



Coimisiún na Scrúduithe Stáit
State Examinations Commission

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Scrúduithe Ardteistiméireachta, 2003

Eolaíocht Talmhaíochta

Gnáthleibhéal

Marking Scheme

Leaving Certificate Examination, 2003

Agricultural Science

Ordinary Level



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Section One

Question 1

- (a) Iron and aluminium **4 + 1 marks**
 (b) Topsoil **5 marks**
 (c) Hill/mountain/high rainfall/acidic area/bad land **5 marks**
 (d) Plough/deep cultivation/sub-soiling/mixing/liming/fertilising **5.marks**

Question 2

4 X 5 marks

Food Type	Test Chemical(s)	Results - Colour Change
<i>Starch</i>	<i>Iodine</i>	<i>Blue-black colour</i>
Glucose	Benedict's or Fehlings Solution	ORANGE/RED COLOUR
PROTEIN	COPPER SULPHATE & SODIUM HYDROXIDE (Biuret reagent)	Purple colour
Vitamin C	D.C.P.I.P. solution	COLOURLESS (or colour of sample)

Question 3

- (a) A = Rumen **2 marks**
 B = Reticulum **2 marks**
 C = Abomasum **2 marks**
 D = Omasum **2 marks**
- (b) Cattle / sheep/goat/ deer any one **4 marks**
- (c) (Digestion of) grass/hay/fibre/roughage/cellulose/bulky food/
any one **4 marks**
- (d) Enzyme(or named) / acid/ gastric juice/water/mucin
any one **4 marks**

Question 4

5 X 4 marks

- (a) A = Filament / stamen any one
 B = Stigma /carpel any one
- (b) Produces pollen / male gamete/male part/reproduction any one
- (c) Scent/ colour/ petal/nectar/ position of carpel/ position of stamen/non-feathery stigma any two

Question 5

4 X 5 marks

- (a) Disinfection / keep clean/prevent joint ill/prevent disease any one
- (b) Pass on antibodies/disease resistance/ nutrients/laxative any one
- (c) Tracing/ identification / keep records/legal requirement any one
- (d) Develop rumen/costs little/provide roughage/more suitable than silage any one

Question 6

5 X 4 marks

Virus
Fungus
Bacteria
Virus
Bacteria

Question 7

10 X 2 marks

- (a) True
- (b) False
- (c) True
- (d) False
- (e) True
- (f) True
- (g) True
- (h) False
- (i) True
- (j) False

Section Two

Question 8

- (a) (i) Blackface mountain / Wicklow Cheviot / Galway / Border Leicester / Texel / Suffolk / Oxford / Charolais/ Ile de France/ Bleu Domaine/ Rouge de l'Ouest/ Halfbreed / Greyface / Brownface / etc
any two **2 X 3 marks**
- (ii) Flushing - feeding up ewes prior to mating/ ewes lightly stocked on good pasture prior to mating any one **3 marks**
Steaming up - feeding up the ewe prior to lambing **3 marks**
- (iii) Flushing - more eggs released at ovulation / more regular heat periods / higher conception rates / better attachment of embryo to uterine wall
any one **3 marks**
Steaming up - development of the foetus / prevent illness (e.g. pregnancy toxemia)/keep ewe healthy/ ensure healthy lamb
any one **3 marks**
- (iv) 2 -3 weeks /14 - 21 days any one **3 marks**
- (b)(i) sponging/ placing progesterone impregnated sponges into the ewes' vaginas/ leaving them for 12-16 days/ sponges are removed together/all ewes come into oestrus 2 days later/ are mated together/ progesterone prolongs the life of the corpus luteum/blocks the oestrous cycle
any two **6 + 3 marks**
- (ii) all ewes mated together / less time wasted / ewes will lamb together / Easter lamb market / less labour/etc. any one **3 marks**
- (iii) 5 months (145 - 153 days) **3 marks**
- (c)(i) cutting teeth / to prevent injury to bonhams or sow / warm conditions/ day 2-3 iron injection to prevent anaemia / bonhams suckle sow / after 5-7 days creep ration introduced on floor / supply of water / weaned abruptly at 5-6 weeks any two **6 + 3 marks**
- (ii) water availability / hygiene / suitable temperature / insulation (or low roof)/ draught proofing/adequate space/floor drainage
any two **5 + 1 marks**
- (iii) ad-lib feeding / high quality ration/ fattener ration// ration contains high protein / contains lysine/water available / feeding restricted a few weeks prior to slaughter/ to prevent fat deposition on carcass
any two **6 + 3 marks**

Question 9

(a) (i)

