Leaving Certificate Biology
Higher Level Marking Scheme
2005

Final Version

Section A – Answer any **5** questions

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

a) Carbohydrate/polysaccharide
b) Fat
c) Carbon / C
d) Starch
e) Disaccharide
f) Excretion

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

(a) A (possible) explanation (for an observation) or explained e.g. assumption
(b) (Set up for) comparison or explained
(c) Measurements or observations or information gathered
(d) A repeat of an experiment or procedure or explained
(e) A supported hypothesis or explained

3. **5(1) + 5(3)**

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

4. **5(2) + 2(5)**

(a) Rate (or photosynthesis) is increasing
(b) Rate (or photosynthesis) is levelling off (is not increasing)
(c) (Light or carbon dioxide) saturated or explained
(d) Chloroplast or chlorophyll
(e) Respiration / combustion or burning
(f) Increased (artificial) lighting/ increased carbon dioxide / heating

5. **Diagram (6, 0) + 7(2)**

(a) Diagram Diag 6,0
Labels – spindle
- centromere
(b) Reproduction
(c) Growth/ repair/ reproduction (only if development of macrospore/microspore is given)
(d) No reduction in chromosomes/ no homologous pairing during process/ resulting nuclei identical/ two cells
(e) Carcinogen /mutation / mutagen / example 1 / example 2 / radiation or named / virus

any two

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

(a) **A** = villus **B** = lacteal or lymph vessel **C** = muscle or wall

(b) Large surface area / rich blood supply / microvilli / thin-walled / lacteal — any two

(c) Diffusion (passive transport)

(d) Fats / fatty acids /glycerol / lipids — any one

Section B

Answer any **two** questions

7. (a) (i) A vessel / container / named industrial example e.g. vat **3**

(ii) (Enzyme) - can be recovered **3**

(b) (i) Name of enzyme / yeast **3**

(ii) Diagram of apparatus (2 pieces) + one label **3**

(iii) Use of apparatus e.g. beaker/ stirrer/ syringe
Names of solutions e.g sodium alginate/ calcium chloride
Purpose e.g. to trap enzyme/ form beads
Sodium alginate / calcium chloride are compulsory points
any four – *at least one from each* **4(3)**

(iv) Named substrate or named product / comment on procedure **2(3)**

8. (a) (i) Making a copy **3**

(ii) (Matching) RNA production
(notion of both DNA and RNA must be given) **3**

(b) (i) Name of plant **3**

(ii) Break up of cell (walls) or release of cytoplasm **3**

(iii) A few seconds only (max 6 secs) **3**

(iv) To break down membrane(s) or membrane components **3**

(v) Clumps (protects) DNA / to remove protein / separates DNA / separates protein **3**

(vi) Breaks down (acts on) protein **3**

(vii) Proteins are associated with DNA (histones or chromosomes) **3**

(viii) (Ice) cold **3**

9. (a) (i) (Possesses) nucleus / membrane-bound organelles or named **3**

(ii) Fungi **3**

(b) (i) Name of plant **3**

(ii) Cut or pick /container or avoidance of contamination / prevent leaves being crushed or shaken **3**

(iii) Storage details / cutting procedure / attach to lid / method of attachment/avoidance of contamination
any two **2(3)**

(iv) Dishes (or agar) with additives (food or example) **3**
To provide a medium or to allow growth **3**

(v) Pink colonies (circles) or negative result qualified **3**

(vi) Description of safe disposal **3**

Section C

Answer any **four** questions

10. (a) (i) Manipulation of genes or explained **3**

(ii) Micro-organism - production of hormone or enzymes or named or interferon or other **3**

Plant - slow ripening tomatoes / herbicide resistant plants/ freeze-resistant plants / other **3**

(b) (i) Recessive – its expression is masked by dominant (allele) / expressed when homozygous only **3**

Allele – form of a gene or explained **3**

(ii) Dominant allele masks the expression of the recessive allele or explained **3**

(iii) 25% **3**

(Gametes) N n X N n **3**

(Offspring Genotypes) NN Nn Nn nn **3**

(Offspring Phenotypes) (Normal Normal Normal) Abnormal **3**

(or cross explained 3(3))

