

**AN ROINN OIDEACHAIS AGUS EOLAÍOCHTA**

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**LEAVING CERTIFICATE EXAMINATION, 2002**

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**AGRICULTURAL SCIENCE - HIGHER LEVEL**

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**WEDNESDAY, 12 JUNE - AFTERNOON 2.00 - 4.30**

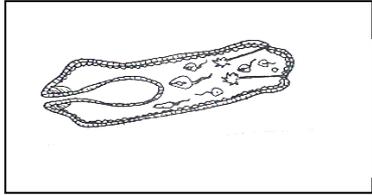
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**SIX QUESTIONS TO BE ANSWERED**

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## SIX QUESTIONS TO BE ANSWERED

1. Answer **any six** of the following:

- (a) Explain each of the following terms: (1) Soil biomass  
(2) Soil humus
- (b) (1) Name **one** member of the Phylum Arthropoda.  
(2) State **two** characteristics of this example from the Phylum Arthropoda.
- (c) Use of artificial fertilisers may result in "run off" from grassland.  
State **three** ways farmers could minimise this.
- (d) The picture shows a stage in the lifecycle of the liverfluke, *Fasciola hepatica*.  
(1) Name the larval stage shown in the diagram.  
(2) In what animal would this larval stage be found?
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- (e) Plants can be described as being annuals and biennials.  
(1) Explain the underlined terms.  
(2) Give **one** example for each of the explained terms.
- (f) Give **one** example of a sedimentary rock and state **one** location for this rock in Ireland.
- (g) Where in a pig's body would you find the ureter and what is the ureter's function?
- (h) Distinguish between photosynthesis and respiration in plants.
- (i) Explain why energy is expended in the uptake of mineral nutrients in ionic form by plant roots.
- (j) Name **one** crop plant from each of the following families:  
(1) Cruciferae  
(2) Leguminosae  
(3) Solanaceae.

(60 marks)

2. (a) Explain how soil temperature is influenced by any **three** characteristics of the soil.
- (b) Describe, with the aid of a labelled diagram, an experiment to investigate a named physical characteristic of a soil.
- (c) State **three** factors which influence the length of the grass-growing season in Ireland.

(48 marks)

**Option one**

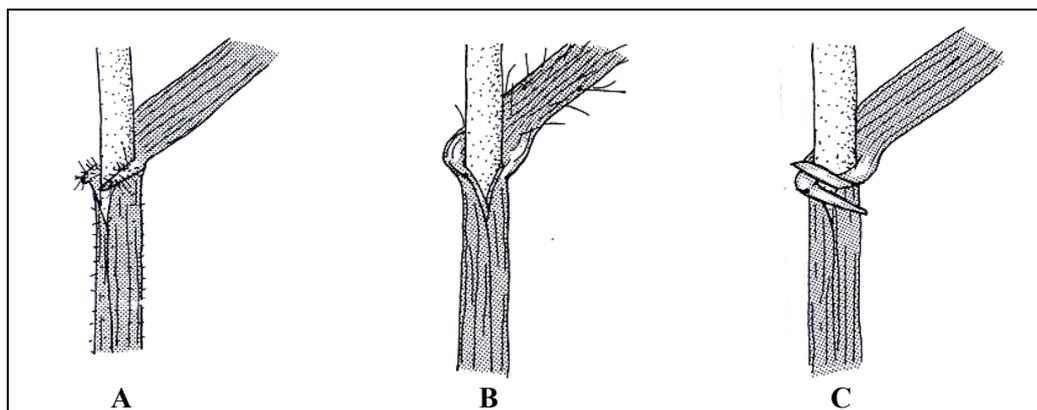
3. (a) Write brief notes to explain **each** of the following, using examples where appropriate.
- (1) Notifiable diseases in farm animals
  - (2) Food conversion ratio
  - (3) Vaccination of farm animals
- (b) With the aid of labelled diagrams compare and contrast strip grazing and paddock grazing on a dairy farm.
- (c) Explain why cattle and sheep grazing together have better growth rates than when grazed separately.

**(48 marks)**

**OR**

**Option two**

3. (a) The diagram shows the leaves and auricles of three cereals at the grass corn stage. Identify which of the diagrams represent wheat, oats and barley.



