

LEAVING CERTIFICATE EXAMINATION, 1982

BIOLOGY—HIGHER LEVEL

WEDNESDAY, 16 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.

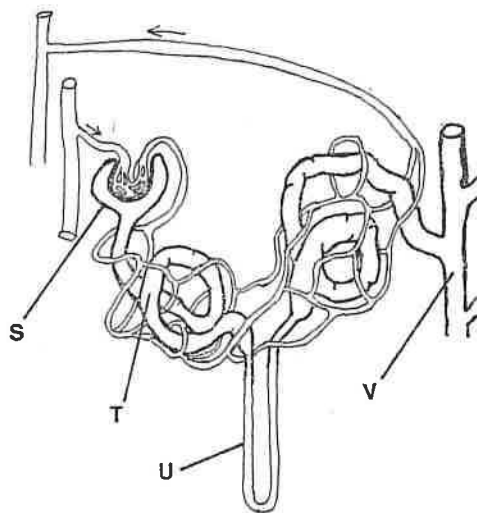
Be sure to return this Part of the examination paper; enclose it in the answer-book you use for answering Part II.

1. Answer five of the following.

- (a) Intercostal muscles are located.....
- (b) An onion is a modified
- (c) The blood vessel that carries blood from the heart to the lungs is the
- (d) Glycogen is made in the
- (e) A function of the Eustachian tube is
- (f) Name a group of organisms that have compound eyes.

2. The diagram shows a single nephron and its blood supply. Name the parts labelled.

- S
- T
- U
- V



Name one substance reabsorbed in the region indicated by T.

.....

By what process is this substance reabsorbed?

.....

Why is the kidney referred to as an osmoregulatory organ?

.....

.....

6. Where is the egg of a mammal usually fertilised?

What is meant by implantation in relation to the fertilised egg?
.....

Name two structures in each case derived from the following:

ectoderm (i) (ii)

mesoderm (i) (ii)

Give two functions of the placenta.

(i)

(ii)

7. Answer the following.

(a) Name the structure shown.

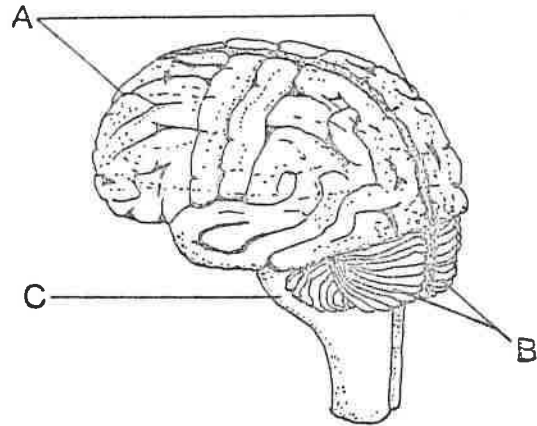
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Name the parts labelled.

A

B

C



(b) Name the structure shown in vertical section.

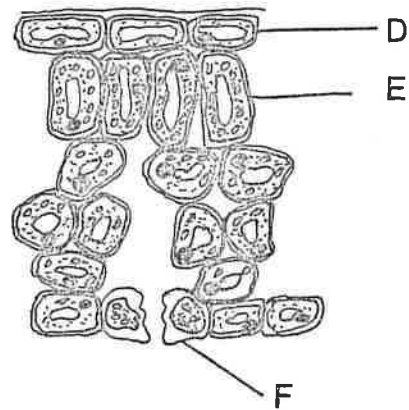
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Name the parts labelled.

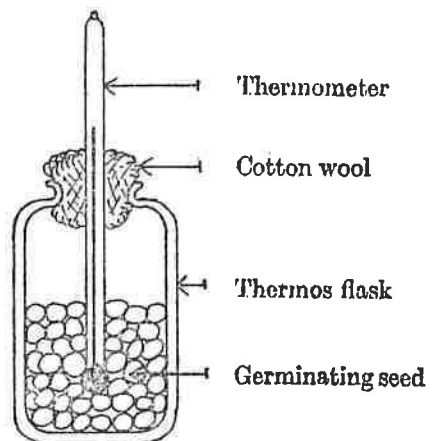
D

E

F



(c) What hypothesis is being tested in this experiment?
.....
.....



