



AN ROINN | DEPARTMENT OF  
OIDEACHAIS | EDUCATION  
AGUS EOLAÍOCHTA | AND SCIENCE

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*Scrúduithe Ardteistiméireachta, 2001*

*Eolaíocht Talmhaíochta*

*Ardleibhéal*

*Marking Scheme*

*Leaving Certificate Examination, 2001*

*Agricultural Science*

*Higher Level*



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# Marking Scheme

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Agricultural Science - Marking Scheme Higher level - 2001

Question □	Answer□	Marks□
1. (a)□	(i) Blanket- high rainfall humidity, mountainous area	5
	(ii) Basin- rainfall accumulates in depressions e.g lake basins, hollows, river valleys <b>Idea of difference in depth between the two = 10 marks</b>	5
(b)□	Animal pathogen - Ringworm etc. (can accept human Fungal pathogen)	5
	Plant pathogen - Potato blight / mildew / rust etc.□	5□
(c)□	Function xylem - water transport	4
	Function collenchyma - provide strength and support	3
	Function phloem - transport food / hormones / sap	3□
(d)□	Explain Tillering = growth of new shoots from axillary buds in grasses	5
	Conditions (any one) = grazing /harvesting / topping / high soil fertility	5
(e)□	Ground rock phosphate = acid nature □	10□
(f)□	Named ruminant = cow / sheep	2
	Stomach compartments = Rumen / reticulum / omasum / abomasum	4 x 2
(g)□	Name = earthworm / leech / Lumbricus etc.	2
	Characteristics (any two) = segmented / clitellum / chatae / coleomate / hydrostatic skeleton etc.	2 x 4
(h)□	Lime and liver fluke = effect to the soil structure e.g encourage flocculation and therefore drainage.	
	<b>Or</b>	10□
	Effect to the organism = pH kills the eggs / miracidium / secondary host.	
(i)□	Plant family	
	Potato = Solonaceae,	2 x 3
	Daisy = Compositae,	
	Crested dogtail = Gramineae,	2 x 2□
	Buttercup = Ranunculus / Ranunculaceae□	
(j)□	<b>Two</b> function of the lymphatic = Antibody production / WBC / lipid transport / circulation of materials / collects extra cellular fluid etc.	2 x 5

Question □	Answer□	Marks□
2 (a)	(i) Complete the columns = (sand) 5, / (loam) 11 / (clay) 9	3 x 2
	(ii) (1) support drought = Loam (2) early spring = Sandy	3+3
	Explain = Loam = most available water	2
	Explain = sand = less water, more air in soil / air heats faster then water / quicker to warm up in spring / a lot of growth in early spring	2
(b)	<i>Field capacity</i> = soil saturated / excess water present allowed to drain away / what remains in the pores when the gravitational water has drained away / amount of water held on and between soil particles (absorbed and capillary water)	8
	<i>Permanent wilting point</i> = when all capillary water is used / unable to extract soil water / loss of too much water / cannot recover / plant death	8
(c)	<i>Experiment</i>	
	Diagram	(0, 2, 4)
	2 graduated cylinders / funnel with filter paper / vol. of soil samples, clay and sand / vol. of water / pour water on soil samples / time taken to drain through or vol. drained in	any
	x time, result / sandy better drainage than clay, conclusion	3 x4
	<b>Points can be represented on the diagram</b>	

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3 (a)	<p style="text-align: center;"><i>Experiment</i></p> <p>Two thermos flasks / pea or wheat seeds (named seed) / thermometer / disinfect flask and seeds / boil half to kill and act as control / seeds into both flasks / plug with cotton wool / record initial temp. / record temp. daily for period of time / Result = increase in live seeds, no change with the dead seeds / Conclusion = temp. increase was due to the energy released by the germinating seeds, other seeds dead so no germination.</p>	<b>any 8x2</b>
(b)	<p style="text-align: center;"><i>Distinguish Between</i></p> <p><b><u>Aerobic</u></b> with oxygen / more energy made / no by products made bar carbon divide and water</p> <p><b><u>Anaerobic</u></b> without oxygen / less energy made / Lactic acid - animals or ethanol + CO<sub>2</sub> in plants</p>	<b>3+3  3+3</b>
(c)□	(ii) Cell organelle = mitochondria	<b>4</b>
	<p style="text-align: center;"><i>Grass Leaf</i></p> <p>Diagram</p> <p>Points</p> <p>Leaf is thin - light absorption</p> <p>Air spaces in spongy mesophyll - gaseous exchange</p> <p>Stomata / guard cell - gaseous exchange</p> <p>Chloroplasts / chlorophyll - pigment for absorbing light found near leaf surface</p> <p>xylem - transport of water</p> <p>Phloem - transport of food, hormones</p> <p>cuticle - for protection</p>	<b>(0, 2, 4)</b>          <b>any 3 x 4 (2 = named part, (which can be on the dig.) + 2 = explain)</b>

