Leaving Certificate 2006 Biology – Higher Level

Section A - Answer any **five** questions

1. ***Any five*** **5(4)**

(a) minerals **or** trace elements **or** inorganic nutrients
(b) lignin
(c) membrane **or** named membrane
(d) Vitamin C **or** ascorbic acid / Vitamin B **or** named
(e) correctly matched disorder
(f) amino acid - [*accept peptide*]

2.
(a) where life can exist **or** all the ecosystems of the earth [*must not define habitat]* **4**
(b) descriptive (survey) / species, **or** organisms, **or** types, present or implied **4**
(c) food chain with four organisms **4**
(d) predator / producer / secondary consumer / primary consumer **4(2)**

3. **6(3) + 2**

(a) amylase [*accept any correct enzyme*]
(b) mouth / small intestine **or** named part
(c) matching carbohydrate product
(d) pH 7 - 9
(e) optimum
(f) 35 ^{0}C - 40 ^{o}C
(g) folded **or** described

4. **6(3) + 2**

(a) glycolysis
(b) pyruvic acid **or** pyruvate
(c) 1. ethanol
2. lactic acid **or** lactate
(d) carbon dioxide
(e) Krebs or citric acid or tricarboxylic acid (cycle)
(f) Mitochondrion

5. **6(3) + 2**

(a) X: liver
Y: (hepatic) portal vein **or** portal system
(b) Arrow 1 –
Arrow 2 –
Arrow 3 -
(c) upper abdomen **or** under diaphragm **or** correctly related to stomach
(d) (produces) bile **or** emulsification **or (**produces) $NaHCO_3$ **or** neutralizes acid

6. **5(2 + 2)**

(a) *tuber:* stem **or** root [***2*** *for all who attempt question*]/ *bulb:* leaf **or** bud
(b) *ureter:* from kidney **or** to bladder / *urethra:* from bladder **or** to outside
(c) *hypha:* a filament **or** described / *mycelium:* a mass of hyphae **or** described
(d) *thigmotropism:* a growth **or** response to touch / *chemotropism:* a growth **or** response to substances **or** chemicals
(e) *antigen*: substance on cell membrane **or** surface of virus or bacteria **or** causes antibody production **or** foreign substance
antibody: produced in response to antigen **or** destroys antigen **or** defence protein **or** produced by lymphocytes

Section B
Answer <u>two</u> questions

7.	(a)	(i)	(for) protein		**3**
		(ii)	(for) reducing sugar **or** named		**3**
	(b)	(i)	1.	investigate effect on plant growth	**3**
			2.	to determine its effect on growth	**3**
		(ii)	1.	digestive **or** other enzyme activity [*accept culturing leaf yeasts or micro-organisms or bacteria*]	**3**
			2.	supplies substrate **or** explained [*accept medium*]	**3**
		(iii)	1.	isolation of DNA	**3**
			2.	to separate DNA	**3**
		(iv)	1.	to investigate conditions for germination	**3**
			2.	to remove oxygen [*accept 'without oxygen'*]	**3**
8.	(a)	(i)	protein synthesis		**3**
		(ii)	selectively permeable **or** explained **or** containment **or** antigenicity **or '**barrier' qualified **or** has receptors		**3**
	(b)	(i)	type of cell		**3**
			how obtained		**3**
		(ii)	name of stain – methylene blue		**3**
			how applied		**3**
		(iii)	to prevent drying out **or** to protect lens **or** easier to view **or** keeps cells in place		**3**
		(iv)	at an angle **or** described		**3**
			to prevent trapping air **or** bubbles		**3**
		(v)	cytoplasm paler **or** nucleus darker **or** nucleus blue		**3**
9.		(a)	(i)	animals	**3**
			(ii)	a guide to identification **or** explained	**3**
		(b)	(i)	five plants	**2(2) + 3(1)**
			(ii)	reasonable attempt at key design **[or** distinguishing features shown or stated 5(1)]	**5**
			(iii)	five animals	**2(2) + 3(1)**
			(iv)	reasonable attempt at key design **[or** distinguishing features shown or stated 5(1)]	**5**

