



Coimisiún na Scrúduithe Stáit
State Examinations Commission

LEAVING CERTIFICATE 2008

MARKING SCHEME

AGRICULTURAL SCIENCE

HIGHER LEVEL



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**Leaving Certificate
Agricultural Science - Higher Level
Marking Scheme**

1. Any six answers			6(10)
(a)	(i)	liver	6 + 4
	(ii)	carbohydrate store/ energy store/or named carbohydrate (except starch)	
(b)	1.	shoot and/or leaf/bud	3
		snowdrop/ daffodil/ onion/ etc.	2
	2.	Stem/root	3
		Example to match	2
(c)		climate(cool/ windy)/ not suitable for aphids/aphids transmit virus(disease)	6 + 4
(d)		Cruciferae have floral parts mainly in fours (or in the form of a cross) and Compositae have “flower” composed of many florets	4
		Cruciferae – cauliflower/ sprouts/ broccoli/ etc.	3
		Compositae – daisy/ dandelion/ lettuce/ thistle/ etc.	3
(e)		O – organic horizon/ peat layer A – bleached horizon/ topsoil B – iron pan/ subsoil C – parent material/ bedrock	D: 2 4(2)
(f)	(i)	to prevent deficiency disorders(disease)/ example of deficiency disorder/ food may be deficient in a named mineral or vitamin	6 + 4
	(ii)	in mineral licks or feeding blocks/ in drinking water/ intravenous/ pellets/implants/ concentrates/ dosing/ bullets/ bolus	
(g)	(i)	click beetle = wireworm crane fly = leatherjacket	3 3
	(ii)	eats roots or lower stems eats roots or lower stems	2 2
(h)	(i)	1 – 1.5	2
	(ii)	5 – 6	2
	(iii)	19-23	2
	(iv)	112 – 116/ 3 months, 3 weeks, 3 days	2
	(v)	20 - 22	2
(i)		nitrate is form of nitrogen required by plants/ CAN is inorganic / urea is organic/ urea must first be mineralised or broken down or changed/ reference to nitrogen cycle/bacteria	6 + 4
(j)		hybrid vigour/ more persistent than Italian/ more herbage than Italian	6 + 4

2.	(a)		soil particles originate from rock (compulsory)	3
			sun or freezing water causes rock expansion or cracking/ wind carrying particles causes grinding/ rainwater causes chemical reactions etc. (any correct examples of weathering)	6 + 3 + 3
	(b)	(i)	1. amount of water in soil after water has drained away by gravity	3
			2. all capillary water used/plant unable to extract more/plant dies	3
			3. difference between 1 and 2/ water plant can get	3
	(ii)	1. 4%	3	
		2. B	3	
		3. A	3	
	(c)		Different samples/ in containers suitable for experiment/ equal(allowed once)/cotton wool/ placed in water/ left for a period/ rise in water level observed /result or conclusion	6 + 3(3)

Option One

3.	(a)	(i)	control of pests / disease/ helps maintain soil structure/ helps maintain organic matter/ weed control/ better farm management/nutrient balance	3(3)
		(ii)	suede or turnip/ fodder beet/ potatoes/ etc. (any rootcrop)	2(3)
		(iii)	matching use – fodder for cattle/ food for humans etc.	3
	(b)		yield/ length of straw/ strength of straw(lodging)/ earliness of ripening/ disease resistance/ suitability to locality/ malting quality	2(3) + 2(2)
	(c)	(i)	fungus/ rotation / lime soil/ use resistant variety/drainage/ fungicide	3 + 2
		(ii)	virus/ control of aphids/ certified seed potatoes	3 + 2
		(iii)	fungus/ seed treatment (certified seed)/ fungicide	3 + 2
		(iv)	bacterium/ grow crop in low pH soil/ early irrigation/resistant varieties/ crop rotation	3 + 2

