



General Certificate of Secondary Education  
2011

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**Science: Biology**

Paper 1  
Higher Tier

[G0903]

THURSDAY 19 MAY, AFTERNOON

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**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 <b>to brain</b> ;	[2]	
	(c) Pupil dilated;	[1]	
6	(d) Eyelid/conjunctiva eye socket;	[1]	8
	(a) To kill any <b>harmful</b> 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	<p>(a) Fewer trees cut down/more trees left standing/more trees to absorb CO<sub>2</sub>;</p> <p style="padding-left: 20px;">Less (waste paper) to landfill/less space used for landfill;</p> <p>(b) <i>Any <b>TWO</b> from:</i>            Increased use of (fossil) fuel/named example;            Increased production of CO<sub>2</sub>/SO<sub>2</sub>/NO<sub>x</sub>;            Increased greenhouse effect/global/warming/acid rain;</p> <p>(c) Poor quality/more expensive;</p>	<p>[1]</p> <p>[1]</p> <p>[2]</p> <p>[1]</p> <p>5</p>
9	<p>(a) Inhaling; chemicals eg. glue;</p> <p>(b) <i>Any <b>TWO</b> 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;</p> <p>(c) <i>Any <b>TWO</b> from:</i>            increased medical costs;            family problems/violence;            vandalism;            absenteeism;</p>	<p>[2]</p> <p>[2]</p> <p>[2]</p> <p>6</p>
10	<p>(a) Plasma; forced out/under pressure; through capillary wall;</p> <p>(b) Blood cells; (plasma) proteins;</p> <p>(c) Absorb/drain away (excess) tissue fluid;</p>	<p>[3]</p> <p>[1] [1]</p> <p>[1]</p> <p>6</p>
11	<p>(a) plant <b>grows</b>; towards light/window;</p> <p>(b) phototropism; <b>more</b> photosynthesis/<b>more</b> light;</p> <p>(c) <i>Any <b>TWO</b> from:</i>            selective weedkiller;            rooting powder;            Stimulate flowering;            fruit formation/seedless fruit;            fruit ripening;</p>	<p>[2]</p> <p>[2]</p> <p>[2]</p> <p>6</p>



			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 <b>TWO</b> from:</i> CFCs; from aerosols/refrigerators/air conditioning; depletes ozone; so <b>more</b> 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 <b>TWO</b> 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 <b>horned bull</b> /homozygous recessive;	[1]		
		If any <b>horned</b> calves then cow is heterozygous/Hh;	[1]		
		If <b>no horned calves/all hornless</b> then cow is homozygous hornless/HH;	[1]		
	(e)	Backcross/testcross;	[1]		
	(f)	Fertilization is random/only 50% chance of Hh;	[1]		

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