- (b) Name and describe **two** methods of cereal grain storage which will prevent damage to the cereal for a period of six months after harvesting.
- (c) Explain how you would estimate each of the following for a quantity of barley seed.
- (1) Percentage purity
  - (2) Percentage germination

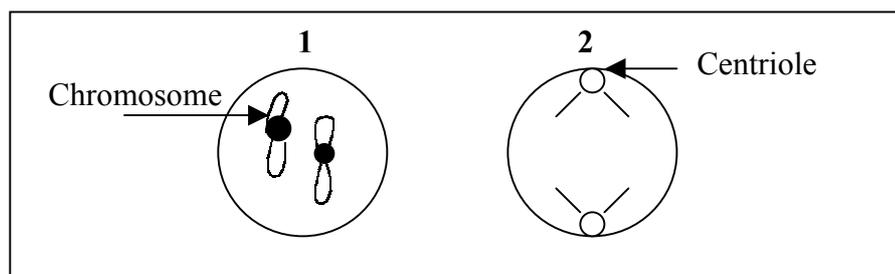
**(48 marks)**

4. Describe a **laboratory method** used to show **any two** of the following:

- (1) The estimation of sugars in grass for silage.
- (2) The presence of a named mineral nutrient in a soil sample.
- (3) Transport of water in plants (Transpiration).
- (4) The percentage of a named food constituent in a sample of a named root crop.

**(48 marks)**

5. (a) Discuss the rearing of replacement heifers on a dairy farm under the following headings: (1) Growth targets (2) Breeding policy
- (b) Explain, using relevant examples, why minerals and vitamins are an essential component of the diet of young pigs.
- (c) Describe the management facilities necessary to maximise the growth rate of beef weanlings when housed indoors during their first winter. **(48 marks)**
6. (a) Using named examples, describe the vegetation on fallow land, (1) after a period of one year and (2) after a period of a further two years.
- (b) A farmer wishes to achieve a very high productive grass sward on a recently sown ley. Give advice to the farmer under each of the following headings:  
 (1) Importance of tillering  
 (2) Weed control  
 (3) Soil fertility
- (c) A common cause of fish kills in rivers is the lack of oxygen. Describe how a named farming activity could lead to the situation mentioned above. **(48 marks)**
7. (a) When Gregor Mendel carried out experiments on pea plants he discovered that purple flower (**PP**) colour was dominant to white flower (**pp**) colour. He called white colour recessive. He also discovered that green pod (**GG**) colour was dominant to yellow pod (**gg**) colour.
- (1) Explain the underlined terms.
- (2) State the phenotypes of the following pea plants: PPGG, PpGg, ppGg.
- (3) Mendel crossed a pea plant homozygous for purple flower colour and green pod colour with a pea plant homozygous for white flower colour and yellow pod colour. Describe the above cross and state the genotype and phenotype of the offspring (**F1**) produced.
- (4) Mendel further crossed the offspring (**F1**) with a pea plant homozygous for white flower colour and yellow pod colour. Describe this cross and state the genotypes and phenotypes of the offspring (**F2**) produced.
- (b) Diagram 1 represents the chromosomes contained in an animal cell. Copy diagram 2 into your answer book and using the same chromosomes shown in diagram 1 complete the diagram to show clearly metaphase of mitosis.



**(48 marks)**

**8.** Answer **any two** of the following:

- (a) Explain why the normal diet of a pig differs from that of a sheep in quantity, quality and variety of food nutrients.
- (b) Outline a laboratory method to identify **two** differences in quality of samples of silage from **two** separate farms.
- (c) Explain the role of calcium in (1) the soil (2) a plant cell and (3) milk production.

**(48 marks)**

**9.** Give a scientific explanation for **four** of the following statements.

- (a) The necessity for a number of thinning operations in forest-tree production.
- (b) The practice of including calcined magnesite in the diet of lactating cows in early spring.
- (c) The development of peat over a gley soil.
- (d) The importance of aphid control in a region where certified seed potatoes are grown.
- (e) The importance of storing the fertiliser Calcium Ammonium Nitrate in sealed plastic bags.

**(48 marks)**