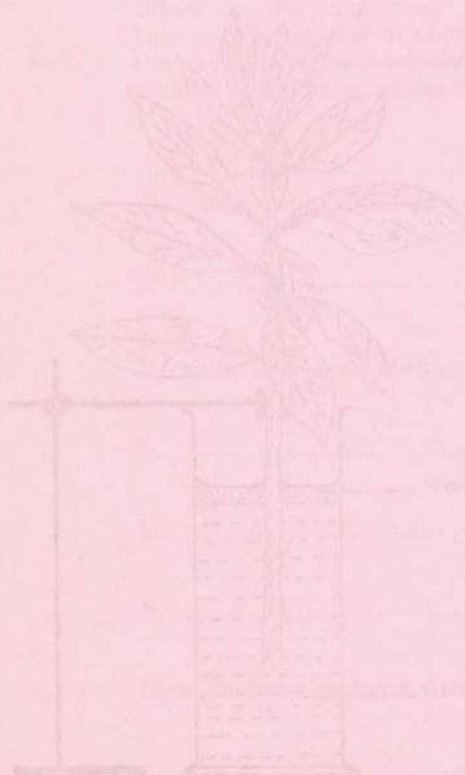
Complete the diagram to show

- (a) the circulation to the stomach and liver;
- (b) the circulation to the kidneys.

The blood flow in the capillaries is very much slower than the blood flow in the vessel labelled S. Suggest how this slow blood flow is related to the function of blood in the body tissues.

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B.T.O.

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Answer **six** questions from Part I and **four** questions from Part II.

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

8. Making use of information provided by light microscope and electron microscope studies, draw a large labelled diagram of a generalised animal cell. Your diagram should include 10 labels.

Write short notes on the functions of two of the structures you label.

Describe briefly, with the aid of labelled diagrams, how the following cell types differ in structure from the cell you have described: phloem sieve tubes, collenchyma.

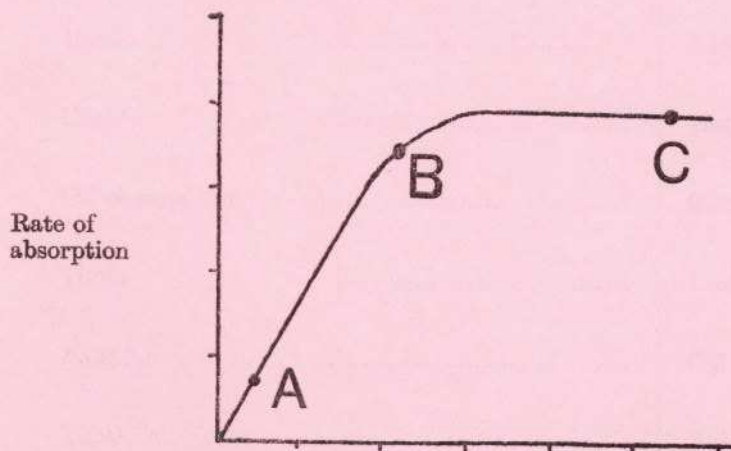
9. Distinguish between a grazing food chain and a detritus food chain.

Draw a diagram to show the nitrogen cycle. Indicate clearly where detritus feeders act in the nitrogen cycle and comment briefly on their role.

Using your knowledge of the distribution of organisms in soil compare the rate of breakdown of leaf litter in topsoil and in subsoil. Briefly explain your answer.

10. List five major mineral nutrients required by plants. Outline the general procedure you would use in a laboratory investigation on the effects of deficiency of each of these elements on the growth of a species of plant.

In an experiment a number of solutions containing the same concentration of phosphate ions were set up and each solution aerated with a different concentration of oxygen. Barley roots were placed in the solutions and the rate of absorption of phosphate by the roots was measured. The graph shows the rate of absorption plotted against the oxygen concentration.



(Data from H. T. Hopkins, 1956)

- What is the relationship between the rate of absorption of the phosphate and the oxygen concentration between the points A and B on the graph; between the points B and C?
- Suggest a reason for the relationship you give for the portion A B of the graph.
- State briefly why a well-aerated soil is desirable in gardening.

11. (a) In man the gene for red-green colour blindness is carried on the X chromosome. The allele for normal vision (N) is dominant over the allele for colour blindness (n). A woman, heterozygous for the gene, marries a colour-blind man. Show, using a diagram, the possible genotypes and phenotypes of the progeny from this marriage.
- (b) Name the material of which genes are composed, and outline a test you could carry out to show the presence of this material in the cells of the root tip of a plant.
- (c) Explain (i) chromatid, (ii) polyploid.
12. (a) Describe the properties and functions of enzymes. List three factors that affect enzyme activity. A teacher suggested that the salivary enzyme produced by cigarette smokers is not as "efficient" as that of non-smokers. Describe how you would test this hypothesis by experiment; include suitable controls.
- (b) Outline what happens to food in the human stomach.
- (c) What happens during germination of a seed that corresponds to digestion in the human?
13. (a) Draw a clearly labelled diagram to show the structure of the eye. Explain how accommodation is brought about.
- (b) Briefly describe the interconnections between ligaments, tendons, bones and skeletal muscles.
14. Describe how the leaf is adapted to its function as a photosynthetic organ. Give an account of the life cycle of *Phytophthora infestans*. Describe briefly the symptoms produced by the parasite and outline how it may be controlled.
15. Answer two of the following.
- (a) Draw labelled diagrams to show the external structure of (i) *Fucus*, (ii) *Paramecium*. Point out the features that adapt these organisms to their environment.
- (b) What is meant by fertilization? Give a brief illustrated description of fertilization in the flowering plant.
- (c) Explain (i) cleavage, (ii) gastrulation, in the case of the frog or the chick.