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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. (i) Describe with the aid of labelled diagrams the arrangement of the chromosomes in a cell at metaphase of mitosis and at metaphase of meiosis I, assuming the $2n$ chromosome number to be 4. Comment on the biological importance of mitosis and meiosis.
- (ii) Write explanatory notes on *five* of the following: genotype, locus, linkage, chiasma, sex-linkage, mutation.
9. (i) Give a labelled diagram of a transverse section of a young dicotyledonous stem to show the general arrangement of the tissues before secondary thickening takes place. Show how the arrangement of the vascular tissues in a monocotyledonous stem differs from that in a dicotyledon.
- (ii) Give an account of the absorption and upward movement of water in the flowering plant.
10. What is meant by an enzyme? Describe fully how you would demonstrate that pH affects the activity of an enzyme. List three other factors that affect enzyme activity. Explain briefly how enzymes work. Outline the role of enzymes in the digestion of carbohydrates in the human digestive system.
11. Explain what is meant by the absorption spectrum of a chloroplast extract. Distinguish between light phase and dark phase in photosynthesis. Outline what happens during the light phase. In an experiment a leaf is treated as follows:
Exposed to light for several hours; plunged into boiling water; transferred to alcohol in a dish and heated over a boiling water bath; transferred to water; then iodine solution is applied and the leaf examined. Briefly explain the purpose of each procedure carried out in this experiment.
12. 'Osmosis is a special case of diffusion.' Comment briefly on the validity of this statement. When mammalian red blood corpuscles (erythrocytes) are transferred from blood plasma to a less concentrated solution they swell and if they swell sufficiently they burst and are said to be haemolysed. In an experiment red blood corpuscles were placed in salt solutions of different concentrations and the following results were obtained.

percentage concentration of salt solution	0.33	0.36	0.38	0.39	0.42	0.44	0.48
percentage red corpuscles haemolysed	100	90	80	68	30	16	0

- (i) Plot the results on a graph, putting salt concentrations on the horizontal axis,
- (ii) Explain why the corpuscles burst when placed in a less concentrated solution.
- (iii) At what percentage salt concentration is the proportion of haemolysed to non-haemolysed corpuscles equal?
- (iv) Explain why the corpuscles burst over a range of salt concentrations rather than at one particular concentration.
- (v) What does the information obtained in this experiment suggest to you regarding the internal environment of the body?

13. (a) Draw a large labelled diagram of a named flower. Outline what happens during fertilization in a flower.
- (b) 'Life cycles of plants can generally be divided into diploid and haploid phases, but plants differ in the relative emphasis given to each phase.' Discuss this statement with reference to *Spirogyra* and the flowering plant.
14. (i) Explain each of the following with reference to a named ecosystem you have studied: community, food web, predation. Describe how you would carry out a quantitative study of either the animals or the plants in that ecosystem. Give an example of the effect of either chemical or local geographic factors on the distribution of one organism in the ecosystem.
- (ii) There are reports that a good export demand exists at present for Irish fox skins. There are also reports that the rat population is increasing in some rural areas. Comment briefly on these reports from an ecological point of view.
15. Answer two of the following.
- (a) Explain the biological basis of three of the following, in each case mentioning the value to man:
- (i) immunization against disease,
 - (ii) the use of legumes e.g. clover, in agriculture,
 - (iii) determination of blood group before giving blood transfusion,
 - (iv) propagation of plants by cuttings.
- (b) What is meant by metamorphosis? Distinguish between complete and incomplete metamorphosis. Outline an experiment to show the effect of iodine or thyroxine on amphibian metamorphosis.
- (c) Give a brief account of the life cycle of one of the following parasites (i) the Liver fluke (*Fasciola hepatica*) (ii) Potato blight (*Phytophthora infestans*). Mention two ways in which the parasite is adapted to its mode of life.
- (d) With regard to (i) agriculture, (ii) fisheries, give two examples in each case to show how failure to apply ecological principles poses a threat to the environment.

Where is the
What is mea
.....
Name two s
ectoderm (i)
mesoderm (i
Give two fu
(i)
(ii)
Answer the
(a) Name
.....
Name
A
B
C

(b) Name
.....
Name
D
E ...
F ...

(c) Wha
exper
.....
.....