



MARKING SCHEME

SUMMER 2016

**LEVEL 1/2 AWARD IN APPLIED SCIENCE (IVQ)
9846/01**

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.

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Unit	Question	Marking point	Marks
1	1 (a)	(i) respiration / decay (ii) photosynthesis (iii) combustion (iv) feeding 3 correct (3) 2 or 3 correct (2) 1 correct (1)	3
	(b)	Ref to recycling CO ₂ or description (1)	1
	(c)	Any (2) x 1 from: bacteria (1) fungi (1) decomposers(1)	2
	(d)	<ul style="list-style-type: none"> • huge amounts of water are needed that must be transported to the fracking site • this has a significant environmental impact • potentially (carcinogenic/poisonous) chemicals used may escape (from ground water) and cause illness • can cause small earth tremors/earthquakes Building damage	4
2	2 (a) (i)	<i>A and B - given</i> C and D (1) B (1) and C (1)	3
	(ii)	Na ₂ SO ₄ + CO ₂	2
	(b) (i)	As time increases volume of (CO ₂) is given off increases (1) less volume of (CO ₂) given off (after 80s)/ levels off (1)	2
	(ii)	More {substrate/substance/reactant/acid} reacts / more gas / reaction is reaching completion (1) {substrate/substance/reactant/acid} runs out less gas given off(1)	2

Unit	Question	Marking point	Marks
	(c)	pH increases/rises(1) acid becomes neutralised / neutralisation occurs(1)	2
	(d)	24 x 0.5 = 20 x conc sulfuric acid 0.6 mol/dm ³ 1 mark substitution 1 mark manipulation 1 mark correct answer Correct answer only (3)	3

Unit	Question	Marking point	Marks
3	(a) (i)	Detect/localization of prey/ determine direction of sound	1
	(ii)	Improves collection of sound / hear better	1
	(iii)	echolocation	1
	(iv)	Hertz / unit of frequency / waves per second	1
	(v)	Stop flying at night / fly during the day (1)	2
		Stop flying if they hear bats clicks / change direction (1)	
	(b)	Refer to hearing loss – any (4)	4
		<ul style="list-style-type: none"> • Normal 125 – 500 Hz • Becomes mild 400 • Moderate at 1600 – 3000Hz • Severe + 3000Hz • Can state the extent of loss e.g. 30dB loss at 1000Hz etc 	
		Accept:	
		2 marks awarded for increasing frequency increases hearing loss OR 2 marks awarded for increasing frequency increases loudness required	
	(c)	Microphone --- picks up sound Speaker --- changes electrical signal into sound Battery --- provides electrical energy	2
		3 correct (2) 2 or 1 correct (1)	
	(d)	Detects the {sound (waves/energy)} / contains sensory cells	2
		sends nerve impulse to brain (via auditory nerve)	
	(e)	kinetic (movement) to (chemical)(1) to electrical energy (1)	2

Unit	Question	Marking point	Marks
4	4 (a)	5 correct plots (2) 4 correct plots (1) 3,2,1 correct plots (0) Tolerance $\pm \frac{1}{2}$ square joint points (1)	3
	(b) (i)	5.2 – 6	1
	(ii)	Increase in distance (1) decrease in SO ₂ conc (1)	2
	(iii)	<ul style="list-style-type: none"> Growth reduced or stopped in {polluted areas / high CO₂} (1) SO₂ dissolves in the water (1) Forms acid / Lowers pH (1) Lichen sensitive to {lower pH / SO₂} / acid kills lichen (1) 	4
5	5 (a) (i)	36.9 / 37 (°C)	1
	(ii)	10 hours	1
	(b)	Any 3 x (1): <ul style="list-style-type: none"> evaporation of sweat (1) needs heat energy (1) heat removed from the body (1) temperature drops / cools patient (1) 	3
	(c)	Any 4 x (1) <ul style="list-style-type: none"> Increase in white blood cell production engulf microbe produce antibodies increase temp - increase chemicals/ (interferon) bactericides in body reduces microbes ability to reproduce ref to physical / chemical barriers 	4
	(d)	death/hyperthermia	1