



Coimisiún na Scrúduithe Stáit
State Examinations Commission

LEAVING CERTIFICATE 2009

MARKING SCHEME

BIOLOGY

HIGHER LEVEL

Biology ATAL 2009 Marking Scheme

Section A

Answer **five** questions

1.	5(4) any FIVE points out of SIX	
	(a) Hydrogen <u>and</u> Oxygen	
	(b) (Made up of) many sugar units	
	(c) Starch [<i>accept</i> other correct named]	
	(d) Cell wall	
	(e) Benedict's or Fehling's	
	(f) 2. (Heat but do not boil)	

2.	6(3) + 2	
	(a) Radicle	
	(b) Hydrotropism [<i>accept</i> geotropism]	
	(c) Phototropism	
	(d) Photosynthesis or described	
	(e) Ethene or abscisic acid [<i>accept</i> other correct named]	
	(f) Rooting powder / selective weedkiller / fruit ripening / seedless fruit / tissue culture (micro propagation) (Any two)	

3.	6(3) + 2	
	(a) Killing (or catching) and eating an animal (or an organism, or prey). OR Killing (or catching) an animal (or an organism, or prey) for food.	
	(b) Predator named	
	Its prey named	
	(c) Organism's role in ecosystem or explained	
	(d) Photosynthesis or protein synthesis	
	(e) (To do with) soil	
	(f) Particle size or soil type or pH or air content or water content or mineral content or temperature or humus content	

4.	(a)	(i)	A = Head (epiphysis)	2
			B = Shaft (diaphysis)	2
			C = Spongy bone	2
			D = Compact bone	2
		(ii)	Between the vertebrae	3
		(iii)	Shock absorption or friction-free movement or prevention of wear and tear	3
	(b)	(i)	Fat storage or can convert to red marrow	3
		(ii)	Blood cell formation	3

5.		6(3) + 2		
	(a)	Anaphase		
	(b)	Chromosomes separated or chromosomes near poles		
	(c)	A = Spindle (fibre) B = Chromosome		
	(d)	Reproduction		
	(e)	Growth or (cell) replacement or repair or renewal or spore formation		
	(f)	Meristematic tissue or root tips or shoot tips or buds or ovule or embryo sac or pollen		

6.		6(3) + 2		
	(a)	Manipulation or alteration of genes or of genotypes		
	(b)	Isolation / cutting (or restriction) / transformation (or ligation) / introduction of base sequence (changes) / expression		Any three
	(c)	1. Micro-organism example: 2. Animal example: 3. Plant example:		

Section B.

Answer **two** questions**2(30)**

7.	(a)	(i)	Two embryonic leaves or two seed leaves	3
		(ii)	Any dicot named	3
	(b)	(i)	(Cut) thin (section) / (cut) away from self / with blade or scalpel or microtome / how transferred to slide / cover slip / how applied / (use of) water	3(3)
		(ii)	(Slide) onto stage / lamp on or mirror / adjust (light) / start with low power lens / how focused	3(3)
		(iii)	<i>Diagram:</i> <i>Labels:</i>	3, 0 3(1)

8.	(a)	(i)	Growth of seed (or embryo part or of embryo)	3
		(ii)	To make (food) soluble or to make (food) transportable	3
	(b)	(i)	Petri dish containing a jelly (or solid medium)	3
		(ii)	Starch or milk	3
		(iii)	Soak (seeds) / split (seeds) / how sterilised correctly / position (seeds) on agar / keep plate warm or stated temperature (max. 35 °C)	2(3)
		(iv)	Boiled seeds	3
		(v)	Starch agar: Iodine (solution) or milk agar: biuret solution.	3
		(vi)	1. No blue-black (under seeds) or no purple (under seeds) 2. Blue-black (under seeds) or purple (under seeds)	3 3

9.	(a)	(i)	Proteins	3
		(ii)	Temperature or pH	3
	(b)	(i)	Named enzyme [<i>accept yeast</i>] / mix (or stir) / with alginate / add to CaCl ₂ soln. / how added / (allow to) harden	3(3)
		(ii)	<i>Diagram:</i>	2,0
			<i>Labels:</i> named substrate / enzyme [<i>accept yeast</i>] or beads / named product / any one apparatus label	2(2)
		(iii)	Add substrate (to immobilised enzyme) / test for named product / how tested / test at set intervals or control described	3(3)

Section C.