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<b>3</b>	<i>Notes on each of the following</i>	
(a)	<p>(i) Crop rotation - crop put into a different field yearly / rotation / to prevent, spread of disease / spread of pests / weed control / improve soil structure / maintain soil fertility</p> <p>(ii) Transpiration - loss of water from surface of the plant / leaf</p> <p>(iii) Translocation - movement of food / hormones / not water through phloem vessels</p> <p>(iv) Embryo transplantation - egg removed from donor / external fertilisation / implantation / transfer into recipient</p>	<p><b>2+2</b></p> <p><b>4</b></p> <p><b>2+2</b></p> <p><b>2+2</b></p>
(b)	<i>Grass conservation as winter feed</i>	
	<p><u>Silage</u> cut earlier / control bacteria / fungi/ micro-organisms by air removal / Acid production / acidification</p>	<b>2 x 4</b>
	<p><u>Hay</u> cut late / control micro-organisms by water removal / Drying</p>	<b>2 x 4</b>
(c)□	<i>Grain Digestibility</i>	
	<p><u>Cows</u> Roll barley / break husk / cow can now digest as it is a ruminant</p>	<b>2 x 4</b>
	<p><u>Pigs</u> grind / small particles / digestive enzyme breakdown / non-ruminant</p>	<b>2 x 4</b> □

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<p>4 (a)</p>	<p style="text-align: center;"><i>Cation exchange in a soil sample</i></p> <p>Aim: test soil sample for named element e.g. Calcium</p> <p>Method: soil sample / filter paper / funnel / slowly drop potassium chloride (1%) / test first drops of leachate for element e.g. Calcium / 10 drops of leachate + 1 drop ammonium oxalate / shake</p> <p>Results: A white ppt.</p> <p>Conclusion: soil is now potassium dominant / the calcium in the soil has been replaced by potassium</p>	<p>Any 5x4</p> <p>1x4 for result/ conclusion</p>
<p>(b)</p>	<p style="text-align: center;"><i>2 named elements for plant growth</i></p> <p>Aim: Test plant for the effect of named elements X and Y</p> <p>Method: 3 flasks / sterilise / 3 plant seedlings of equal size / nutrient tablets - one with all (control), two minus one element each / aeration tube / tinfoil cover / measure and take plant description at the start / run for weeks / measure at weekly intervals / top up nutrient medium during expt.</p> <p>Result: control grows well / others either stunted, yellowing leaves (chlorosis) etc.</p> <p>Conclusion: Relate elements X and Y to the deficiencies observed (e.g Nitrogen = stunted growth, due to a lack of protein, Magnesium = chlorosis, due to the inability to make chlorophyll)</p>	<p>Any 5x4</p> <p>1x4 for result/ conclusion</p>
<p>(c)</p>	<p style="text-align: center;"><i>Diversity of plant life in an old meadow</i></p> <p>Aim: To determine that certain plants are found within an old meadow.</p> <p>Methods: Use of quadrat (random or non random) / transect) / collection of plants / identification keys / list plants found / place in families</p> <p>Results: illustrate some results found (table or graph or words) from different areas within the meadow</p> <p>Conclusions: Does the meadow show diversity or not</p>	<p>Any 5x4</p> <p>1x4 for result/ conclusion</p>
<p>(d)</p>	<p style="text-align: center;"><i>Energy value of a foodstuff</i></p> <p>Aim: Name a food stuff (oil sugar etc.) / food contains energy</p> <p>Method: simple calorimeter / vol. food in crucible / 100cm<sup>3</sup> in beaker + note temp / heat food till burns / place burning food under water / leave there till food is completely burned / note final water temp /</p> <p>Results: The increase in temp of the water</p> <p>Conclusions: increase in water temp. can be related to the burning foodstuff (per unit weight)</p>	<p>Any 5x4</p> <p>1x4 for result/ conclusion</p>

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<p><b>5 (a)</b></p>	<p style="text-align: center;"><i>Feeding regime</i></p> <p>feed colostrum / ewe milk / creep feed of meals to develop rumen / grass / concentrates / vitamins / minerals / silage to get to slaughter weight of 40kg.</p>	<p style="text-align: center;"><b>Any (4 x 4)</b></p>
<p><b>(b)</b></p>	<p style="text-align: center;"><i>Disease Pressures</i></p> <p>Named Farm Species</p> <p>Indoors Vs. Outdoors Any relevant points under the following headings Environment / Temperature / Hygiene / Humidity / Stocking Rate / Diet / disease</p>	<p style="text-align: center;"><b>4</b></p> <p style="text-align: center;"><b>3 points 3x4</b></p>
<p><b>□(c)□</b></p>	<p style="text-align: center;"><i>Rearing of Spring Born Calf</i></p> <p>(i) Disease control - colostrum is a natural form of immunity / graze on fresh pastures / head of older cattle less chance of infestation</p> <p>(ii) Growth rate - born at 40kg / grass at 80kg / growth at a fast rate / reasonable size to be housed in Autumn or sold</p> <p>(iii) Feeding principles - mothers milk for colostrum / whole milk / milk replacer / hay or grass to help develop rumen / fresh grass or hay / creep feed</p>	<p style="text-align: center;"><b>5</b></p> <p style="text-align: center;"><b>5</b></p> <p style="text-align: center;"><b>3+3</b></p>

