GCE MARKING SCHEME

SUMMER 2016

BIOLOGY - BY2 (LEGACY)
1072/01

INTRODUCTION

This marking scheme was used by WJEC for the 2016 examination. It was finalised after detailed discussion at examiners' conferences by all the examiners involved in the assessment. The conference was held shortly after the paper was taken so that reference could be made to the full range of candidates' responses, with photocopied scripts forming the basis of discussion. The aim of the conference was to ensure that the marking scheme was interpreted and applied in the same way by all examiners.

It is hoped that this information will be of assistance to centres but it is recognised at the same time that, without the benefit of participation in the examiners' conference, teachers may have different views on certain matters of detail or interpretation.

WJEC regrets that it cannot enter into any discussion or correspondence about this marking scheme.

GCE BIOLOGY - BY2 (LEGACY)

SUMMER 2016 MARK SCHEME

Question			Marking details	Marks Available
1	*(a)*	(i)	obtains {nourishment/water and nutrients} {and causes damage to the host/ at expense of host};	1
			Accept tree for host	
		(ii)	(It has green leaves and is therefore) autotrophic/ can photosynthesise;	2
			Therefore it is not entirely dependent upon the tree for its survival/ can synthesise their own organic molecules; OWTTE	
	(b)		**<u>Animal X:</u>**	
			Carnivore/ carnivorous;	1
			Any 2 (x1) from	2
			<u>Large</u> (pointed) canines to {catch prey/ grip prey/ pierce flesh/ tear flesh};	
			NOT kill	
			<u>Carnassials</u> (have sharp cutting edges) to {slice flesh/ crush bone};	
			(Sharp) incisors to strip flesh from bones;	
			<u>Animal Y:</u>	
			Herbivore/ herbivorous;	1
			Any 2 (x1) from	2
			{<u>Large/ interlocking</u>} molars to grind plant material;	
			Incisors to {cut/ tear} {grass/plant material} <u>against a horny pad</u>;	
			{Diastema (between canines and molars)/ or description of} allows manipulation of food by tongue;	
			Question 1 total	**[9]**

Question			Marking details	Marks Available
2	*(a)*	(i)	Arthropoda/Arthropod;	1
		(ii)	Segmented body; (Pairs of) jointed legs; (ignore reference to numbers/ segments) Exoskeleton made of <u>chitin</u>	2
		(iii)	A group of closely related species/ similar species capable of producing (infertile) hybrids/ OWTTE ;	1
		(iv)	*Aeshna; Must start with capital*	1
	(b)		They have evolved due to <u>convergent</u> evolution; Reject ref to common ancestor The wings are <u>analogous</u> structures;	2
			Question 2 total	**[7]**

Question			Marking details	Marks Available
3	*(a)*		A: Palisade (mesophyll); B: Xylem; vascular bundle = neutral C: <u>Lower</u> epidermis;	3
	(b)		Any 4 (x1) from 1. Leaves have {a large surface area / can be orientated towards the light} for {maximum/ more} absorption of light; 2. {Cuticle/ upper epidermis} transparent to allow light to pass through (to the mesophyll layer); 3. {Palisade/ mesophyll} cells are {elongated/ arranged vertically}, so there are {fewer cross walls to absorb light / so chloroplasts absorb more light} ; 4. {Palisade/ mesophyll} cells have {many chloroplasts/ chloroplasts can move} to {maximise/ increase} light absorption; 5. Leaf is thin so that light can pass to all cells;	Max 4
	(c)		They open the stomatal pores to allow CO_2 to {enter for photosynthesis/ be fixed}; They close the stomatal pores to reduce water loss/ open stomata to maintain transpiration stream;	2
	(d)		Any 4 (x1) from 1. K^+ are actively transported into the guard cells; 2. Starch is converted to malate; 3. This lowers the water potential of the (guard cells); 4. Water moves into (the guard cells) by osmosis; 5. This causes the (guard cells) {to swell/ become turgid} and curve apart; 6. Due to the uneven thickening of the cell wall/inner cell wall {thicker/less elastic} than the outer cell wall;	Max 4
	(e)		Hydrophyte;	1
			Any 2 (x1) from • Stomata found on upper epidermis/ ORA; • Larg(er)/more air spaces; • reduced xylem/ vascular tissue; reference to cuticle = neutral	Max 2
			Question 3 total	**[16]**

Question			Marking details	Marks Available
4	*(a)*		Asexual **and** sexual;	1
			Asexual Any 1 from • Produces {clones/ genetically identical offspring} to {retain useful genes/ which are adapted to the environment}; • Saves {energy/ time} as only one parent needed/ allows rapid colonisation/ OWTTE; NOT reproduce faster	1
			Sexual Any 1 from • Produces genetically varied offspring to adapt to a changing environment; • Produces {a resistant stage in the life cycle/ seeds} to survive adverse conditions;	1
	(b)		• Frogs show external fertilisation and crocodiles show internal fertilisation; reproduction = neutral • Frogs need water to provide a medium for the {male gamete/sperm} to reach the egg whereas crocodiles do not/ use of intromittent organs; • Frog (fertilised) {eggs/ spawn} would dry out on land and the {amniote egg/ (leathery) shell} prevents the desiccation of the crocodile eggs;	3
			Question 4 total	**[6]**

