Coimisiún na Scrúduithe Stáit
State Examinations Commission

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Bitheolaíocht *Gnáthleibhéal*

Marking Scheme *Leaving Certificate Examination, 2004*

Biology *Ordinary level*

LEAVING CERTIFICATE EXAMINATION 2004

BIOLOGY – ORDINARY LEVEL

MARKING SCHEME

SECTION A

Answer any **five** questions

1. any four **2(8)+2(2)**

(a) liver
(b) muscle
(c) light or source
(d) endocrine or ductless glands or name of gland
(e) stomata or dermal tissue or named tissue

2. **2(7) + 3(2)**

Column A	Column B
a. Contains chlorophyll	chloroplast
b. Site of protein formation	ribosome
c. Site of energy release	mitochondrion
d. Site of storage of water, salts and sugars	vacuole
e. Allows osmosis to occur	cell membrane

3. **2(5) + 5(2)**

a. Mitosis……. T
b. A sperm……..… T.
c. Chromosomes …… F
d. Organisms ……. T
e. Aerobic respiration…….F
f. RNA …… F
g. Immobilised enzymes…… T

4. **5 + 5(3)**

(i) articulating joint (allow hinge joint) or explained example
(do not allow location i.e. knee)
(ii) location of any articulating joint (if type of articulating joint specified in first answer then location must match)
(iii) A = cartilage
B = ligament or capsule
C = synovial or fluid
(iv) fixed joint or non-articulating joint
or any named joint not mentioned above

5. **2(5) + 5(2)**

a. glycerol
b. oil
c. **two** functions – insulation / energy/storage / cell membrane/ myelin sheath/ medium for vitamins/ protection/ structural **any two**
d. vitamin A / vitamin D/ vitamin E/ vitamin K **any one**

e. source
[vitamin A – milk/ butter/ egg / fish oil/ carrot/ etc.
vitamin D – sunlight (on skin)/ fish oil/ butter/ margarine/
vitamin E – egg/ green vegetables/ wheat germ/
vitamin K – fish oil/ spinach/ bacteria in gut]

Or any other correct sources

f. deficiency
[vitamin A – night blindness/ hardening and thickening of skin/ kidney stones
vitamin D – rickets
vitamin E – infertility (in rats)
vitamin K – lack of prothrombin/ bleeding/ slow clotting]

Or any other correct sources

NOTE: Incorrect vitamin = 0
Correct source of incorrect vitamin = OK

6. **6, 3, 0 + 7(2)**

a. Ash tree ► caterpillars ► robins ► owls or Ash tree ► earthworms ► robins ► owls

(Any one error, then only allow 3 marks – two or more errors = 0)

b. ash tree
c. ladybirds/ robins/ owls **any two**
d. greenflies/ mice/ caterpillars/ earthworms **any two**
e. robin
f. ladybird/ owl **any one**

SECTION B

Answer any **two** questions

7. (a) A = eye piece B = objective or lens or high power
(allow lens for A or B but not for both)
X 400 **3(2)**

(b) (i) name of plant **3**
(ii) description – peel off thin film of plant tissue with forceps / cut thin section of plant tissue with blade (or microtome) or any other correct method i.e. How = 3 plus instrument = 3 **2(3)**

(iii) name of stain **3**
(iv) application of stain – use dropper to place stain on tissue on slide <u>or</u> place tissue in stain or any other correct method. **3**

(v) put on cover slip <u>or</u> remove excess stain **<u>any one</u>** **3**
(vi) cell wall/ chloroplasts or chlorophyll/ (large) vacuoles/ (starch) granules/ leucoplasts/ chromoplasts / shape **<u>any two</u>** **2(3)**

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8. (a) name of ecosystem **3**
three animals **3(1)**

(b) name of animal (mark already awarded above) **0**
two features including generic name of feature e.g. No. of legs
(allow marks for 'other' animal i.e. not from the 3 named earlier but from same ecosystem, features **2(3)**
name of organism **3**

<u>quantitative estimate</u> – any appropriate description
Name of method
Description } **6 + 3**

