Rewarding Learning

General Certificate of Secondary Education
2012

Biology

Unit 1

Higher Tier

[GBY12]

WEDNESDAY 30 MAY, AFTERNOON

MARK SCHEME

				AVAILABLE MARKS
1	**(a)**	A – Palisade (mesophyll cell); B – Guard cell; C – Lower epidermis (cell);	[1] [1] [1]	
	(b)	Thin/clear/transparent/no pigment;	[1]	4
2	**(a)**	Nerves carry **electrical** (impulses); Hormonal system uses **chemical** (messages);	[1] [1]	
	(b) **(i)**	The larger the diameter of the nerve, the higher/faster the speed (of conduction);	[1]	
	(ii)	Faster **response**/**reflex**/**reaction rate** (/time); **Reject**: "faster conduction rate" unqualified	[1]	4
3	**(a)**	As age increases so does the amount of energy required; Boys require more energy than girls;	[2]	
	(b)	Increased weight/BMI/obesity; Increased risk of heart disease/heart attack/stroke/high blood pressure/ diabetes/arthritis;	[2]	
	(c)	More energy required for **growing**/**developing** embryo;	[1]	
	(d)	Genetics/inherited factors/alcohol/smoking/drugs;	[1]	6

AVAILABLE MARKS

4 (a) Indicative content:

1 Dish B (/with more iodine) has a larger dark (blue/black) area than dish A;
2 Iodine turns starch blue/black colour;
3 Larger concentration of/more iodine in **B**/**5%**;
4 Iodine (diffuses) through the agar;
5 Increasing the concentration of iodine solution speeds up the rate of **diffusion**;
6 From region of high concentration to region of low concentration;

Response	Marks
Candidates must use appropriate specialist terms throughout to describe and explain the conclusions from the results using **at least 5** of the above points. They use good spelling, punctuation and grammar and the form and style are of a high standard.	[5]–[6]
Candidates use some appropriate specialist terms throughout to describe and explain the conclusions from the results using **at least 3** of the above points. They use satisfactory spelling, punctuation and grammar and the form and style are of a satisfactory standard.	[3]–[4]
Candidates make little use of specialist terms throughout to describe and explain the conclusions from the results using **at least 1** of the above points. The spelling, punctuation and grammar, form and style are of a **limited** standard.	[1]–[2]
Response not worthy of credit.	[0]

[6] 6

5 (a) (i) A – respiration; [1]
B – fossilisation; [1]
C – combustion; [1]

(ii) Photosynthesis; [1]

(b) (i) (22 × 100) ÷ 100;
22%; [2]

(ii) Any **two** from:
(**In city**) more factories/more industrial;
More vehicles/cars etc;
More houses;
Less living organisms;
Accept: converse in countryside [2] 8

				AVAILABLE MARKS
6	**(a)**	(Animal) cell which divides/clones/mitosis; Unspecialised/undifferentiated/later becomes specialised/described;	[2]	
	(b)	Any **two** from: Easier to **grow**/**culture**; Easier to extract/obtain/plentiful; Can develop into different cell types/tissues; **Accept**: converse for adult stem cells **Accept**: more in placenta/umbilical than in adult bone marrow	[2]	
	(c)	Any **three** from: Involves killing/destroying embryo/human life; Against their religion/playing God; Human rights of embryo; Other appropriate response;	[3]	
	(d)	Nervous; **Reject**: brain/brain tissue	[1]	8

AVAILABLE MARKS

7 **(a)** **(i)** A – bronchus; [1]
B – diaphragm; [1]

(ii) Ribs/intercostal muscles/pleural membranes; [1]

(iii) **Pulling rubber** sheet/diaphragm/B **down**;
(Belljar/thorax/chest/lung) volume increases or
Pressure decreases; [2]

(b) Any **two pairs** *(feature; appropriate adaptation;)* from:
(Many) alveoli; Large surface area;
Close to blood supply/surrounded by capillaries; Maintain (high) diffusion;
Thin walls; short diffusion distance;
Moist (lining); Allows gases to **dissolve**;
Permeable (membranes); Allows gases to diffuse through;
Ventilation; (maintain high) **diffusion** gradient; [4]

(c) **Indicative content:**
1 Oxygen % reduced (in exhaled);
2 Carbon dioxide % increased (in exhaled);
3 More moisture/water vapour (exhaled);
4 More heat/warmer (are exhaled);
5 Respiration (in cells);
6 In (body) cells; into blood;
7 Transported in/diffused into blood/lungs;
Reject: reference to nitrogen

