Coimisiún na Scrúduithe Stáit
State Examinations Commission

LEAVING CERTIFICATE 2009

MARKING SCHEME

BIOLOGY

ORDINARY LEVEL

Leaving Certificate 2009 Biology – Ordinary Level

Section A ----------Answer 5 questions (20 marks each)

1.			**Answer any <u>four</u>**		**2(9)+2(1)**
	(a)		Carbon, Hydrogen, Oxygen / Symbols		
	(b)		Hydrogen, Oxygen		
	(c)		e.g. Cellulose		
	(d)		e.g. Energy, storage		
	(e)		Nitrogen		
2.					**2(9)+2(1)**
			Column A	**Column B**	
			Example: Where an organism lives	**Habitat**	
			All places where life is possible	**Biosphere**	
			Organism's role in the ecosystem	**Niche**	
			Position in a pyramid of numbers	**Trophic level**	
			Organisms and their environment	**Ecosystem**	
3.					**9 +8 ++3(1)**
	(a)		Survival of the fittest or explained e.g. best (adapted) survive		
	(b)		Darwin / Wallace		
	(c)	i	e.g. Radiation (any 2 examples in i and ii & allow chance)		
		ii	e.g. Chemicals		
	(d)		Fossils / Anatomy / Embryos/ Genetics or example		
4					**9 +8 + 3(1)**
			<u>Example: The cells produced by meiosis are haploid</u>	***<u>T</u>***	
			The cells produced by mitosis are identical	**T**	
			Meiosis gives rise to variation	**T**	
			Mitosis always produces four new cells	**F**	
			Meiosis is never involved in gamete formation	**F**	
			Single-celled organisms use mitosis for reproduction	**T**	
5.					**2(8) + 4(1)**
	(a)		Plasma		
	(b)	i ii	Any two		
	(c)		**(Red Blood Cells)** Transport O_2 / CO_2		
			(White Blood Cells) e.g. to make antibodies		
			(Platelets) e.g. Blood Clotting		
6.					**9 +8 +3(1)**
	(a)		Phototropism		
	(b)		More light		
	(c)		(Growth) Regulator / Promoters. <u>Or</u> example – allow (Plant) Hormones		
	(d)		Vascular / Phloem		
	(e)		Geotropism / Hydro- /Thigmo / Chemo-		

Leaving Certificate 2009 Biology – Ordinary Level
Section B----------Answer 2 questions (30 marks each)

7	(a)				**5 + 1**
		(i)	Component / Solvent / Medium / Reaction / Transport / (cell) shape / Temp. regulator / (allow reference to hydration)		
		(ii)	e.g. Sweating		
	(b)1				**2(9) + 6(1)**
		(i)	Clinistix / Benedicts / Fehling's / Copper sulphate		
		(ii)	(Clinistix) Orange to Blue or (others) Blue to Red		
		(iii)	Yes / (Clinistix – No)		
	(b)2				
		(i)	Biuret Test / Sodium Hydroxide & Copper sulphate		
		(ii)	Blue to violet /purple / lilac		
		(iii)	No		
8	(a)				**5 + 1**
		(i)	(Movement of) water through (semipermeable) membrane or reference to concentration		
		(ii)	Any indication of water movement between cells or soil to root		
	(b)				**2(9) + 6(1)**
		(i)	Diagram (2 solutions / membrane) Any **three** labels		
		(ii)	Different solutions / Observe / Time / Control /Measure /safety precaution	Any two	
		(iii)	e.g. heavier after		
		(iv)	Reference to direction of water movement		
9	(a)				**5 + 1**
		(i)	Breaking down food		
		(ii)	Soluble / for transport / allow 'glucose for respiration'		
	(b)				**2(9) + 6(1)**
		(i)	Any suitable plant		
		(ii)	Boiling		
		(iii)	Destroys enzymes / allow 'to kill seeds or cells'/ allow 'control'		
		(iv)	e.g. agar plates / seeds on / test type		
		(v)	Experiment result Control result		

Section C----------Answer 4 questions (60 marks each)