Question □	Answer□	Mark□
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6 (a)	<i>Calf to Beef System</i>	
	<u>First summer</u> - 80kg / leader follower system / disease protection e.g. fluke	2+2
	<u>First winter</u> - 200kg / housed in open sheds or slatted house / well ventilated / fed high quality silage, if hay feed meal also /disease control	2+2
	<u>Second summer</u> - 280kg going out / yearling / rotation on good quality grass, not the pick of the grass / dosed for lice, stomach worms, hoose.	2+2
	<u>Second winter</u> - 460kg at start / fed meals and good quality silage / factory weight of 500kg	2+2
(b)	<i>Mortality of Cow at Calving</i>	
	Isolate cow 1-2 days before calving / inspect regularly / experienced person at hand / Assistance / Vet if needed / Calf not to big for heifer - selective breeding / reduce feed for last 2 months / choice of Bull / cow in good condition	<b>Any 4x4</b>
(c) □	<b>Name</b> - Barley / wheat / potato /sugar beet	2
	<b>(mark for one named tillage crop only)</b>	
	<u>Barley/ wheat</u> (i) pH 6-6.5 / <u>structure</u> : grey brown podzolic / brown earth's (ii) plough & harrow (iii) 10 : 10: 20 / 300 hundred wt / per ac. Or metric equivalent / N,P,K, or relevant element named (iv) 5-7	2+2 1x4 4 2
	<u>Potato</u> (i) pH 5-6 / deep loam (ii) autumn plough/harrow / 12" rough seed bed / ridges & furrows (iii) half ton. per ac. K put on as sulphate of potash/ N makes pot watery / relevant element named (iv) 30	2+2 1x4 4 2
	<u>sugar beet</u> (i) pH 6.5-7.0 / deep loam (ii) autumn plough / harrow / rotavate / 6-9" fine seedbed (iii) NaCl - sea conditions / B - heart rot / S / N:P:K / relevant element named (iv) 40-50	2+2 1x4 4 2



Question □	Answer□	Mark□
<p><b>8 (a)</b></p>	<p style="text-align: center;"><i>Distinguish between the importance of clover</i></p> <p>(i) Clover fixes atmospheric N to nitrate for the plant to make protein / improves the N status in the soil</p> <p>(ii) Spreads out via stolons / fills up space / reduce weeds within pasture / good cover</p> <p>(iii) Clover is higher than grass in protein / high mineral</p> <p>(iv) the ability to change N from one form to another and reduce the effect of N getting into the ground water / reduces pollution / reduces the need for artificial nitrates</p>	<p style="text-align: center;"><b>6</b></p> <p style="text-align: center;"><b>6</b></p> <p style="text-align: center;"><b>6</b></p> <p style="text-align: center;"><b>6</b></p>
<p><b>(b)</b></p>	<p style="text-align: center;"><i>Carbon Cycle</i></p> <p>Photosynthesis by green plants / Respiration by plants / Respiration by microbes / Respiration by animals / Combustion of fossil fuels / Animal Protein / Plant Protein / Decomposition / Excretion of animal waste / CO<sub>2</sub> absorbed by plants / CO<sub>2</sub> released by animals / Animal eating plant material</p> <p>Arrows must be indicating the correct direction for marks</p>	<p style="text-align: center;"><b>Any 6 x4</b></p>
<p><b>(c)□</b></p>	<p style="text-align: center;"><i>Composition of cow's milk</i></p> <p>□Age of animal / Feed quality / stage of lactation / type of cow / breed / time of year (spring low solids) / Time of milking ( early milk low in fat to late milk) / feed intervals / Somatic Cell counts higher in older animals</p>	<p style="text-align: center;"><b>Any (4 x 6)□</b></p>

Question	Answer	Mark
9	<i>Scientific Explanation for four of the following</i>	
(a)	Babesiosis (Babesia bovis), / parasite spread by common tick / destroys RBC'S <b>red water fever = 6 marks only</b>	<b>2x6</b>
(b)	Gley formed by waterlogged conditions / rushes and sedges like wet conditions / help in the water absorption of the excess water / competition removed / better grassed die	<b>2x6</b>
(c)	Tips contain oxalic acid / toxin / harmful chemical / cause diarrhoea (scour) / allowed to wilt for toxin to degrade / oxalic acid removed calcium and can lead to milk fever <b>If just wilting stated = 6 marks</b>	<b>2x6</b>
(d)	High light intensity = high photosynthesis rate which will reduce CO <sub>2</sub> in the air / as light intensity decreases the levels of CO <sub>2</sub> will rise	<b>2x6</b>
(e) □	Milking empties the udder / this stimulates the milk secreting alveoli to start further secretion / higher yield results from frequent milking	<b>2x6</b>