



AN ROINN OIDEACHAIS
AGUS EOLAÍOCHTA | DEPARTMENT OF
EDUCATION
AND SCIENCE

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Scrúduithe Ardteistiméireachta, 2001

Bitheolaíocht

Gnáthleibhéal

Marking Scheme

Leaving Certificate Examination, 2001

Biology

Ordinary Level

LEAVING CERTIFICATE BIOLOGY 2001

ORDINARY LEVEL

MARKING SCHEME

PART 1 (ANY / BEST SIX QUESTIONS / 20 MARKS EACH)

1. Any four 4(5)
- a. chloroplast
 - b. digestion / grinding of food / physical digestion any one
 - c. adrenaline / cortisone/ corticosteroid/epinephrine any one
 - d. gravity
 - e. limewater/ calcium hydroxide any one
2. True or False 10(2)
- a. F
 - b. T
 - c. F
 - d. T
 - e. T
 - f. T
 - g. T
 - h. F
 - i. F
 - j. T
3. 7 points 6(3) +2
- (a) a leaf that is partially green (or words to that effect)
 - (b) to kill it / to stop breakdown of starch / to soften leaf any one
 - (c) to dissolve (remove / absorb) the chlorophyll (colour)
 - (d) to remove all alcohol (or residue) /to soften the leaf any one
 - (e) to test for starch
 - (f) i. green part (or patches) will turn black
 - ii. non-green part will turn brown (will not go black).
4. 5 points 5(4)
- (a) trypsin
 - (b) 46
 - (c) rickets
 - (d) synovial fluid
 - (e) lactation
5. 7 points 6(3) +2
- A. (root) hair
 - B. endodermis / pericycle any one
 - C. xylem
 - D. phloem
 - E. epidermis
- Function of A absorption (of water/minerals) OR anchorage of plant
Function of D transport (of food or hormones)) OR translocation

6. 7 points 6(3) +2

- A. prostate gland
- B. vas deferens OR sperm duct
- C. penis
- D. testis

(Where sperm formed)testis OR semeniferous tubules OR D if correctly named above

(Function of seminal vesicle).....forms nutrient liquid OR semen OR stores sperm

(Function of testosterone).....determines secondary sex characteristics/maleness OR example/ formation of sperm any one

7. 7 points 6(3) +2

- A cornea OR conjunctiva
- B vitreous humour
- C retina
- D yellow spot OR fovea

(Cell type in C) rod OR cone

(Function of iris) controls light entering eye

(Lens to correct short-sightedness) concave OR bi-concave OR diverging

PART II (ANY FOUR QUESTIONS / 70 MARKS EACH)

Q.8	(a).	(i)	A = stomach		
			B = pancreas		
			C = rectum		
			D = colon OR large intestine		
			E = duodenum OR small intestine		
			F = liver		3 (3) + 3(2)
			(function of D) = water absorption OR faeces formation OR Vitamin. (B) production (by bacteria)		3
		(ii)	diagram of tooth		0, 4, 7
			[NB must show enamel, dentine, pulp cavity, root for 7 marks} labels (any three)		3(3) (34)
	(b).	(i)	Benedict's/ OR Fehling's	<u>any one</u>	6
		(ii)	turns green OR orange OR brick red	<u>any one</u>	6
		(iii)	(distilled) water/ reagent (solution)/no glucose	<u>any one</u>	6 (18)
	(c).		three parts of diet		
			lipids (fats, oils) / protein / water / fibre	<u>any three</u>	3(3)
			one function of each of any three parts		3(3)
			lipids - energy/insulation	<u>any one</u>	
			protein - growth/repair / energy 'in extreme'	<u>any one</u>	
			water - solvent / reaction medium etc.	<u>any one</u>	
			fibre - faeces formation / prevents colon cancer aids peristalsis/ prevents constipation/prevents dehydration	<u>any one</u>	(18)
					<hr/> (70)