10	(a)				**8 + 1**
		(i)	Biotic: living features / Abiotic: non-living factors / defining either term is sufficient	Single point	
		(ii)	(Relating to) soil		
	(b)				
		(i)	Quantitative: How many are there Qualitative: What is there		**2(3)**
		(ii)	Quadrat		**3**
		(iii)	Animals move		**3**
		(iv)	e.g. very large plant		**3**
		(v)	Throw or place / several times / random (belt) / how random achieved or equivalent for belt / count or estimate / identify	Any two	**2(3)**
		(vi)	e.g. chart / table		**3**
		(vii)	(Due to) human error / Changing conditions / Accidental discovery / Sample size	Any one	**3**
	(c)				
		(i)	Species: (Group of) interbreeding (organisms) / (Group) producing fertile offspring		**3**
		(ii)	Mauve stinger		**3**
		(iii)	France / Spain or any named Mediterranean country		**3**
		(iv)	Swelling / redness / oozing / allergy	Any two	**2(3)**
		(v)	To kill prey / Defence	Any one	**3**
		(vi)	e.g. Global warming / more food / tides		**3**
		(vii)	No free movement		**3**

<table>
<tr><td>11</td><td>(a)</td><td></td><td></td><td></td><td>7 + 2(1)</td></tr>
<tr><td></td><td></td><td>(i)</td><td>Heterozygous: having different alleles / Aa</td><td></td><td></td></tr>
<tr><td></td><td></td><td>(ii)</td><td>Incomplete Dominance: Neither allele masks the expression of the other</td><td></td><td></td></tr>
<tr><td></td><td></td><td>(iii)</td><td>Phenotype: Physical expression / interaction of genotype & environment</td><td>Any one</td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td>(b)</td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td>(i)</td><td>Parents Rr x Rr
Gametes (R) (r) x (R) (r)
Offspring
<table><tr><td></td><td>R</td><td>r</td></tr><tr><td>R</td><td>RR</td><td>Rr</td></tr><tr><td>r</td><td>Rr</td><td>rr</td></tr></table>Phenotypes: Red / Pink / White</td><td></td><td>3
3(3)
3(3)</td></tr>
<tr><td></td><td></td><td>(ii)</td><td>60 or 50%
Because of results shown or explanation</td><td></td><td>2(3)</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td>(c)</td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td>(i)</td><td>Making a pattern / explanation / accept (Genetic) Fingerprinting</td><td>Any one</td><td>6</td></tr>
<tr><td></td><td></td><td>(ii)</td><td>Enzymes</td><td></td><td>3</td></tr>
<tr><td></td><td></td><td>(iii)</td><td>Size / allow mass /weight / use of gel electrophoresis</td><td></td><td>3</td></tr>
<tr><td></td><td></td><td>(iv)</td><td>Crime(forensic) / Medicine / Paternity / Archeology / Evolution</td><td>Any two</td><td>2(3)</td></tr>
<tr><td></td><td></td><td>(v)</td><td>e.g. Onion</td><td></td><td>3</td></tr>
<tr><td></td><td></td><td>(vi)</td><td>To separate the DNA</td><td></td><td>3</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>

12	(a)				**7 + 2(1)**
		(i)	Decaying / rotting	Any one	
		(ii)	Bacteria Fungi		
	(b)				
		(i)	A = Cell Wall / Cell Membrane / Capsule B = DNA / Chromosome / Genetic material C = Flagella (allow tail)		**3(1)**
		(ii)	Movement		**3**
		(iii)	Rod / Coccus / Spiral	Any two	**2(3)**
		(iv)	(Binary) Fission / allow asexually		**3**
		(v)	Do not use Oxygen		**3**
		(vi)	Disease causing		**3**
		(vii)	e.g. Causes crop diseases / causes human diseases / biotechnology	Any two	**2(3)**
	(c)				
		(i)	Non-cellular / Only one type of Nucleic Acid / Don't show characteristics of living things	Any one	**3**
		(ii)	Protein (coat) / DNA or RNA		**2(3)**
		(iii)	Entry / Use cell's components / Synthesis / Assembly / Release Replication (using) / host – allow 2(3) only	Any three	**3(3)**
		(iv)	Beneficial – Disease control / specific example Harmful – Cause diseases / specific example	Any two	**3** **3**