Option Two

3.	(a)	(i)	improves yield/ improves quality of pasture	3
		(ii)	ability of grasses to produce side shoots from base of plant (or diagram)	3
		(iii)	cutting/ topping/ rolling/ grazing/ fertilising	2(3)
		(iv)	improvement of herbage/ weed control/ recycling of nutrients/tillering	2(3)
	(b)	(i)	calves graze ahead of older cattle	3
			best quality for calves/ parasite control/ better utilisation of grass	2(3)
		(ii)	palatable/ fixes N/ high protein/ saves cost of fertiliser/ Nitrates directive (pollution)/ increase production/ ground cover/ high mineral content/ REPS	2(3)
	(c)		cut grass on dry day/ cut grass on sunny day / degree of chopping/ wilt grass/ roll grass in pit/ keep airtight (anaerobic conditions)/ add molasses (or stimulant)/ exclude light/no soil contamination/ cut in the middle of the day(highest sugar content)	6 + 6 + 3

4.	(a)		Chop/ dry grass/ place in plastic bag/ roll up to remove air/ place in freezer/ remove when frozen/squeeze drop of cell sap / place in refractometer/ read off percentage sugar on scale/ repeat or average	6(4)
	(b)		named factor (e.g. named mineral/ water/ light/ temperature, tropismsetc.)	6(4)
			control	
			Any four other valid points	
	(c)		Sample of milk from beginning of milking/ sample of milk from end of milking/(sample of milk: <u>one point</u>) bring sample to approx 20 °C / add(concentrated) sulphuric acid/ to butyrometer/ add milk gently down side of butyrometer/ add(amyl) alcohol/ stopper/ invert/ transfer to centrifuge/ centrifuge/ remove samples/ place in water bath heated to 65 0C/ leave / read percentage fat from graduations/ result: 3-5% fat	6(4)
	(d)		sample of fresh liver/ cut into pieces/ grind with mortar and pestle/ and sand/ place hydrogen peroxide in tube/ constant pH/ constant temperature/ add washing-up liquid/ add liver/ note foam/ measure rate (stop watch, height of foam)/ control	6(4)

5.	(a)	(i)	Clean housing/ washing cows udders and teats/ checking for mastitis/ fly control/ using filters/washing bulk tank regularly/wash the milk line/ milk cooled before entering bulk tank/ to 4 °C/ operator hygiene	3(3)
		(ii)	replace old cows/ use a named dairy breed/ of genetic merit (eg quality bull)/ good feeding/ milking interval / health	2(3) +2
	(b)	(i)	fed ration / and silage/ early grazing/ strip or paddock grazing	3 + 2
		(ii)	graze/ on leafy grass/ strip or paddock grazing	3 + 2
		(iii)	housed/ fed silage/ good autumn grass	3 + 2
	(c)	(i)	number of calves weaned per 100 cows served	3
			cows well fed before mating/ care at calving/heat detection/cull old cows	3 + 2
		(ii)	time elapsing between successive calvings	3
			accurate heat detection/ target of 12 months/good condition at mating/ feeding after calving	3 + 2

6.	(a)		<u>dairy ration</u> – more protein/ cow in calf or producing milk; More Ca / prevent milk fever; more Mg / prevent grass tetany (any one difference + explanation)	6 + 6
	(b)		colostrum/ milk/ milk replacer / hay/ concentrates/ grass	6 + 3 + 3
	(c)		ensures proper feeding before lambing/ easier to observe or manage at lambing/ multiple lambs can be transferred to new mothers/ lambs can be managed to ensure suckling/ lower mortality/ better life for farmer/ avoid predation/prevent poaching/prevent chill/early grass next spring/disease control	4(3)
	(d)		low plane of nutrition (high stocking rate)	3
			low stocking rate/ rich pasture/ 2 to 4 weeks before mating/continue 3-4wks	3
			Advantages:- more eggs released/ more regular heat periods/ higher conception rates/ better embryo implantation	2(3)

