



Rewarding Learning

**General Certificate of Secondary Education
2011**

Science: Biology

Paper 1
Higher Tier

[G0903]

THURSDAY 19 MAY, AFTERNOON

**MARK
SCHEME**

			AVAILABLE MARKS	
1	(a)	Water;	[1]	5
		Chlorophyll;	[1]	
		Sugar/glucose/starch;	[1]	
	(b)	Any PAIR [<i>mineral</i> + <i>appropriate use</i>] from: Calcium; Cell walls; Magnesium; Chlorophyll; Nitrate; Growth/protein production/amino acid production;	[2]	
2	(a)	Carbohydrates;	[1]	6
		Proteins;	[1]	
	(b)	Protects baby from infection/confers immunity;	[1]	
	(c)	Any two from: Convenience (correct temp/no sterilising bottles); Maternal bond/security/love; Easier absorbed/digested; Easier to wean; Helps prevent childhood diabetes; Less cost; Help prevent breast/ovarian cancer in mother;	[2]	
	(d)	May pass virus on to baby/would be in milk;	[1]	
3	(a)	A – combustion/burning;	[1]	6
		B – photosynthesis;	[1]	
		C – respiration;	[1]	
	(b)	animal eats plant; made into animal <u>carbohydrates/fats/proteins</u> ;	[2]	
	(c)	Coal/natural gas/oil/peat;	[1]	

			AVAILABLE MARKS
4	(a) Dentine;	[1]	6
	(b) Blood (named example)/nerve (neurone);	[1]	
	(c) (Bacteria) use/respire/break down sugars from food; Produce acid which corrodes the enamel;	[2]	
	(d) Enamel;	[1]	
	(e) Lack of freedom of choice/excess can cause fluorosis;	[1]	
5	(a) A – Lens;	[1]	7
	B – cornea;	[1]	
	C – retina;	[1]	
	(b) Optic nerve; carries impulses to brain ;	[2]	
	(c) Pupil dilated;	[1]	
6	(d) Eyelid/conjunctiva eye socket;	[1]	8
	(a) To kill any harmful bacteria/microorganisms;	[1]	
	(b) (Starter) bacteria killed by heating;	[1]	
	(c) Any three from: respiration; fermentation/anaerobic; feed on sugar; produces acid; multiply/grow;	[3]	
	Quality of written communication	[2]	
(d) slows microorganism growth/decay of yoghurt;	[1]		
7	(a) A – (waxy) cuticle;	[1]	5
	B – Spongy (mesophyll);	[1]	
	C – Guard cell;	[1]	
	(b) Large number of chloroplasts/neatly aligned/near top of leaf; to trap light/for photosynthesis;	[2]	

		AVAILABLE MARKS
8	(a) Fewer trees cut down/more trees left standing/more trees to absorb CO ₂ ;	[1]
	Less (waste paper) to landfill/less space used for landfill;	[1]
	(b) <i>Any TWO from:</i> Increased use of (fossil) fuel/named example; Increased production of CO ₂ /SO ₂ /NO _x ; Increased greenhouse effect/global/warming/acid rain;	[2]
	(c) Poor quality/more expensive;	[1]
		5
9	(a) Inhaling; chemicals eg. glue;	[2]
	(b) <i>Any TWO from:</i> Heart damage; Damage to liver/bone marrow/kidneys; Damage to respiratory system/swelling of throat or air passages; Poisonous/toxic; Death; Damage to brain/blurred vision;	[2]
	(c) <i>Any TWO from:</i> increased medical costs; family problems/violence; vandalism; absenteeism;	[2]
		6
10	(a) Plasma; forced out/under pressure; through capillary wall;	[3]
	(b) Blood cells; (plasma) proteins;	[1] [1]
	(c) Absorb/drain away (excess) tissue fluid;	[1]
		6
11	(a) plant grows ; towards light/window;	[2]
	(b) phototropism; more photosynthesis/ more light;	[2]
	(c) <i>Any TWO from:</i> selective weedkiller; rooting powder; Stimulate flowering; fruit formation/seedless fruit; fruit ripening;	[2]
		6

		AVAILABLE MARKS
12 (a)	skin labelled R;	[1]
(b)	pathway – sensory neurone; association neurone; motor neurone; synapse; (Any three)	[3]
(c)	muscle contracts ; moves arm (away);	[2]
6		
13 (a)	A chemical that kills pest;	[1]
(b)	(0.16 – 0.04/0.12); 300%/correct method ÷ 0.04 then × 100 or × 100 then ÷ 0.04;	[1] [1]
(c)	<i>Any TWO from:</i> Not broken down/digested/excreted, Remains/persists in body; Each consumer eats several plants/animals in the level below;	[2]
(d)	Effective at killing pests; Economic/cheap compared to modern non-polluting insecticides;	[1] [1]
7		
14 (a)	Diffusion;	[1]
(b)	Concentration gradient/described; Maintain the diffusion/movement of substances (named example) out of the blood/into the dialysis solution;	[1] [1]
(c)	Salt level normally regulated by kidneys/kidneys not able to remove salt; OR High salt level in blood causes osmotic effects/described;	[1]
(d)	Disadvantage – lack of donor/surgery/risk of infection/risk of rejection; Advantages – <i>Any TWO from:</i> Permanent cure/reduced chance of infection; Can eat a normal diet; No visits to hospital 2/3 times per week/better quality of life;	[3]
7		

		AVAILABLE MARKS		
15	(a) (i) Abnormal cell division; capable of spreading;	[2]	8	
	(ii) Prevents cell division/DNA replication;	[1]		
	(iii) Smaller tumour easier to remove/causes less pain;	[1]		
	(iv) Radiation more concentrated on tumour/ less damage to healthy tissue;	[1]		
	(b) (i) Ultra violet/UV;	[1]		
	(ii) <i>Any TWO from:</i> CFCs; from aerosols/refrigerators/air conditioning; depletes ozone; so more UV enters;	[2]		
16	(a) increase the number of eggs; maturing at once;	[2]		8
	(b) via a needle <u>from the ovary</u> ;	[1]		
	(c) to check for fertilization; cells dividing/developing/growing/alive;	[2]		
	(d) implantation;	[1]		
	(e) <i>Any TWO from:</i> blocked oviducts; not ovulating; Uterus removed;	[2]		
17	(a) Different forms of the same gene;	[1]	9	
	(b) The appearance of the organism;	[1]		
	(c) Hornless; Hornless allele is dominant/heterozygous genotype has one dominant and one recessive allele/Hh;	[1]		
		[1]		
	(d) Mate with horned bull /homozygous recessive; If any horned calves then cow is heterozygous/Hh; If no horned calves/all hornless then cow is homozygous hornless/HH;	[1]		
		[1]		
	(e) Backcross/testcross;	[1]		
	(f) Fertilization is random/only 50% chance of Hh;	[1]		

18 (a) Reduced activity; Enzyme <u>denatured</u> ;	[1]	AVAILABLE MARKS
	[1]	
(b) Mouth/pancreas/duodenum/small intestine;	[1]	
(c) A protein; Catalyses/speeds up reactions; Breaking down proteins (to amino acids);	[1]	
	[1]	
	[1]	
(d) Stomach; Highest activity/optimum at pH 3;	[1]	
	[1]	
(e) Temperature/substrate concentration/substrate surface area;	[1]	9
Total		120