- Q.9.** (a) producer organisms / which make food (photosynthesis) 2(3)
- predator animal that kills (pursue) other animal(preyl)/ for food 2(3)
- competition sharing (fighting for or striving for)/ same food {or light or mate or shelter} 2(3)
- (18)**
- (b) a habitat studied
- (i) name 2
- (ii) map 0, 4, 7
no label = 0 marks, 1 label = 4 marks, 1 label and North arrow = 7 marks
- (iii) four plants (allow “grass” but not “tree”) 4(1)
- (iv) four animals (not “bird”, not “insect”) 4(1)
- (v) food chain (for named organisms) 3 (1)
(for correct linkages) 2(1)
- (vi) (use of quadrat)
throw / random / several times / count / calculate any four 4(3) **(34)**
- (c). percentage of air in soil 6(3)
- i. add soil to beaker x ml
- ii. add similar volume of water. x ml
- iii. note new volume y
- iv. note difference (apparent loss in volume) $2x - y = z$
- v. divide this latter volume by volume of soil
- vi. multiply by 100% [i.e. $\frac{z}{x} \times 100\% = (\% \text{ vol. of air})$]

OR

Note volume of soil sample (A) / crumble soil/add to fixed volume of water(B) / note volume of water plus soil (C) / note difference (A + B) – C/ estimate percentage

$$\frac{(A + B) - C}{A} \times 100$$

OR

volume of soil / equal volume of water / mix / note difference / calculate / result

(18)

[NB estimation of percentage is worth 2 points i.e.2 X 3]

(70)

Q.10. (a) Explain the terms 3(6)

- | | | |
|------------------------|--|--------------------|
| 1. <u>locus</u> | the position of a gene (on a chromosome) | |
| 2. <u>heterozygous</u> | having two different alleles or example e.g. Tt | |
| 3. <u>diploid</u> | “double set” of chromosomes OR chromosomes in pairs
OR 2n | <u>(18)</u> |

(b) The genetic cross 16(2)

Cross 1.

- | | | | |
|------|-----------------------------------|--------------------|--------------------|
| i. | genotypes of the original parents | <u>(FF)</u> | <u>(ff)</u> |
| ii. | gametes produced by each parent | (F) | (f) |
| iii. | genotype of the offspring (F1) | (Ff) | |
| iv. | phenotype of the offspring(F1) | <u>Full</u> | |

Cross 2.

- | | | | |
|-----|------------------------------------|------|----------------|
| i. | genotypes of the parents. | (Ff) | (Ff) |
| ii | gametes produced by these parents: | (F) | (f) x (F) (f) |
| iii | genotypes of the offspring (F2) | (FF) | (Ff) (Ff) (ff) |

- | | | | |
|-----|--------------------------------------|-------------|--------------------|
| iv. | The phenotypes of the offspring (F2) | <u>Full</u> | <u>Small</u> |
| | | | <u>(32)</u> |

(c) diagrams of mitosis

- | | | |
|------|---|--------------------|
| (i) | <u>prophase</u> diagram
[nucleus, chromatids or chromosomes for 6 marks]
two labels (allow title as one label) | 0,3,6

2 (2) |
| (ii) | <u>anaphase</u> diagram
[spindle or centriole, chromatids separate for 6 marks]
two labels (allow title as one label) | 0,3,6

2 (2) |

(20)

(70)