7.	(a)		mutation – change in genetic code sex linkage – gene located on sex (X) chromosome diploid – chromosomes in pairs/ 2n/ normal number of chromosomes multiple alleles – more than two alleles of a gene (or diagram) back-crossing – cross between hybrid (or heterozygous) organism and original (or parent or homozygous recessive) organism (or diagram)	4(3)
	(b)		XX is female/ XY is male	2(3)
			male parent donates X or Y gamete, female parent donates X/ if male donates X then offspring XX (female)/ if male donates Y then offspring XY (male) (or shown by diagram)	2(3)
	(c)	(i)	allele for broad leaf dominant	3
		(ii)	incomplete or partial dominance / co-dominant / lack of dominance	3
		(iii)	Broad Red/ Broad Pink/ Broad White/ Narrow Red/ Narrow Pink/ Narrow White	6 (3)

8.	(a)	(i)	texture/ drainage/ pH/ organic matter (fertility)/ structure/profile (depth)/ aeration/ light (easy to work)/ dark colour	4(3)
		(ii)	1. how measured	3 + 3
			2. how growth is influenced (must match 1.)	3 + 3
			<u>Examples</u> : malting barley – soil profile/ grey-brown podzol best for growth potatoes – soil texture/ sandy loam best for growth sugar beet - pH/ 6.5 – 7.0 best (name of crop : 3m; influence : 3m)	
	(b)	(i)	A = epidermal (cell) B = palisade (cell) C = spongy (cell) D = guard cell	4(1)
		(ii)	Chloroplasts to absorb light/ palisade layer with chloroplasts near upper surface/ spongy mesophyll allows movement of gas or greater surface area for gas absorption/ stoma allows exit or entry of gases/ guard cell controls entry or exit of gases (or any other correct part and its role)	2(3)
		(iii)	water vapour/ oxygen/ carbon dioxide	2(3)
		(iv)	$6\text{CO}_2 + 6\text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$	4 (1) + 4
	(c)			4 (3 + 3)
		(i)	<u>monocots</u> - 1 cotyledon in the seed/ parallel leaf veins/ scattered vascular bundles in section of stem/ narrow leaf/ no cambium in vascular bundles?/ floral parts in threes or multiples/fibrous roots/ herbaceous/ xylem in a circle in root <u>dicots</u> - 2 cotyledons/ pinnate or palmate leaves/ vascular bundles arranged in a ring in section of stem/ broad leaves/ cambium in vascular bundles/ floral parts in fours or fives/taproot/ woody/ xylem in a cross in root	
		(ii)	<u>osmosis</u> is movement across semi-permeable membrane/ osmosis is movement of water only/ <u>diffusion</u> movement with a concentration gradient/ movement of molecules of any substance/doesn't require a membrane	
		(iii)	<u>aerobic</u> respiration requires oxygen/releases a large amount of energy/ breaks glucose down to water and CO ₂ ; <u>anaerobic</u> respiration does not require oxygen/ releases a small amount of energy/ the end products are lactic acid or ethanol.	
		(iv)	<u>mitosis</u> maintains same chromosome number/ produces cells identical to parent cell/ produces two cells/ takes place in somatic cells; <u>meiosis</u> results in reduction of chromosomes/ in reproductive cells/produces four cells/ produces variation.	

9	(a)	lime contains calcium salts/ increase pH/ improves flocculation/ better drainage/ increases bacterial activity/ increases availability of some nutrients/ increases earthworm population/ cation exchange	3 + 3 + 6
	(b)	may be caused by N or Mg deficiency/ waterlogging (or leaching) may account for N deficiency/ N or Mg needed for chlorophyll molecule/ chlorosis/ virus yellows (or other disease) / drought/ pests	3 + 3 + 6
	(c)	removing apical buds or meristem/ apical dominance replaced by lateral domina (thickening) / REPS/ amenity or appearance/ road safety/ more shelter	3 + 3 + 6
	(d)	tuber is a stem/ exposed to light/ causes chlorophyll production/ poisonous alkaloids in tuber/ solanin/ lack of earthing-up (or the idea)	3 + 3 + 6
	(e)	(organic material) decomposing/ anaerobic/ bacteria/ respiring/ one named gas (carbon dioxide, methane, ammonia, hydrogen sulphide)	3 + 3 + 6

