



Agricultural Science Past Exam Questions

Soil Science

Higher Level

2013 – Question 2

(a) The table below shows the results of soil tests carried out on samples from three different fields.

Field 1. A field sown with barley for the previous three years.

Field 2. A ploughed-in ley.

Field 3. A dairy paddock.

	Result A	Result B	Result C
Nitrogen test	high	low	medium
Phosphorus test	high	medium	medium
Potassium test	low	low	medium

- (i) Match **each** field with its appropriate result and justify your choice in each case.
- (ii) Which one of the three macronutrients above is not considered a serious pollutant of water?
- (b) (i) State any **two** of the standards with which ground limestone must comply before it can be sold.
- (ii) Mention **two** consequences of over-liming.
- (c) Describe an investigation to determine the pH of a soil.

(48 marks)

2012 – Question 1 – Part (g)

(g) Compare limestone and granite as parent materials in soil formation.

2012 – Question 2

(a) The National Ploughing Association of Ireland often holds its ploughing championships on brown earth soils.

- (i) Suggest **two** reasons why such soils are suited to tillage.
- (ii) Draw a large labelled diagram of a brown earth soil profile.
- (b) Explain how a named soil texture influences
- (i) pore spaces,
- (ii) water movement,
- (iii) fertility.

(c) Describe a laboratory experiment to show the effect of phosphate deficiency in a plant.

(48 marks)

2011 – Question 1 – Part (d)

(d) List **three** practices that would increase the population of earthworms in farmland.

2011 – Question 2

(a) (i) Name **one** type of soil pan.

(ii) Outline how the named soil pan is formed.

(iii) State **one** problem associated with the named soil pan.

(iv) Say how the named soil pan could be removed.

(b) (i) Describe gleisation and its role in the development of a soil profile.

(ii) Explain the factors to be considered when collecting soil samples for analysis.

(c) Describe an experiment to investigate the presence of nitrogen in a soil sample.

(48 marks)

2010 – Question 2

(a) List **four** factors that are responsible for the development of soil structure.

(b) Outline the formation of peat bogs in Ireland.

(c) Describe an experiment to estimate the percentage organic matter in a soil sample.

(48 marks)

2009 – Question 1 – Part (d)

(d) Give **three** reasons for low earthworm populations in certain soil conditions.

2009 – Question – Part (e)

(e) Name **three** minerals present in igneous rocks.

2009 – Question 2

- (a) (i) Outline in reasonable detail why care should be taken in removing soil samples from a field before testing the soil fertility levels.
- (ii) What is meant by the term lime requirement?
- (iii) List the elements found in ground limestone.
- (b) (i) Explain cation exchange.
- (ii) Explain the term cation exchange capacity (CEC).
- (iii) Mention a soil type where CEC is very low.
- (iv) Describe a method by which CEC may be increased in a soil.
- (c) Describe a laboratory experiment to test a soil for the presence of phosphates.

(48 marks)

2008 – Question 1 – Part (e)

- (e) Draw a labelled diagram to show the main features of a podzol soil.

2008 – Question 2

- (a) Explain how the weathering of rocks contributes to soil formation.
- (b) (i) Explain the following terms as used in the context of plant growth in soil;
1. field capacity, 2. permanent wilting point, 3. available water.
- (ii) The following table shows the water content of three soil samples.
1. What is the percentage of available water in sample A?
 2. Which sample would be the most suitable for a crop suffering a drought during the growing season?
 3. Which sample would be the most suitable for a crop growing during a wet spring?

Soil sample	% Water at Field Capacity	% Water at Wilting Point
A	6	2
B	24	12
C	30	22

- (c) Describe an experiment to compare the capillarity of two contrasting soils.

(48 marks)

2008 – Question 8 – Part (a)

(a) A farmer has recently purchased a farm and intends to grow tillage crops on it.

(i) Outline **four** soil characteristics which would determine the suitability of the soil for tillage.

(ii) With reference to **one** of the soil characteristics you have mentioned in (i), describe;

1. how it might be measured,

2. how it might influence the growth of a named tillage crop.

2007 – Question 1 – Part (e)

(e) Explain why colloidal humus particles are more beneficial than colloidal clay particles in a soil.

2007 – Question 1 – Part (i)

(i) List **three** characteristics of a loam soil that would make it suitable for tillage.

2007 – Question 2

(a) (i) State **two** differences in composition between soil air and atmospheric air.

(ii) Explain how any **one** of the differences you have mentioned occurs.

(b) Describe an experiment which compares the movement of water by capillarity within two contrasting soils.

(c) Explain how **each** of the following influences the temperature of a soil:

(i) aspect,

(ii) colour,

(iii) water content,

(iv) location.

(48 marks)

2006 – Question 1 – Part (a)

(a) Explain why most soils in Ireland are regarded as “young” soils in geological terms.

2006 – Question 1 – Part (b)

(b) State **three** reasons why texture is an important soil property.