Q.11.	(a)	(i)	<u>diagram of <i>Rhizopus</i></u> NB sporangiophore, stolon and rhizoids for 7 marks <u>labels</u> - sporangiophore / sporangium / rhizoids / spores / hyphae / stolon / mycelium / columella <u>any four</u>	0, 4, 7 4(3)
		(ii)	<u>how <i>Rhizopus</i> gets its food</u> hyphae (rhizoids) grow into substrate / secrete enzymes / digest / absorb nutrients NB "saprophyte" on its own 3 marks <u>any three</u>	3(3)
		(iii)	<u>asexual reproduction in <i>Rhizopus</i></u> sporangium / bursts / in dry (suitable) conditions / spores released / germination (growth) <u>any four</u>	4(3) (40)
	(b)	(i)	<u>three beneficial effects of fungi</u> food / antibiotic / brewing / baking / cheese / decomposition / drugs <u>any three</u>	3(3)
		(ii)	<u>three harmful effects of fungi</u> dry rot / crop disease / human disease / poisonous / food spoilage <u>any three</u>	3(3) (18)
	(c)		<u>natural immunity</u> from birth (without exposure to disease/pathogens) e.g. skin / respiratory system / digestive system / cilia / blood clotting / white cells (phagocytes) <u>any one</u>	3 3
			<u>acquired immunity</u> results from antibodies being produced (from exposure to disease / antigens) e.g. suffering from an infection / vaccine / immunisation antibody injection / drugs / antibiotics <u>any one</u>	3 3
				(12)
				<hr/> (70)

- Q.12. (a) (i) Name the parts 4(3)
- A = pyrenoid
 B = chloroplast
 C = vacuole
 D = cell wall **OR** mucilage
- (ii) Function of D
 shape / structure / support / flexibility/protection any one
OR
 prevents dessication/ protection any one 3
- (iii) Two differences between a *Spirogyra* cell and *Amoeba*
Spirogyra - chloroplast / cell wall / cylindrical/pyrenoid
 NB not limited to structural differences any two 2(3)
- (iv) Group to which *Spirogyra* belongs
 Algae **OR** Thallophyta 3
- (b) (i) Insect phylum Arthropoda 3
- (ii) Name the parts labelled on the diagram 6(3)
- O = antenna (feeler)
 P = (compound) eye
 Q = thorax
 R = spiracle
 S = abdomen
 T = mouthpart (palp/mouth/proboscis)
- (iii) State one function of
 O = sensory / smell / touch / feel any one 3
 R = gas exchange / breathing / respiration / obtains oxygen any one 3
- (iv) Explain underlined terms
 ecdysis = shedding of skeleton 3
 metamorphosis = change in body structure 3
- (v) Name an insect with complete metamorphosis
 example (butterfly, etc...) 3
- (vi) Name and disease of one insect vector
 name of insect (mosquito / tsetse fly / housefly, etc.) 3
 disease (malaria / sleeping sickness / food poisoning, etc.) 3
- (vii) Economic benefit of one insect
 pollination / honey / silk / biological pest control / waste disposal / bait etc..
any one 4

(46)

(70)

- Q.13 (a)** Letter on diagram corresponding to each of the following: 2 (6) + 3 (1)
- | | | | |
|--------|--------------------------|---|--|
| Labels | (i) aorta | E | |
| | (ii) hepatic portal vein | F | |
| | (iii) pulmonary vein | D | |
| | (iv) renal artery | G | |
| | (v) vena cava | J | |
- Changes in blood as it passes through
- | | | | |
|------|--------------------|--|------------------------------|
| (i) | <u>the lungs</u> | increase in O ₂ / decrease in CO ₂ / decrease in H ₂ O
<u>any one</u> | 3 |
| (ii) | <u>the kidneys</u> | water or salt or urea or uric acid or urine removed /
water retained / water balanced/ salt balanced /
waste removed / food removed (returned)
filtered/cleaned | <u>any one</u> 3 (21) |
- (b) (i) diagram of artery 0, 4, 7
(middle layer must be relatively thicker than in diagram of vein)
labels (allow title as one label)
collagen layer(fibres) / elastic fibres /
muscle / endothelium / lumen any three 3(2)
- (ii) diagram of vein 0, 4, 7
(middle layer must be relatively thinner than diagram of artery)
labels as above, and allow valve any three 3(1)
veins have valves - reason
pressure lower / flow against gravity /
need to prevent back-flow any one 5 **(28)**
- (c) Experiment to show effect of exercise on heart rate.
stop clock or watch (or reference to time)
measure pulse at rest
repeat
note rate per minute
exercise
measure pulse after exercise
repeat
note rate per minute
compare results (mandatory point) any seven 7(3)
(21)
-
- (70)**

