

# Mark Scheme (Results)

## January 2009

GCE

GCE O level Biology  
7040/02

## Section A

Question Number	Answer	Mark
1(a) (i)	taken into cell / engulfed / eq;	(1)
1(a) (ii)	breakdown / large / insol. / protein to small / sol. / amino acid;	(1)
1(a) (iii)	oxygen / carbon dioxide; (into) blood / (out of) blood;	(2)

Question Number	Answer	Mark
1(b)	1 mark for each correct answer from any of the following - maximum 3 mark.  alveoli / air sacs; digested / destroyed / eq; less surface area; less (gas) exchange of oxygen/ eq; emphysema;	(3)

Question Number	Answer	Mark
1(c)	1 mark for each correct answer from the following.  need oxygen / unable to get enough oxygen; for respiration / energy;	(2)

Question Number	Answer	Mark
1(d)	Aa and Aa; A and a A and a; AA Aa Aa aa; normal normal normal emphysema /eq ;  Accept carrier for heterozygotes	(4)

Question Number	Answer	Mark
1(e) (i)	blood group / tongue roll / eq;	(1)
1(e) (ii)	height / weight / eq;	(1)

(Total 15 marks)

Question Number	Answer	Mark
2(a)	945;	(1)

Question Number	Answer	Mark
2(b)(i)	minus; 25.49 / 25.5(%);; Allow one for 25 / minus 25 = 2	(3)

Question Number	Answer	Mark
2(b)(ii)	light (intensity); temperature; increased rate of photosynthesis;	(3)

Question Number	Answer	Mark
2(c)	1 mark for each correct answer - maximum 3 mark.  (pH) rose in A/alkaline/ fell in B; carbon dioxide (used in A) / produced in B; less respiration (of animals) in A / more in B; more plants in A/more photosynthesis / less in B;	(3)

(Total 10 marks)

Question Number	Answer	Mark
3(a)	1 mark for each correct answer - maximum 3 mark.  More active at night / nocturnal ; no predators / hidden from predators; more food ; more humid ; warmer ; animals cannot see / fall into trap / eq;	(3)

Question Number	Answer	Mark
3(b)(i)	stop animals being eaten (by predators) / stop being washed out / stop escape / prevent bait stolen;	(1)
3(b)(ii)	attract animals / keep animals alive / eq;	(1)
3(b)(iii)	same mass / amount / age; same species / eq;	(2)

(Total 7 marks)

Question Number	Answer	Mark
4 (a)	<b>Step</b>	<b>Reason for step</b>
	1. soak one set of peas in water for 24 hours	allow seeds to germinate;
	2. boil second batch of seeds	kill seeds / set up control / describe control;
	3. wash both sets of peas in disinfectant	remove/kill surface bacteria / eq;
	4. place each set of peas in different vacuum flask and leave for several days	(Compare heat production)
		(3)

Question Number	Answer	Mark
4(b)	retain heat / insulates / eq;	(1)

Question Number	Answer	Mark
4(c)	carbon dioxide out / air / oxygen in; seeds not killed / gas release / explosion / eq;	(2)

Question Number	Answer	Mark
4(d)	1 mark for each correct answer - maximum 2 marks.  live seeds increased/higher temperature / dead seeds decreased/lower temperature; respiration; produces heat;	(2)

(Total 8 marks)

Question Number	Answer	Mark
5(a)	S scale at least half and linear; L line straight and through points; A labelled and correct way; P points correctly plotted;;	(5)

Question Number	Answer	Mark
5(b)(i)	1 mark for correct answer - maximum 2 marks.  increase; decrease;	(2)
5(b)(ii)	1 mark for correct gas - maximum 3 marks.  respiration; bacteria / microorganisms / decomposers / eq; reproduction / increase in number; less food available / eq;	(3)

Question Number	Answer	Mark
5(c)	1 mark for each correct answer - maximum 4 marks  eg temperature; increases rate / increased energy of molecules / enzymes / eq;  eg moisture / humidity; increased rate; solution / activity of enzymes / eq;  pH; affects enzyme activity;  oxygen; increases rate / respiration;	(4)

(Total 14 marks)

Question Number	Answer	Mark
6	<p>1 mark for each correct answer from any of the following - maximum 6 marks.</p> <p>C + / - cigarettes / 1 group of smokers / 1 group of non-smokers / different numbers per day;</p> <p>O same person / people / gender / mass / eq;</p> <p>R more than one person / 2 or more in each group / repeat;</p> <p>M1 Finger on wrist / neck / artery / pulse;</p> <p>M2 per minute / per unit time;</p> <p>S same temperature;  same exercise / at rest;  same time of day;  same diet / eq;</p>	(6)

