



**General Certificate of Secondary Education
2012**

Science: Biology

Paper 1
Higher Tier

[G0903]

WEDNESDAY 30 MAY, AFTERNOON

**MARK
SCHEME**

			AVAILABLE MARKS		
1	(a)	A – Cytoplasm; B – Chloroplast; C – Nucleus;	[3]	5	
	(b)	Cell wall; Vacuole;	[2]		
2	(a)	$90 \div 100\,000/0.0009$ (or $0.001\ 3dp$); $1\,742\,000 \times 0.0009$; ($1568 = [2]$) Accept 1567.8 or 1567 or 1568	[2]	6	
	(b)	(i)	Blockage; In coronary blood vessel;		[2]
		(ii)	No oxygen/sugar reaches heart muscle/cells/tissue/organ ;		[1]
	(c)	Exercise (regularly);	[1]		
3	(a)	Purple; Red; Respiration;	[3]	6	
	(b)	Control;	[1]		
	(c)	Size of leaf; Volume of indicator; Temperature; Time;	[2]		
4	(a)	Mechanical – Condom/Cap/IDU/coil; Chemical – Pill/Spermicide;	[2]	6	
	(b)	Any one from: Permanent; Don't have to remember to take it/use before intercourse;	[1]		
		(c)	Have to remember to take/side effects;		[1]
	(d)	Abstain from intercourse; During 2–3 days before and after ovulation (/day 14 of cycle);	[2]		

			AVAILABLE MARKS
5	(a) A – Uterus; B – Amnion; C – Cervix;	[3]	7
	(b) B – (Amnion) ruptures/bursts; C – (Cervix) dilates/widens;	[2]	
	(c) Contracts; Pushing baby out;	[2]	
6	(a) 45; 15;	[2]	8
	(b) Energy/heat lost to – atmosphere/air/apparatus; boiling tube;	[1]	
	(c) Any three from: Gender/males require more energy than females; Age/younger people require more energy than older; Activity/people who are sporty require more energy; Pregnancy/woman needs extra energy for the growth of the foetus;	[3]	
	Quality of written communication	[2]	
7	(a) Dilates/widens; More blood to the surface/ more heat lost/ more heat radiated through surface;	[2]	5
	(b) Evaporation of sweat requires/takes heat from the body; Muscle contraction produces/generates/releases heat;	[2]	
	(c) Trap a layer of air for insulation;	[1]	
8	(a) A – Retina; B – Optic nerve; C – Iris;	[3]	6
	(b) Protection against infection/entry of microorganisms;	[1]	
	(c) C (<i>NCM</i>) /Iris closed in/pupil small; Prevents too much light entering/damaging retinal cells;	[2]	
9	(a) (i) Breaks down/digests/decomposes dead organic material;	[1]	5
	(ii) Fungi;	[1]	
	(b) (Greater) aeration/(more) oxygen/(more) respiration; Bacteria/saprophytes more evenly spread;	[2]	
	(c) Warmer/doesn't dry out;	[1]	

			AVAILABLE MARKS
10	(a) 1900; thousand tonnes;	[2]	6
	(b) Allows time to reproduce;	[1]	
	(c) Any three from: Quotas; Smaller nets; Larger mesh size; Decommissioning of boats/licence; Seasonal ban/limit time at sea;	[3]	
11	(a) Potometer;	[1]	7
	(b) Arrow ←;	[1]	
	(c) To move (air) bubble to right/zero/to reset bubble;	[1]	
	(d) Any three from: Fan, then no fan; Measure distance moved by (air) bubble; In certain time /stated time ; Repeat a number of times/average;	[3]	
	(e) Humidity/temperature/light/leaf area;	[1]	
12	(a) Decreases/thinner;	[1]	6
	(b) CFCs;	[1]	
	(c) Aerosols/refrigerator (air conditioning) coolants;	[1]	
	(d) UV;	[1]	
	(e) Increased skin cancer; Increased cataracts/eye cancer;	[2]	
13	(a) Inherited on the sex chromosomes;	[1]	6
	(b) (male/Y chromosome) is shorter/smaller/carries fewer or different genes (/alleles);	[1]	
	(c) Carrier/heterozygous;	[1]	
	(d) Women require two h/recessive haemophiliac/alleles/genes ; Men require only one h/recessive/haemophiliac alleles/genes ;	[2]	
	(e) Colour-blindness/any correct answer (see http://en.wikipedia.org/wiki/List_of_genetic_disorders)	[1]	

			AVAILABLE MARKS	
14	(a)	Concentration of minerals is higher in root/plant/cell;	[1]	7
	(b)	Plants use oxygen/sugar for respiration; To produce energy/uses energy; To move mineral against/up concentration gradient;	[3]	
	(c)	[Hair/finger-like extension gives] large surface area;	[1]	
	(d)	Calcium – (New) cell walls; Magnesium – Chlorophyll;	[2]	
15	(a)	Carbon, hydrogen, oxygen, nitrogen;	[1]	8
	(b)	Liver; Glycogen;	[2]	
	(c)	Kidney; Ultrafiltration ;	[2]	
	(d)	Down ureters to bladder ; Out through urethra ;	[2]	
	(e)	Urine is toxic/poisonous;	[1]	
16	(a)	Chromosomes replicate/duplicate/copied; Separate into two (daughter) cells;	[2]	8
	(b)	Any two from: Mitosis one division, meiosis two divisions; Mitosis produces two cells, meiosis four cells; Mitosis produces (genetically) identical cells, meiosis (genetically) different cells; Mitosis produces diploid cells, meiosis haploid cells;	[2]	
	(c)	Any two from: Gametes (sperm and eggs) contain different alleles/chromosomes/genes/DNA /independent assortment; During fertilisation random; Different children have different combinations of alleles/chromosomes;	[2]	
	(d)	23; 46;	[2]	

		AVAILABLE MARKS
17	<p>(a) Artery wall is thick/muscular/has elastic (fibres) and capillary wall is one cell thick;</p> <p>Artery wall is thick/muscular/has elastic (fibres) and vein wall is thin/has valves;</p> <p>(b) Tissue fluid;</p> <p>(c) High pressure in artery/fluid forced; Through capillary walls;</p> <p>(d) (i) Any two from: Oxygen; Glucose/sugar/amino acids/fatty acids/glycerol; Hormones;</p> <p>(ii) Carbon dioxide/nitrogen wastes;</p> <p>(e) Returned to blood system;</p>	<p>[1]</p> <p>[1]</p> <p>[1]</p> <p>[2]</p> <p>[2]</p> <p>[1]</p> <p>[1]</p> <p>[1]</p>
18	<p>(a) A – Denitrification; B – Consumption/feeding; C – Decomposition;</p> <p>(b) Nitrate/nitrite/ammonium compounds;</p> <p>(c) Any two from: Minerals (nitrates/nitrogen compounds) absorbed/used by plants for growth; Minerals (nitrates/nitrogen compounds) removed when plants are harvested; Fertilizers replace minerals (nitrates/nitrogen compounds);</p> <p>(d) Change nitrogen gas into ammonium compounds/amino acids/nitrates; More in soil/more absorbed; Used to make proteins (for growth); or Improved soil texture/crumb structure; More aeration/O₂; For active uptake;</p>	<p>[3]</p> <p>[1]</p> <p>[2]</p> <p>[3]</p>
Total		<p>9</p> <hr/> <p>120</p>