Answer any **four** questions

10.	(a)	(i)	Two factors that separate at gamete formation (each gamete receiving one factor)	3
		(ii)	Mitochondrion / chloroplast	2(3)
	(b)	(i)	<i>Alleles</i> = Different forms of a gene <i>Dominant</i> = An allele that masks its (recessive) partner or an allele that is always expressed	3 3
		(ii)	Linked	3
		(iii)	Independent assortment (or described) can occur or more variation (in offspring)	6
		(iv)	BbSs Bbss bbSs bbss	4(2)
			black + long black+ short brown + short brown + long	4(1)
			Each excess incorrect cancels a correct answer	
	(c)	(i)	Interbreeding organisms / producing fertile offspring	2(3)
		(ii)	1. Differences (between individuals)	3
			2. Sexual reproduction / mutation / environment / meiosis	2(3)
		(iii)	Produces new genotypes or allows natural selection (or explained)	6
		(iv)	Fossils or embryos or anatomy or genetics or example ^e Any ONE	e 2

11.	(a)	(i)	The management of the environment or of organisms	3
		(ii)	Example / conservation benefit	2(3)
	(b)	1.	Occupying territory / defending territory / marking territory boundaries / hunting in family groups or foraging in family groups	2(3)
		2.	With scent and urine	3
		3.	By accompanying the parents (on hunting trips)	3
		4.	They make waste food harder to get at or explained	3
		5.	Eats plants and animals	3
		6.	Avoids competition or more prey or enhance survival or less visible	3
		7.	Valid reasoned argument	6
	(c)	(i)	1. The types of organisms present	3
			2. Numbers of individuals or number of species	3
		(ii)	Name of ecosystem Quadrat / random / how random achieved / many times / count or estimate / record OR Belt (or line) transect / stations / at intervals / place quadrat / count or estimate / record	3 3(3)
		(iii)	(Bar) chart or table or graph	3
		(iv)	Not enough samples taken or example of human error	3

12.	(a)	(i)	ADP	3
		(ii)	Energy	3
		(iii)	<u>Capturing or transferring</u> electrons or protons or hydrogen (ions)	3
	(b)	(i)	Glycolysis	3
		(ii)	1. Lactate (lactic acid)	3
			2. Ethanol (and CO ₂)	3
		(iii)	Mitochondrion	3
		(iv)	Acetyl (Co-enzyme A)	3
		(v)	Krebs cycle	3
			CO ₂ or ATP or Hydrogen ions or protons	3
		(vi)	1. Forming ATP (or described)	3
			2. To oxygen or involved in H ₂ O formation	3
	(c)	(i)	Counted bubbles (or measure volume) per unit time or use a (datalogging) sensor	3
		(ii)	Light source at different distances (from plant) or different wattages or different concentrations of NaHCO ₃ solution	3
		(iii)	Temperature / how OR light (if not given in (c) (ii)) / how OR CO ₂ concentration (if not given in (c) (ii)) / how	2(3)
		(iv)	Axes labelled correctly	3
			Curve matching axes given	3
		(v)	Increasing (or decreasing) / (more or less) light (energy) for light phase or (more or less) CO ₂ for dark phase OR Levels off / saturation (or explained)	2(3)

13.	(a)	(i)	Pulmonary circuit	3
			Systemic circuit	3
		(ii)	Systemic or described	3
	(b)	(i)	1. Pulse: contraction of (wall of) artery or expansion of artery or due to pumping of heart (or of left ventricle) or rate at which heart beats [accept relevant medical reference]	3
2. Blood pressure: Force exerted by blood (or by heart) [accept relevant medical reference]			3	
		(ii)	1. Comment on diet: Dietary factor + matching effect	3
			2. Comment on exercise: Comment + matching effect	3
		(iii)	Contain haemoglobin / no nucleus (or other named organelle) / comment on shape	2(3)
		(iv)	Causes contraction (of heart muscle) or Pacemaker (or described) or impulse generation	3
		(v)	SA (In wall of) right atrium or indicated on diagram	3
			AV In (or near) septum or near tricuspid valve or between atrium and ventricle or indicated accurately on diagram	3
	(c)	(i)	A = Bronchiole	2
			B = Alveolus	2
			C = Arteriole or Capillary	2
		(ii)	Thin walled / moist surfaces / proximity (of alveoli and capillaries) / large surface area / large number (of alveoli or capillaries)	Any two 2(3)
		(iii)	Named disorder	3
			1. Cause	2
			2. Prevention	2
			3. Treatment	2
		(iv)	*CO ₂	3