	Root crop	Cereal crop
Crop Name 2 X 1 marks	Sugar beet / potato/etc.	Barley / wheat / oats /etc.
Soil type needed 2 X 2 marks	Deep/well drained loams/ sandy loams / brown earths/ grey brown podzolics	Deep/ sandy loam / brown earths/ grey brown podzolics
pH of soil 2 X 2 marks	Sugar beet = 6.5 to 7.0 Potato = 5 to 7	pH > 6 is essential / pH 6.5 ideal
Type of seed bed 2 X 2 marks	Sugar beet = deep/fine/ drills / ridges/stone free Potato = deep/fine/drills/ ridges/ stone free	fine (or implied) /harrow/ shallow
Time of sowing 2 X 2 marks	Sugar beet =spring (Jan-May) Potato = spring (Jan-May)	autumn –winter (Sept.- Dec)/ spring (Feb – May)
Time of harvest 2 X 2 marks	<u>must match time of sowing</u> Sugar beet = September to December/when ripe Potato = early June onwards /main crop late autumn/when ripe	late summer/ autumn/ winter/when fully ripe (or description of)

(ii) Root crop harvesting (need not correspond to named crop above)

Potato: haulms (stalks) killed before harvest/ with a contact herbicide / reason for killing haulms/ time allows skins on the tubers to harden / elevator digger used to harvest potatoes / picked by hand / handle with care

OR

Sugar beet: sugar beet harvester / lift beet / remove top / hopper or trailer/etc. any two **3 + 2 marks**

Cereal crop harvesting - combine harvester / cuts/ threshes /delivers to storage bin/etc. any two **3 + 2 marks**

(iii) Crop storage (must relate to named crop)

Root: leak-proof building / frost proof / ventilated / cover with straw / cool/pest free/ dark (potato only) any two **2 X 3 marks**

Cereal: store in dry location / ensure grain is dry / rodent or pest free / cool / ventilated any two **2 X 3 marks**

Rotation

weed control/ to improve soil structure / improve soil fertility/ disease control /to avoid wireworms / blight / eelworm / beet cyst nematode/etc

any one **6 marks**

(b) seed tray/medium/count seeds/ moisture/ suitable temperature/ count germinated seeds/ repeat count/repeat experiment (or control)/estimate percentage any four **3 X 3 + 1 marks**

Question 10 - Answer any two parts

- (a) (i) gravel (small stones), sand, silt, clay **4 X 1 marks**
(ii) water/ ice/ frost/ wind/ temperature any one **4 marks**
heating and cooling/water freezing/ causes cracks/ rocks broken
into smaller particles (must match named method)
any one **3 marks**
(iii) burrows/aeration/drainage/mixes layers/adds humus/ brings down.
plant material/increases organic content/etc.
any two **6 + 3 marks**
(iv) measure volume of soil sample (A) / place in graduated cylinder /
add fixed volume of water (B) / stopper and shake / leave to settle
/ read volume of mixed soil and water (C) / the expected volume
(volume of water (A) + volume of soil (B))/ minus actual volume
(C)/equals volume of air OR any valid experiment
any four **3 X 3 + 1 marks**
- (b) (i) under sowing / direct drilling / stitching in
any two **5 + 1 marks**
(ii) undersowing – seeds sown with cereal crop/mix of peas and
cereal/usually spring cereal/after crop is harvested (or arable
silage)/ establishment and use of grassland begins/fertiliser
OR
direct drilling – seeds drilled into unploughed ground/drilling
machine/cultivates narrow strip of soil/old sward should be grazed
bare or mown/killed with herbicide/fertiliser and slug pellets
drilled with seed OR
stitching in – machine/used on grassland/severe grazing/cutting
back on N use/cutting back on herbicide/cultivated slit/slug
pellets/slurry any two **6 + 3 marks**
(iii) cut at correct growth stage / cut when dry weather / use rotary
mower / cut in manageable amounts / tedding or turning or
shaking out/test frequently to ensure fast drying / rowing/ bale /
store any four **6 + 3(3) marks**
- (c) (i) Hereford/ Aberdeen Angus/ Charolais/ Limousin/ Simmental/
Belgian Blue/Friesian/Shorthorn any two **2 X 3 marks**
(ii) block-like in two dimensions / top line and underline parallel /
shoulder and hindquarters wide and well fleshed/ short and wide
head / neck short and thick /shoulder blades well apart / shoulder
well fleshed/ back level /back broad at all points/ chest and
abdomen deep from front legs to loin/ hindquarters and legs long /
wide / deep / evenly fleshed to hocks / good feet
any three **5 + 2 + 2 marks**
(iii) housed in open sheds bedded with straw or slatted house / well
ventilated / draft free / not over-crowded/ minimum of 1.4m² of
floor space per animal / 7m³ of air space per animal / good silage
quality/ made of young leafy grass/ high DMD value / supplement
with meals where silage is poor / dose for worms/ spray for lice or
ectoparasites / water/hygiene/etc. any three **2(6) + 3 marks**