Graph (decrease / increase) **2(3)**

(a) i. State which one (No mark – repeat of quest **0**
ii. Average rate at rest (Pulse 65 to 79 bpm or Breathing 11 to 21 bpm) **3**
iii. raises rate **3**

(b) <u>i. measure of resting rate</u>:
use pulse monitor / read result in bpm <u>or</u>
use of finger or wrist (radial pulse) / use timer or calculate in bpm
observe / count / repeat / average / record **2(3)**
<u>ii. investigation:</u>
(measure) resting rate/ description of exercise/ measure rate during (or immediately after) exercise/ repeat / compare or state result / record
<u>any three</u> **6 + 2(3)**

<u>iii. graph</u> (Showing increase – starting at origin is OK) **6**

SECTION C

Answer any **four** questions

10. (a) solvent/ transport/ structural or other correct function including thirst quenching
any three **3(3)**

(b) (i) carbon/ hydrogen/ oxygen (or symbols) **3(1)**
(Only take first 3 of a list)

(ii) cellulose or other correct answer **any one** **3**
cell wall or other correct answer **any one** **3**
(location must correspond with carbohydrate)

(iii) energy store or other correct answer **any one** **3**

(iv) Benedict's/ Fehling's **any one** **3**

(v) dissolve sample in water or put in test tube / add reagent/ heat / don't boil / observe change or state result (brick-red-orange precipitate)
any three **3(3)**

[If reagent is named in (v) but not in (iv) then allow 3 marks in both cases]

(c) (i) nitrogen (sulphur / phosphorus) **any one** **3**

(ii) fish/ meat/ egg / milk /other correct dairy products/ pulses
any two **2(3)**

(iii) amino acids / peptides **any one** **3**

(iv) structural (growth, repair, muscle, hair, nails) or
metabolic (enzymes) or immunity (antibodies) **any one** **3**

(v) biuret test or named chemicals or other correct test **3**

(vi) add biuret reagent (or sodium hydroxide and copper sulfate)/ to sample/ heat or shake

(vii) / observe or record colour change (purple-violet)
any three **3(3)**

[If reagent is named in (v) but not in (iv) then allow 3 marks in both cases]

11. (a) definition – features developing at puberty or features for sexual attraction. **3**

example **6**

(b) (i) A = urethra B = scrotum C = epididymis
D = testis E = vas deferens (sperm duct) **5(3)**

(ii) testis (or D or Seminiferous tubule)) **3**

(iii) (seminal) fluid or nutrition (of sperm) **3**

(iv) is motile or has a tail or correct comment on shape or size or very little cytoplasm or may contain 'Y' chromosome or has more mitochondria. **any one** **3**

(c) (i) inability to produce (or release) gametes (or eggs or sperm) or inability to fertilise gamete (or egg) or inability to conceive (or induce conception) or inability to reproduce **any one** **6**
low sperm count or low sperm motility or hormonal or other correct cause **any one** **3**

(ii) name of method **any three** **3(3)**
method of prevention **any three** **3(3)**
[mechanical or example– prevents contact between sperm and egg
surgical or example– prevents contact between sperm and egg
chemical or example– prevents ovulation or hormone levels changed
natural - (safe period) – intercourse takes place avoiding ovulation]

12. (a) dominance – one allele masking the expression of its partner **3**
genotype – all the genes of an individual or genetic makeup or genome or example e.g. Tt **3**
phenotype – the expression of a genotype (the appearance or the characteristic(s) of an organism) **3**

(b)

genotypes of parents	**Pp**	**pp**
gametes	**P p**	**p**
genotypes of calves	**Pp**	**pp**
phenotypes of calves	**polled**	**horned**

(**NOTE:** This may be done in the Question Book) **9(3)**

(c) (i) (to look at) an organism's pattern of DNA fragments
or genetic fingerprinting or (preparing) a pattern of DNA fragments **6**

(ii) cells are broken down / how cells are broken down / DNA is released/ DNA is cut into fragments / by (restriction) enzymes / the fragments are separated / on the basis of their size **any four** **4(3)**