(iv) Testing (people) for the presence of a (specific) gene **3**

(v) Selection of embryo or any valid role **3**

(c) (i) (Genes) on the same chromosome **3**

Gene located on a sex (or X) chromosome **3**

(ii) They are transmitted/ on the same chromosome or together **2(3)**

(iii) 1. XXCc and XY c - **2(3)**

2. XXcc and XY C - **2(3)**

[In 1. and 2. if genes are correct in both parents – 3 marks

If genes and chromosomes are correct in both parents – 6 marks]

11. (a) (i) Aerobic respiration requires oxygen or anaerobic respiration does not **3**

(ii) $C_6H_{12}O_6 + 6O_2 \longrightarrow 6H_20 + 6CO_2$ **6, 3, 0**

(b) (i) Cytoplasm **3**

(ii) Uses energy / combines with phosphate / to form ATP/ ATP stores energy / high energy bond / energy transferred (by ATP) any three **3(3)**

(iii) Pyruvic acid (Pyruvate) **3**

(iv) Mitochondrion **3**

(v) Lactic acid **3**

(vi) Increased breathing (deeper or faster) or reference to oxidation of lactic acid or increased oxygen **3**

(c) (i) Diagram - vessel plus anaerobic conditions **3**

Label (comment) relating to anaerobic conditions **3**

(ii) Sugar or named sugar or starch **3**

(iii) First reagent(s) or test named / any procedural point / initial colour / final colour / any three **3(3)**

(Potassium) dichromate / add acid or warm / orange / to green

Iodoform test or potassium iodide / add sodium hypochlorite or warm / colourless / to yellow

(iv) Carbon dioxide **3**

(v) No more bubbles given off **3**

(vi) Alcohol kills yeast or yeast dies or sugar used up **3**

12.	(a)	(i)	Rivalry (fight) for resource or named resource / organisms requiring limited resources	**3**
		(ii)	True (stated or implied) / because requirements are the same or explained	**2(3)**
	(b)	(i)	'increase in day length'	**3**
		(ii)	food / climate (weather) / to breed any two	**2(3)**
		(iii)	'fat'	**3**
		(iv)	'beneath skin' / 'inside abdomen' or around organs or named organ	**2(3)**
		(v)	converted to carbohydrate /used for energy (respiration)	**3**
		(vi)	'(growing) tips'	**3**
		(vii)	meristematic tissue or explained / region of high metabolic activity	**3**
	(c)	(i)	Named plant	**3**
			Choose sample area or transect (line or belt) / quadrat / random throw or along transect/ many times or at stations/ count or observe any three	**3(3)**
			Method of recording data/ calculate percentage cover or frequency or density / presentation of results	**3**
		(ii)	Any three valid effects	**3(3)**
13.	(a)	(i)	Testis	**3**
		(ii)	Development of secondary sexual characteristics or example named / / development of sex organs /sperm production any two	**2(3)**
	(b)	(i)	Diagram (testis, associated duct, penis)	**6, 3, 0**
			labels	**2(3)**
		(ii)	Testis	**3**
		(iii)	Size comment / shape or structural comment / motile *(only if 'tail or 'flagellum'' not given*)/ chromosomal difference / does not (usually) contribute mitochondrial DNA to zygote any two	**2(3)**
		(iv)	Cowper's gland / seminal vesicle / prostate gland	**3**
		(v)	Allows sperm to swim / provides nutrients / lubricant / protects sperm	**3**
	(c)	(i)	Prevention of fertilisation (conception) or implantation or pregnancy	**3**
		(ii)	Vasectomy or described	**3**
			Advantage – simple operation/ avoids side effects of hormonal contraception / effective / single procedure	**3**
			Disadvantage – not easily reversed / medical complications / no protection against STIs	**3**
		(iii)	Any three examples	**3(3)**
		(iv)	Decrease (no increase) in population / demographic imbalance/ improved social conditions /comment on STIs / health issues	**3**