- (d) (i) CAN/ straight fertiliser or example/ sulphate of ammonia/ super phosphate/ rock phosphate/ muriate of potash/ sulphate of potash/ compound fertiliser (or name of e.g. 10:10:20)/ farmyard manure/ animal slurry/ straw/ seaweed/ sewage sludge
any four **2(3) + 2 (1) marks**
- (ii) replacing mineral elements (nutrients)/ improving soil structure/ improving crop growth or yield/ *preventing deficiency disease (or example) any two **5 + 1 marks**
***separate points for animal and plant diseases**
- (iii) placed on land with planters or drills/ scattered (broadcast) onto surface/ by hand/ by machine/top dressing/spreading and ploughing in (manure)/muck spreader/slurry spreader
any three **4 + 2 (2) marks**
- (iv) avoid spreading on rainy day/ time of year/apply at proper rate/ apply during period of rapid grass growth / analyse soil to determine what correct fertiliser is (soil test)/ keep away from streams/ keep away from hedgerows
any three **4 + 2 (2) marks**

Question 11

- (a) (i) Heart **6 marks**
(ii) Thorax / chest/in rib cage/between lungs **6 marks**
(iii) A= Right atrium (auricle)
B= Septum/muscle
C= Left ventricle
D= Aorta **4 X 1 marks**
(iv) Pumps blood **5 marks**
- (b) (i) exoskeleton / jointed limbs / segmented body/ bilateral symmetry/moulting any two **2 X 3 marks**
(ii) (an organism/animal/ fungus) that lives on (outside) another organism (animal/plant) **6 marks**
(iii) any two valid examples **2 X 3 marks**
(v) liver fluke/tapeworm/lungworm/intestinal worm/tick/mite/ bacteria/protozoa/*Babesia*/fungi/etc. any one **3 marks**
- (c) **Diagram = (0, 3, 5 marks)**
Points can be on diagram or written
seeds / control (e.g.. dead seeds) / sterilise seeds/ to prevent micro-organism attack / thermos flask / seeds in thermos / cotton wool plug / thermometer in flasks / record temperature / leave for time / read temperature over time intervals/result
any five **4 X 3 + 1 marks**

Question 12

- (a) (i) milk production declines / milk quality declines/infertility problems / disease / age/ injuries to udders (or feet)/ bad temperament/ difficult to manage/ calving problems/ improved breeding
any four **6 + 3 + 2(1) marks**
- (ii) fed good grass/ old cows fed less/ fed sufficient nutrients to reach lactation peak / peak governs total milk yield / fed for maintenance and production / fed according to body condition/ heifers fed higher level to ensure milk production/ roadways maintained/etc.
any two **6 + 2 marks**
- (iii) 10 ml in a test tube / add 1 ml of Resazurin solution / stopper/ incubate at 37 °C (in warm water bath or incubator)/ for 10-30 min. / examine the colour / blue (or mauve) indicates best quality / pink (or white) indicates poor quality OR experiment using sterile agar plates
any four **4 X 2 marks**
- (iv) **Diagram** **0, 3, 5 marks**
Points can be on diagram or written
20-25 paddocks / electric fences/ water supply/permanent roadway/ set stocking density/ fresh strip of herbage daily /spread with N fertilizer once animals removed/ when last paddock is grazed stock is returned/ first paddock has reached the correct growth stage/ rotational grazing
any three **6 + 2 (3) marks**
- (b) Explain **any four** **4 X 4 marks**
- (i) Prevent mineral (nutrient) deficiency / ensure balanced nutrition/
any one
- (ii) Screening areas / shelter belt / amenity / landscape / biodiversity / borders to land / nesting / etc
any one
- (iii) Nitrogen fixation/ improves nitrogen level of soil/ improved fertility of soil/ contains symbiotic bacteria (*Rhizobium*) in nodules/ improves feed value
any one
- (iv) Babesiosis (*Babesia bovis*) / red blood cells destroyed / red water fever
any one
- (v) Hygiene test
- (vi) Keeps semen alive/ extends life/ for use at another time any one

Question 13

- (a) (i) Diagram **0, 3, 5 marks**
 Three labels **3 X 3 marks**
- (ii) Nucleus **3 marks**
- (iii) (1) 46 or 23 pairs or diploid (2) 23 or haploid or half **2 X 3 marks**
- (iv) Meiosis/ reduction division **3 marks**
- (b) (i) Homozygous = identical alleles (or genes)/ example **2 marks**
 Heterozygous = different alleles (or genes)/ example **2 marks**
- (ii) Gametes **Y X y**
 F1 genotype **Yy**
 F1 phenotype **yellow** **4 X 3 marks**
- (iii) Parents **Yy X yy**
 Gametes **Y y X y**
 F2 genotype **Yy yy**
 F2 phenotype **yellow green** **9 X 2 marks**