14.	Any two of (a), (b), (c)			(30, 30)
14.	(a)	(i)	Diagram <i>Indicate sites of:</i> Meiosis: (Ovary) indicated on diagram Fertilisation: (Fallopian) tube indicated on diagram Implantation: (Uterus) indicated on diagram	6, 3, 0 3 3 3
		(ii)	<i>Oestrogen</i> : repairs endometrium / inhibits FSH / stimulates LH OR <i>Progesterone</i> : thickening (or maintenance of) endometrium / inhibits FSH / inhibits LH production	2(3)
		(iii)	Named menstrual disorder: 1. Cause 2. Treatment	3 3 3

14.	(b)	(i)	Example of transport in (or out) / example of barrier / produces progesterone	2(3)
		(ii)	Uterine and embryonic	3
		(iii)	Change in hormone levels (or correctly described) / contractions / waters break / cervix dilates / delivery / cord cut / afterbirth	3(3)
		(iv)	Sperm and egg fuse / outside the body (or described)	2(3)
		(v)	<i>Morula</i> : (Solid) ball of cells <i>Blastocyst</i> : Fluid-filled (or hollow) ball of cells	3 3

14.	(c)	(i)	Rhizopus	3
		(ii)	Fungi	3
		(iii)	A = Sporangiphore B = Sporangium C = Spore	2 2 2
		(iv)	1. Comment on nutritional role or spreading 2. Secretes enzymes or absorbs products or growth (on substrate) (Answers 1. and 2. must match)	3 3
		(v)	Saprophytic	3
		(vi)	<u>Nucleus</u> Membrane-bound organelles or other named organelle	3 3
		(vii)	Prokaryotic	3

15.	Any two of (a), (b), (c)		(30, 30)
------------	---------------------------------	--	-----------------

15.	(a)	(i)	Production of new plant from root or from stem or from leaf or plant asexual reproduction (or described)	3
		(ii)	Fast or preserves desirable features or cheap or more reliable	3
		(iii)	Cuttings (or described) / layering (or described) / grafting (or described) / micro propagation (or described)	2(3)
		(iv)	No gametes (or one parent) / identical plants or example / rapid production / no outside agent	2(3)
		(v)	1. Wind / animal / self (or mechanical) / water	2(3)
			2. Colonisation / reduces competition / elaboration of competition	2(3)

15.	(b)	(i)	V = Iris W = Pupil X = Choroid	2 2 2
		(ii)	<i>Function of Y (Lens):</i> To focus (light) onto the retina <i>Function of Z (Retina):</i> To convert light into nerve impulses or image forms on it OR <i>Function of Z (Vitreous Humour):</i> Gives shape (to eye)	3 3
		(iii)	1. Holds lens in place or (involved in) changing shape of lens 2. (Detects) colour (or explained) 3. Brings impulses from retina or brings impulse to brain 4. Interprets information (received from retina)	Any three 3(3)
		(iv)	(muscular) contraction in response to light intensity or pupil size changes or allows more (or less) light in	3 3
		(v)	Increased visual field or to judge distance (depth) or 3D vision (accept other reasonable suggestion)	3

15.	(c)		<i>Any three</i> 3(4+3+3)	
-----	-----	--	-------------------------------------	--

		(i)	Immune system (or described) / B lymphocytes / produce antibodies / T lymphocytes / any function of T lymphocyte	
		(ii)	Secreted by neuron (or vesicle) / presynaptic (neuron) / in response to impulse / chemical transmission / across synaptic cleft / cause impulse in next neuron / destroyed by enzymes / recycled or reabsorbed by pre-synaptic neuron	
		(iii)	Maintenance of / constant internal environment / example how / example why (Example = pH, solute concentrations or examples of such solutes, temperature, water)	
		(iv)	Long stamens / long stigmas / feathery stigmas / large numbers of pollen grains / smooth pollen or light pollen / no showy colours or no scent or no nectar or small petals or no petals	
		(v)	<i>At least one from each category:</i> <i>Economic importance:</i> Crop damage / example of viral crop disease / animal disease / example of viral animal disease / human medical costs <i>Medical importance:</i> Human diseases / examples of viral human diseases / used in medical research / virus control of bacteria / genetic engineering (or described)	