<table>
<tr><th colspan="3">Question</th><th>Marking details</th><th>Marks Available</th></tr>
<tr><td>5</td><td>(a)</td><td>(i)</td><td>Potometer;</td><td>1</td></tr>
<tr><td></td><td></td><td>(ii)</td><td>Any 3 from:
1. Cut leafy shoot under water/ insert leafy shoot into potometer under water; Accept cutting NOT plant
2. Use {Vaseline/ petroleum jelly} to ensure the equipment is air-tight,
3. Introduce a bubble of air into (the end of) the potometer;
4. Record the distance travelled by the bubble in a specific period of time;</td><td>Max 3</td></tr>
<tr><td></td><td>(b)</td><td></td><td>3.6 – 1.2 ;
10
= 0.24;

OR

3.6 - 1.1;
10
=0.25;

Correct answer = 2 marks</td><td>2</td></tr>
<tr><td></td><td>(c)</td><td>(i)</td><td>Arid/ dry/ desert/ tundra/ one with low water availability;
Temperature = neutral</td><td>1</td></tr>
<tr><td></td><td></td><td>(ii)</td><td>
<table>
<tr><td colspan="2">Any one from:</td></tr>
<tr><td>Structure</td><td>Explanation</td></tr>
<tr><td>sunken stomata (1)</td><td>traps water vapour/ to reduce the water potential gradient (between the leaf and the atmosphere) (1)</td></tr>
<tr><td>leaf rolling (1)</td><td>traps water vapour/ to reduce the water potential gradient (between the leaf and the atmosphere) (1)</td></tr>
<tr><td>presence of hairs (1)</td><td>traps water vapour (1)</td></tr>
<tr><td>reduction in size of leaves/ spines/ needles (1)</td><td>Less surface area/ fewer stomata (1)</td></tr>
<tr><td>Thick waxy cuticle (1)</td><td>Reduces (cuticular) <u>evaporation</u> (1)</td></tr>
<tr><td>Fewer stomata (1)</td><td>Less {transpiration/ water loss} (1)</td></tr>
</table>
</td><td>2</td></tr>
<tr><td></td><td></td><td></td><td>Question 5 total</td><td>[9]</td></tr>
</table>

Question			Marking details	Marks Available
6	*(a)*		Any three from: • They have a large surface area; • Surface area to volume ratio = neutral • They are thin/provide a short diffusion pathway; • They are moist; • Permeable to gases;	3
	(b)		They reduce/minimise the loss of water (and heat);	1
	(c)		1. Maintains a {concentration/diffusion} gradient / blood always meets air containing a higher oxygen concentration/equilibrium never reached; 2. Oxygen diffuses into the blood; 3. across the entire gas exchange surface; Accept alveoli 4. Results in a higher saturation of blood with oxygen;	4
	(d)	(i)	• The curve is to the left (of the curve for the domestic duck); • Haemoglobin therefore has a higher affinity for oxygen; NOT goose has higher affinity for oxygen • Hb can therefore become fully saturated at a lower ppO_2 / has higher percentage saturation with oxygen at {any/all} ppO_2;s; • Enables geese to {fly/ live at high altitude / migrate over Everest} where the {ppO_2/oxygen concentration} is very low;	4
		(ii)	Harder to unload oxygen/ less dissociation of oxygen at any given pO_2;	1
			Question 6 total	**[13]**

Question			Marking details	Marks Available
7	*(a)*		A. Cardiac muscle is myogenic/can It can generate its own impulse/it does not need to be stimulated by a nerve to make it contract; B. The sino atrial node/pacemaker; C. Sends out an impulse/a wave of excitation/ initiate heartbeat; D. Causing atrial systole / the atria to contract; E. This reduces the volume/increases the pressure in the atria; F. blood flows into the ventricles (from the atria); G. The impulse/wave of excitation is picked up by the atrio-ventricular node/ AVN delays impulse; H. And is conducted down the bundle of His/ Purkinje fibres (to the apex of the ventricles)/ I. The impulse spreads upwards along the Purkinje fibres; J. Causing {ventricular systole/ the ventricles to contract} from the {<u>apex/ bottom upwards</u>}; K. This reduces the volume <u>and</u> increases the pressure in the ventricles; L. When the pressure in the ventricles <u>exceeds</u> the pressure in the atria the {atrio-ventricular valves/bicuspid valve/tricuspid valve} close; M. This prevents the back-flow of blood into the atria; N. When the pressure in the ventricles <u>exceeds</u> the pressure in the {arteries/aorta/pulmonary artery} the {semi-lunar/aortic} valves open; O. This forces blood (out of the ventricles and) into the arteries; **Question 7 total**	**[10]**

Question			Marking details	Marks Available
7	*(b)*		A. Arteries/veins are composed of three layers; Accept from diagram B. Endothelium is smooth to reduce friction; C. Arteries have thick walls to withstand high pressure; D. Many {elastic fibres/ elastic recoil} to force blood along the artery; E. Many muscle fibres to maintain high blood pressure; Accept small lumen F. Arterioles can adjust their diameter to control blood flow to different parts of the body; G. Veins have thinner walls as blood pressure is low; H. Veins have large diameter lumens I. to reduce frictional resistance to blood flow; J. Veins contain valves to ensure blood flows in one direction/prevent the back-flow of blood; K. Capillary walls are one cell thick Accept from diagram L. to give a short diffusion distance (for gas exchange); M. {Fenestrations/pores} in the capillary wall allow molecules to pass out of the plasma into the tissue fluid/ allows formation of tissue fluid; N. They have {a small diameter/ friction}; O. {reduces the speed of blood flow/ allowing more time for exchange with the surrounding tissue (fluid)}; **Question 7 total**	**[10]**