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

(a) (i) Osmosis / reference to different concentrations / membrane partially (selectively) permeable / comment on surface area of root hair(s) or no cuticle present
any three **3(3)**

(ii) No **3**
Only water (solvent) moves by osmosis or other correct comment **3**

(iii) Tubular or continuous lumen / reinforced (lignified) walls / end to end / pits / lateral movement of water / wettable lining / narrow (bore)
any two **2(3)**

(iv) (called) cohesion / water evaporates in leaf or transpiration / is replaced / upward pull or tension /continuous stream / ensures movement / water column hard to break
any three **3(3)**

(b) (i) growth regulator / in plants or named plant or plant part **2(3)**

(ii) 10^{-5} - 10^{-3} **3**

(iii) 1 – 10 **3**

(iv) Inhibition or explained **3**

(v) Rooting powder / tissue culturing / weed killer / ripening of fruit / seedless fruits / other **2(3)**

(vi) Thorns/ modified leaves e.g. pine needles /stinging (cells)/deep roots / heat shock proteins/ phytoalexins e.g. production of antimicrobial chemicals / use of seeds / leaf fall / perennating organs or examples / dormancy / succulent tissues / toxins / other
any three **3(3)**

(c) (i) *Exocrine*: ducted or explained **3**
Endocrine – ductless or hormone producing **3**

(ii) Insulin or glucagon **3**
Regulates blood sugar or regulates sugar (level) or correct explanation **3**

(iii)1. **Name** **3**
Arthritis / osteoporosis

Cause **3**
Arthritis – injury / hormonal imbalance / genetic /immune response
Osteoporosis- hormonal imbalance / lack of exercise / genetic / dietary /menopause

Treatment **3**
arthritis – anti-inflammatory drugs/ analgesics/ rest / exercise/ replacement of joint / steroids or named/ immuno-suppressants

osteoporosis: HRT / exercise / diet / dietary supplements or named

2. **Name** **3**
Paralysis/Parkinson's disease/

Cause **3**
Injury / genetic / disease / lack of dopamine

Treatment
Physiotherapy / dopamine or drugs to promote neurotransmitter production / stem cell / implant **3**

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

(a) (i) non-cellular / one nucleic acid / can reproduce in host cell only
or obligate parasite / do not possess organelles or named organelle
any two **2(3)**

(ii) Cold / 'flu / polio / rabies / mumps / measles / AIDS (HIV)
any two **2(3)**

(iii) B-cells/ T-cells or two named T cells e.g. helper / killer / suppressor / memory
any two **2(3)**

B-cells – produce antibodies/agglutination or lysis / memory
T-cells – recognise / destroy infected or damaged cells / memory / activation / suppress immune system
Helper T – stimulate B cells or stimulate killer T cells/ recognise antigens /
Killer T – Destroy infected or damaged cells /
Suppressor T – Switch off immune system or explained /
Memory T – memorise antigen
any two **2(3)**

(iv) yes **3**
in both cases the result is the production of antibodies **3**

(b) (i) Diagram (wall, membrane) **3, 0**
Labels **2(3)**

(ii) Cell wall / size / capsule / flagellum / plasmid **2(3)**

(iii) Produce spores **3**

(iv) Disease-causing **3**

(v) Substances produced by micro-organisms / inhibit (growth or reproduction) of bacteria or fungi **2(3)**
Misuse: survival of resistant strains / build up of resistant population **3**

(c) (i) saprophytic – live on dead organisms (matter) **3**
parasitic – living in or on another organism causing harm. **3**

(ii) saprophytes – recycling (of nutrients) / decay **3**
parasites – keep populations under control / natural selection **3**

(iii) beneficial – yeast for brewing or baking / named edible fungus/ other **3**
harmful – ringworm / athlete's foot / potato blight / thrush /
dry rot / death cap / other **3**

(iv) *Rhizoid* – anchors / digestion / absorption **3**
Sporangium – produces spores / stores spores / asexual reproduction **3**
Gametangium – produces gametes / sexual reproduction **3**
Zygospore – survival / dispersal **3**