13	(a)				**7 + 2(1)**
		(i)	Pulmonary (vein)		
		(ii)	Renal (artery)		
		(iii)	Hepatic Portal (vein)		
	(b)				
		(i)	Thorax		**3**
		(ii)	Rib cage		**3**
		(iii)	Atria / allow Auricle		**3**
		(iv)	Bicuspid (mitral) valve		**3**
		(v)	69 - 75		**3**
		(vi)	e.g. exercise / anxiety / drugs / infection	Any two	**2(3)**
		(vii)	Coronary (arteries) / allow cardiac		**3**
		(viii)	They pump		**3**
	(c)				**12(2)**

Vessel	**A**	**B**	**C**
Name	ARTERY	**XXXXXXXXX**	CAPILLARY
Lumen	**XXXXXXXXX**	LARGE	SMALL
Wall	THICK	THIN(NER)	(VERY) THIN
Direction of Blood flow	FROM HEART	TO HEART	**XXXXXXXXX**
Valves present	NO	YES	NO

Any two parts of Question 14

14	(a)				**11 + 8(2)** **<u>N.B.</u> Part (iii) labels 3(1)**
		(i)	(Vascular) bundle<u>s</u> / more than one bundle / bundles in a ring	Any one	
		(ii)	A = Xylem B = Phloem		
		(iii)	Diagram e.g. 2 tubes – one wide & one narrow Labels: Sieve tube / Sieve plate / Companion cell	Labels 3(1)	**3(1)**
		(iv)	1. Dermal Tissue – e.g. to protect / absorb 2. Ground Tissue – e.g. to store / bulk – allow 'diffusion'		
		(v)	1. Xylem 2. e.g. Narrow / tubes / continuous / hollow 3. Up		
	(b)				**11 +3 +8(2)**
		(i)	A = Cortex B = Medulla / Allow Pyramids C = Ureter		
		(ii)	Bladder		
		(iii)	A / Cortex		
		(iv)	Getting rid of waste (products of metabolism)		
		(v)	Water / Salts / Urea - if urine than 1(3) only	Any two	
		(vi)	Skin / Lungs / Liver	Any two	
	(c)				**6 +11 + 6(2) +1**
		(i)	Ovary / Carpel / Receptacle		**6 (This '6' is affixed to Part (i) exclusively)**
		(ii)	Animal dispersal / Winged / Wind /Self dispersal / Water Dispersal / Human dispersal / or Examples	Any three	
		(iii)	To avoid competition / colonisation		
		(iv)	Period of no growth		
		(v)	e.g. Survival / Avoid harsh winter weather		
		(vi)	Germination / allow Growth		
		(vii)	e.g. (Growth) regulators		

Any two parts of Question 15

15	(a)				**6 +11 + 6(2) +1**
		(i)	$6\ CO_2 + 6\ H_2O \rightarrow C_6H_{12}O_6 + 6\ O_2$	Perfect – 6 1 mistake – 3 2 mistakes- 0	**6, 3, 0** **(This '6,3,0' is affixed to Part (i) exclusively)**
		(ii)	The sun		
		(iii)	Electrons, Protons or H (ions) /, Oxygen, accept OH^-		
		(iv)	• Electrons – to chlorophyll / reference to energy / ATP • Protons / H (ions) - Pathway 2 / Dark Stage / general proton pool • Oxygen – Respiration / Excreted • OH^- - forms water, releases electrons, releases oxygen		
		(v)	Chloroplasts		
	(b)				**6 +11 +6(2) +1**
		(i)	Using oxygen or energy release	One point	**6 (This '6' is affixed to Part (i) exclusively)**
		(ii)	A – Stage 2 B – Stage 2 C – Stage 1 D – Stage 1		
		(iii)	A – Glucose solution B – 15°C to 40°C (allow room temperature) C – Bubbling stops / Yeast settles / Solution clears D – e.g. Iodoform test or chemicals or bleach / Dichromate		
	(c)				**11 +3 +8(2)**
		(i)	Proteins		
		(ii)	Amino Acids		
		(iii)	Substrate – substance changed (by enzyme) Catabolic – (Breakdown of) large molecules into smaller ones		
		(iv)	Binding enzyme / in inert substance or Trapping enzyme/ in beads (gel)		
		(v)	(Enzyme) mixed / with alginate / (mixture) dropped / into $CaCl_2$ (solution)	Two points	
		(vi)	e.g. Easy to separate / reuse / cheap / (allows) continuous production / more stable		
		(vii)	e.g. may damage skin		