- Q.14 (a) Photosynthesis equation 6(1)**
- Carbon dioxide + water + light + chlorophyll = glucose + oxygen
 ($\text{CO}_2 + \text{H}_2\text{O} + \text{light} + \text{chlorophyll} = \text{C}_6\text{H}_{12}\text{O}_6 + \text{O}_2$)
- (i) Purpose of water bath
 to control the temp. 3
- (ii) Purpose of thermometer
 to note any temp. changes 3
- (iii) How to determine rate of photosynthesis
 count the number of bubbles/ per minute 2(3)
- (iv) Two other factors affecting rate of photosynthesis
 carbon dioxide / light 2(3)
- (24)**
- (b) Large diagram of T.S. of leaf
- diagram 0, 4, 7
 palisade layer must be distinguishable for 7 marks
 labels 5(3)
 (cuticle, epidermis, palisade cells, spongy mesophyll,)
- (22)**
- (c) Show there are several pigments in chlorophyll
- chromatography paper
 chlorophyll (extract)
 solvent
 spot
 spot above solvent
 leave
 observe separation
 note pigments (they may be named) any six 6(3)
- Name two of the pigments
- carotene
 phaeophytin
 xanthophyll
 chlorophyll a
 chlorophyll b
 fucoxanthin any two 2(3)
- (24)**
-
- (70)**

Q.15. Answer any two

- (a) (i) What is osmosis? 3(3)
movement of water / across (selectively) semi-permeable membrane / from a hypotonic solution (dilute) to a hypertonic solution (concentrated)
OR
movement of water / across semi-permeable membrane / from a high water conc. to a low water conc.
OR
movement of water / across semi-permeable membrane / down a concentration gradient (from a solution of high osmotic potential)
- (ii) How would you use thistle funnel, Visking tubing, a beaker, distilled water and glucose to demonstrate osmosis. [NB may be demonstrated by diagram]
make glucose solution
attach Visking tubing securely to mouth of funnel
fill funnel with solution
place in beaker of distilled water
observe result any four 4(3)
- (iii) Five ways water is important to living things:
solvent / forms blood / forms lymph / temperature regulation / medium for reactions / forms cell cytoplasm / reagent in photosynthesis / transport medium / medium for aquatic organisms / product of respiration / transpiration / cohesion / adhesion / capillarity
any five 4 (3)+ 2
(35)
- (b) (i) diagram of flower [must have petal, carpel, stamen for 7 marks] 0, 4, 7
labels (may include name of flower) 3(3) + 3(1)
- (ii) Two reasons why dispersal is important.
reduce competition / colonise new areas/ etc.. 2(3)
two methods plus examples of dispersal.
(any two methods plus related examples)
self – pea/bean/lupin/furze/shepherd’s purse, etc.
water – water lily/alder/etc.
animal – blackberries/strawberries/burdock/goosegrass/etc..
wind – sycamore/ash/dandelion/poppy/orchid/etc...
any two methods 2(3)
two related examples 2(2)
(35)
- (c) (i) Three factors other than temp which affects reaction rates.
pH / enzyme concentration / substrate concentration/ inhibitor any three 3(5)
- (ii) Experiment to show effect of one factor on enzyme rate
name of factor / different conditions / name of enzyme / measurement of rate /
at least two fixed factors / name of substrate / name of product / how product is recognised / control [allow temperature experiment] 5(4)
(35)
- (d) (i) diagram of wormery (must show layers) 0, 3, 5
labels (any five) 5 (2)
- (ii) 5 ways in which earthworms are beneficial to soil
aeration / drainage / breakdown of plants /mixing of layers / addition of nitrogen compounds (by excretion)/ addition of minerals / increase organic matter (death and decay) / improved texture/ control of pH any five 5 (4)
(35)