Response	**Mark**
Candidates must use appropriate specialist terms throughout to explain how named features of the respiratory system are adapted for gas exchange **using at least 5 of the above points**. They use **good** spelling, punctuation and grammar and the form and style are of a **high standard**.	[5]–[6]
Candidates use some appropriate specialist terms throughout to explain how named features of the respiratory system are adapted for gas exchange **using at least 3 of the above points**. They use **satisfactory** spelling, punctuation and grammar and the form and style are of a **satisfactory standard**.	[3]–[4]
Candidates make little use of specialist terms throughout to explain how named features of the respiratory system are adapted for gas exchange **using at least 1 of the above points**. The spelling, punctuation and grammar, form and style are of a **limited standard**.	[1]–[2]
Response not worthy of credit.	[0]

[6]

15

				AVAILABLE MARKS
8	**(a)**	Villus;	[1]	
	(b)	A – lacteal; transports/absorbs fats;	[2]	
		B – capillary; Transports/soluble (digested) food molecules/named example/ or maintains diffusion gradient;	[2]	
	(c)	One cell thick/short diffusion distance; **Accept**: microvilli; produces mucus;	[1]	6
9	**(a)**	**Z** – Respiration;	[1]	
	(b)	**Y** – Primary consumer;	[1]	
	(c)	**(i)** = 3300; kJ;	[2]	
		(ii) Energy passes to decomposers;	[1]	
		Not all plant (cells/tissues) can be **digested/absorbed** by Y;	[1]	
	(d)	Any **two** from: Only certain amount/limited amount of energy fixed by producers; Energy lost at each trophic level/step/stage; After 3 trophic levels 30 kJ left; Not enough energy/secondary consumers in the area to support another level/Tertiary consumers would have to eat many secondary consumers;	[2]	8

					AVAILABLE MARKS
10	**(a)**	**(i)**	Phototropism;	[1]	
		(ii)	Auxin;	[1]	
	(b)		**Sensitive to light**: B/C;	[1]	
			Tip covered so no light hits tip;	[1]	
			Involves diffusion of plant hormone from tip;	[1]	
			D; Glass stops hormone moving down stem; or B; no tip to produce hormone/no auxin/no response;	[1]	
	(c)		Light causes uneven distribution (of hormone);	[1]	
			Hormone causes **cell** elongation;	[1]	
			More (Cell) elongation/growth on dark side;	[1]	
	(d)		Any **two** from: Dandelions have larger surface area; (Dandelions) absorb **more** or **lethal** concentration of weedkiller; Abnormal/excessive growth/respiration leading to death;	[2]	
	(e)		Less **competition**; For **named** resource/able to access more of a **named** resource; **Accept**: water/light/nutrient/space	[2]	
	(f)		Any **two** from: All fruit same/uniform size/fully developed; Ripe at same time/harvested at same time; Decreased harvesting costs/more profit;	[2]	15
11	**(a)**		(Involves different) scientists **working together/in teams**; Sharing ideas/publishing results/research of past discoveries; Different scientists did their own type of experiment/did further work;	[3]	
	(b)		Peer review/by other scientists **repeating** the work; Do **not** accept: Bauting and Best were supervised	[1]	
	(c)		Presence of glucose in urine/lethargy/thirst/frequent urination;	[1]	
	(d)		Blood glucose concentration constantly **monitored** (by pancreas); Change in concentration of insulin produced returns blood glucose concentration to normal;	[2]	
	(e)		Any **three** from: Produced in the pancreas; In response to **falling** blood glucose; Acts in liver; Causes glycogen to be converted to glucose; which is released into the blood or increases glucose concentration;	[3]	10

	AVAILABLE MARKS

12 (a) Any **three** from:
More nitrates;
Eutrophication;
algae growth/plants grow;
Light blocked by suspended solids/shading;
Nutrients used up;
Therefore plants die [3]

(b) 1 km; [1]

(c) **Indicative content**:
1 Bacteria breakdown/decay/feed on sewage (suspended solids)
2 Bacteria grows/increase when/are high in sewage (/suspended solids) released;
3 Bacteria/respiration is anaerobic;
4 (so) Dissolved oxygen falls between 1 and 2 km along river;
5 Bloodworms can survive in low oxygen (anaerobic conditions)/ increased population in low oxygen;
6 Bloodworms are indicator species/indicate polluted water;
7 3 km all sewage solids decomposes therefore bacteria/ bloodworms decrease/O_2 rises;

Response	**Mark**
Candidates must use appropriate specialist terms throughout to explain the link between bacteria and bloodworms **using at least FIVE of the above points, in a logical sequence**. They use **good** spelling, punctuation and grammar and the form and style are of a **high standard**.	[5]–[6]
Candidates use some appropriate specialist terms throughout to explain the link between bacteria and bloodworms **using at least THREE of the above points, in a logical sequence**. They use **satisfactory** spelling, punctuation and grammar and the form and style are of a **satisfactory standard**.	[3]–[4]
Candidates make little use of specialist terms throughout to explain the link between bacteria and bloodworms **using at least ONE of the above points, in a limited sequence**. The spelling, punctuation and grammar, form and style are of a **limited standard**.	[1]–[2]
Response not worthy of credit.	[0]

[6] 10

Total **100**