Section C

Answer any **four** questions

10. (a) (i) lemmings increase as phosphorus increases **3**
lemmings decrease as phosphorus decreases **3**
(or phosphorus increases lemmings increase/
phosphorus decreases as lemmings decrease)
[*population proportional to phosphorus = 6]*

(ii) (forage) more nutritious with increased phosphorus / P allows increased survival rate / P allows increased reproductive rate / P important for energy **or** protein **or** named structure, **or** molecule, **or** process / lemmings releasing phosphorus / dietary requirement **3**

(b) named animal **3**
METHOD
matched ecosystem / capture / how / count / mark or tag / how/ release / where/ recapture / count marked ones / formula **or** calculation shown
OR
matched ecosystem / chose area **or** transect / quadrat / type / size **or** length of line / at random **or** stations / how **or** where / count **or** note presence / several times / calculation / how result expressed
any eight **8(3)**

(c) (i) harmful addition to the environment **3**
(ii) name **3**
effect of named pollutant **3**
(iii) matching control **3**
(iv) *problems* – may be toxic/ non-biodegradable/ pollute groundwater/ no land-fill available / costly / incineration (causes toxins) /valid example
any two **2(3)**
minimising – reduce **or** example(s) **or** recycle **or** example(s) **or** re-use **or** example(s) *any two* **2(3)**

11. (a) (i) traps or uses light or explained **3**
(ii) balanced equation (*one error = 3*) **6, 3, 0**

(b) (i) light not required **3**
(ii) CO_2 **3**
(iii) $NADPH_{(2)}$ **3**
ATP **3**
(iv) *$NADPH_{(2)}$*: supplies hydrogen **or** mention of reduction **or** e^- **3**
ATP: supplies energy **3**
(v) monosaccharides **or** polysaccharides **or** carbohydrates **6**

(c) (i) concentration gradient /root hair / osmosis / cell to cell / root pressure/ / xylem / cohesion **or** explained / adhesion **or** capillarity **or** explained / Dixon and Joly / transpiration **or** evaporation [*accept water loss*] / tension
any six **6(3)**

(ii) photolysis **or** split **3**
Protons **or** H^+ / electrons / oxygen **2(3)**

12. (a) (i) *species*: interbreeding results in fertile offspring **3**
variation: difference between members of species **or** population **3**
(ii) sexual reproduction / meiosis / mutation **or** agent / **3**

(b) (i) female **3**
(ii) 4 [*accept 8*] **3**
(iii) Yes (*stated or implied*) **3**
A and B on the same chromosome
or A and C not on same chromosome **3**
(iv) No (*stated or implied*) **3**
explained **3**
(v) heterozygous **3**
(vi) *diagram:*
XY chromosomes **3**
AA, BB, CC, **3**

(c) *account:* high reproductive rate / variation / example / competition / survival /
of the fittest / breeding / offspring survive/ traits passed on /
those without advantage die out *any five* **5(3)**

Darwin **3**
Wallace **3**

one observation: large numbers of offspring / low survival /
populations constant / variation in offspring / specific example **3**

13. (a) (i) marrow **or** named bone e.g. skull/ribs/long bones/sternum **3**
(ii) no nucleus / haemoglobin / shape comment / size comment /
/ no mitochondria / carries oxygen or CO_2 *any two* **2(3)**

(b) (i) *plasma*: liquid part of blood **3**
glomerular filtrate: (plasma) that has entered Bowman's capsule
or has left the glomerulus **or** plasma less proteins **3**
(ii) too big (to pass into Bowman's capsule) **3**
(iii) (glucose) small **or** passes through **3**
(iv) reabsorbed **or** explained **3**
(v) sweating **or** water loss **or** dehydration / blood volume drops **or**
concentration increases /detected by receptors / brain alerted /
ADH secreted / from pituitary / (stimulates) reabsorption of water/
in distal tubule **or** collecting duct *any four* **4(3)**

(c) (i) (lymph) nodes / (lymph) vessels **2(3)**
(ii) transport / defence / fluid collection / (transport) of fats /
/ (transport) of hormones / (transport) of excretory matter / nodes filter /
bacteria **or** pathogens / produce lymphocytes **or** antibodies /
returns fluid to blood / absorbs fat / at lacteals / *any six* **6(3)**