(iii) forensic/ paternity/ medical or examples **any two** **2(3)**

13. (a) metabolism – (chemical) reactions taking place in a cell or in an organism **3**
enzymes are catalysts/ reactions in cells controlled by enzymes or enzymes affect (initiate, speed up) chemical reactions **2(3)**

(b)
(i) carbon dioxide or CO_2 **3**
(ii) oxygen or O_2 3
(iii) stated source or light **3**
(iv) respiration or breathing/ combustion **2(3)**
(v) used in respiration or inhaled/ released (into environment) **2(3)**
(vi) near upper surface or other correct answer **3**
(vii) autotrophic (photosynthesis) **3**

(c) (i) X = water Y = pondweed or aquatic plant – do not allow 'plant' on its own. **2(3)**
(ii) number of bubbles or volume /in a fixed time **2(3)**
(iii) carbon dioxide or light or other factor **any one** **3**
(iv) addition of sodium hydrogen carbonate or changing distance of light source (must correspond to (iii)) **any one** **6**
(v) light or carbon dioxide or temperature (not mentioned in (iii)) **3**

14. Answer **any two** of (a), (b), (c). **(30, 30)**

(a) (i) 1. attraction of insects or feature of or platform for insects to land on **any one** **3**

2. protection (of flower)(bud) or photosynthesis **any one** **3**

3. (production, storage, use of) pollen **3**

(ii) transfer of pollen / to carpel (stigma) or to female **2(3)**

self pollination – occurs on same plant (or flower) **3**

cross pollination – occurs between plants **3**

(iii) wind/animal **any two** **2(3)**

(iv) cross pollination increases variation or reduces chance of genetic problems. **3**

(b) (i) carpel/ ovary/ style / receptacle **any one** **3**

(ii) wind dispersal e.g. dandelion/ sycamore **any one** **3**

animal dispersal e.g. blackberry/ burdock **any one** **3**

(iii) colonise new areas/ reduce competition/survival of species **any two** **6 + 3**

(iv) period of very low metabolism or period before germination or period during which germination will not occur. **any one** **6**

(v) to prevent germination in unfavourable conditions or has longer period available for dispersal or (evolution has guaranteed) optimal germination conditions. **any one** **6**

(c) (i) (resumption of) growth of seed or explained **any one** **3**

(ii) suitable temperature/ oxygen/ water **3(3)**

(iii) oxygen – needed to respire or needed for energy

water – needed as medium for reactions or needed as solvent for food store or needed for formation of new tissue or needed for splitting testa or needed for absorbing minerals.

suitable temperature – optimal temp. for enzymes **any one** **3**

(iv) diagram (showing vessel, seeds & cotton wool (at least one of which must be labelled) (Any one missing only allow 3 marks – more missing = 0) **6, 3, 0**

seeds/ experiment or one factor missing / explain how one factor was removed / control or all three factors present / identical conditions / leave for period/ observe or state result **any three** **3(3)**

15. Answer **any two** of (a), (b), (c). **(30, 30)**

(a) **6(3)**

(i) A = malleus (hammer) (allow bone or ossicle)
B = auditory canal or outer ear
C = tympanum (ear drum)(Tympanic membrane)
D = Eustachian tube
E = cochlea
F = semicircular canals

(ii) pharynx (throat) **3**

(iii) gas **3**

(iv) hearing **3**

(v) balance **3**

(b) (i) a chemical / messenger / secreted by a ductless gland / transported in the blood / to a target area / causing a response **any two** **2(3)**

(ii) diagram with correctly positioned labels (word or letter) **4(3)**

(iii) 1. **Name or letter of gland repeated** **0**
Hormone name **3**

2. **function** **3**

3. **deficiency symptom** **3**

(iv) hormone vs nerve
slower to act or more sustained or chemical (cf. ionic or electrical)
(comments taken to refer to hormone) **any one** **3**

(c) (i) A = xylem or vessel B = phloem **2(3)**

(ii) transports substances **6**

(iii) X = sieve plate (allow sieve tube) **3**
Y = companion cell or cytoplasm **3**

(iv) transport of water or minerals or support **3**

(v) transport of food **3**

(vi) vein or mid rib or bundle **3**

(vii) lignin **3**