14. ANY TWO PARTS

(a) (i) *sepal:* protection / photosynthesis / attracts insects **3**
anther: pollen - production **or** storage **or** release) **3**
stigma: receives pollen **3**
ovary: produces **or** contains ovule **or** embryo sac **or** female gametes/ becomes fruit / site of fertilisation **3**

(ii) *Pollination v fertilisation:*
transfer (of pollen) versus fusion **3**

(iii) mitosis **3**
from haploid (generative nucleus) **or** chromosome number retained **or** two (daughter cells) produced **3**

(iv) one fuses with "egg" (nucleus) **3**
other fuses with (primary) endosperm nucleus or polar nuclei **3**

(v) growth regulator / selective propagation **3**

(b) (i) nerve cell **3**

(ii) *sensory*: towards CNS **or** named part **or** from receptor **or** structural feature **3**
motor: away from CNS **or** named part **or** to effector **or** structural feature **3**
inter: links two neurons **3**

(iii) carries impulse / across synaptic cleft / triggers impulse in next neuron *any two* **2(3)**

(iv) *Schwann cell:* produces myelin (sheath) **3**
Myelin sheath: insulation **or** protection **or** speeds impulse **3**

(v) *Disorder:*
Cause: injury / genetic / disease / lack of dopamine / **3**
Treatment: physiotherapy / stem cell / dopamine **or** drugs qualified **3**

(c) (i) 4 labels – **P** (*phloem), **G** (ground tissue), **X** (xylem),* **D (***dermal tissue)* **4(3)**

(ii) P (phloem) **3**

(iii) protection **or** example of protection e.g. water loss, infection **or** comment on turgor **3**

(iv) 1. blade **or** scalpel **3**
2. pith / holder / hand **or** implied **3**
3. mounted needle **or** section lifter **or** forceps **or** paintbrush **3**

(v) *Difference:* vascular bundles scattered **3**

15. ANY TWO PARTS

(a) (i) diagram **6, 3, 0**
labels (*cartilage, fluid, capsule* ***or*** *membrane, ligament*) **3(2)**

(ii) cartilage: absorbs shock **or** reduces wear **or** protection
or reduces friction
synovial fluid: friction-free movement **or** absorbs shock
ligaments: hold bones together
synovial membrane **or** capsule: secretes **or** contains synovial fluid
any three **3(3)**

(iii) osteoporosis **or** arthritis **3**

(iv) *Disorder:*
cause: genetic / hormonal / dietary / injury **or** wear and tear **3**
treatment: anti-inflamatory drugs / hormonal **or** named /
dietary supplements / pain killers / muscle relaxants /
physiotherapy / exercise **3**

(b) (i) using light to make food **or** obtain energy **3**
Make food **or** obtain energy using a chemical reaction **3**
[*accept 'from chemicals']*
Example 1**:** role **or** implied role e.g. volcanic pools **3**
Example 2: role **or** implied role e.g. in soil **3**

(ii) parasitic / saprophytic **2(3)**

(iii) substances produced by bacteria **or** fungi [*accept micro-organisms]* **3**
treat infections **or** correct example **3**

(iv) *resistance:* bacteria **or** fungi not killed by **or** inhibited by **or**
immune to (antibiotic) **3**
how develops: natural selection has occurred **or** surviving
strains multiply **or** misuse comment **or** plasmid transfer **3**

(c) ANY THREE TOPICS

(i) *menstruation:* shedding of endometrium / in absence of fertilisation **or**
low level of progesterone
disorder: Endometriosis **or** fibroids / comment **4 + 2(3)**

(ii) Antibodies **or** immunity / less danger of infection/ uterus contracts /
may reduce risk of breast cancer / bonding / correct nutrients **or**
easier to digest / suitable temperature / delayed ovulation
any three **4 + 2(3)**

(iii) *sperm*: up to 7 days
ova: up to 2 days
one valid comment e.g. sperm nourished in female tract **or**
longer survival time means greater chance of fertilisation **4 + 2(3)**

(iv) *formation:* (placenta) formed from embryonic and uterine tissues **4**
functions: connected to embryo by umbilical cord / (placenta)
produces hormones /example of transfer / example of a barrier
any two **2(3)**