(Total 6 marks)

Total for Section A: 53 marks

## Section B

Question Number	Answer	Mark
7(a)	1 mark for each correct answer from any of the following - maximum 4 marks.  oxygen used; carbon dioxide produced; water produced; no lactic acid produced; higher energy / ATP yield;	(4)

Question Number	Answer	Mark
7(b)	1 mark for each correct answer from any of the following - maximum 4 marks.  SA:Vol; small have high (SA:Vol); (greater) heat loss; need to keep body temperature constant / eq; respiration generates heat;	(4)

(Total 8 marks)

Question Number	Answer	Mark
8(a)	<p>1 mark for each correct answer from any of the following - maximum 4 marks.</p> <p>oxygen used / decreases / eq;  death of organisms;  bacteria / microorganisms / fungi;  respiration;  decomposers / decomposition decay;  algal growth / eutrophication;</p>	(4)

Question Number	Answer	Mark
8(b)	<p>1 mark for each correct answer from any of the following - maximum 4 marks.</p> <p>not enough energy available / energy loss;  respiration;  heat;  excretion / urine;  egestion / faeces / uneaten;  death;</p>	(4)

(Total 8 marks)

Question Number	Answer	Mark
9(a)	<p>1 mark for each correct answer from any of the following - maximum 4 marks.</p> <p>less growth;  less (contact with) oxygen;  less (contact with food) / nutrients;  less aerobic respiration / more anaerobic respiration;  build up of (toxic) waste products</p>	(4)

Question Number	Answer	Mark
9(b)	<p>1 mark for each correct answer from any of the following - maximum 4 marks.</p> <p>Identical / exact copy / eq;  genes from different species/other organisms/foreign;  make useful proteins;  large quantities;  e.g. human antibodies / insulin / factor VIII / eq;  organ transplants;</p>	(4)

(Total 8 marks)

Total for Section B: 16 marks

Section C

Question Number	Answer	Mark
10	<p>1 mark for each correct answer from any of the following - maximum 12 marks.</p> <p>glasshouses / Polythene tunnels / eq;  heaters / fire / paraffin heater;  increase temp;  increase carbon dioxide;  increases rate of photosynthesis;  (inorganic) fertilisers;  organic fertiliser/ manure;  increase nitrate/ mineral /eq;  light;</p> <p>pest control / pesticide;  insecticide;  less plants eaten;  herbicide;  fungicide  prevents competition;  biological control;  selective breeding;  cloning;  GM;  water / irrigation;  crop rotation;</p>	(12)

(Total 12 marks)

<ul style="list-style-type: none"> <li>• Question Number</li> </ul>	<ul style="list-style-type: none"> <li>• Answer</li> </ul>	<ul style="list-style-type: none"> <li>• Mark</li> </ul>
<ul style="list-style-type: none"> <li>• 11</li> </ul>	<ul style="list-style-type: none"> <li>• 1 mark for each correct answer from any of the following - maximum 12 marks.</li> <li>•</li> <li>• arteries; <ul style="list-style-type: none"> <li>• thick walls;</li> <li>• muscle / elastic walls;</li> <li>• high pressure;</li> <li>• small lumen;</li> </ul> </li> <li>•</li> <li>• arterioles; <ul style="list-style-type: none"> <li>• muscle fibres;</li> <li>• change lumen size;</li> <li>• vasoconstriction / dilation;</li> <li>• divert blood;</li> </ul> </li> <li>•</li> <li>• capillaries; <ul style="list-style-type: none"> <li>• small;</li> <li>• thin walled / one cell thick;</li> <li>• allow exchange / diffusion;</li> <li>• glucose / oxygen / CO<sub>2</sub> / eq.</li> </ul> </li> <li>•</li> <li>• veins; <ul style="list-style-type: none"> <li>• thin walled;</li> <li>• larger lumen;</li> <li>• <u>less</u> muscle and elastic tissue in walls;</li> <li>• valves;</li> <li>• lower pressure;</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• (12)</li> </ul>

(Total 12 marks)

Question Number	Answer	Mark
12	<p>1 mark for each correct answer from any of the following - maximum 12 marks.</p> <p>glomerulus; renal/Bowman's capsule; nephron; ultra filtration; ref. pressure; out of blood / into capsule; ions/ urea/ water/glucose;</p> <p>(selective) reabsorption; ONCE water/ glucose / amino acids / eq. back into blood; distal / proximal convoluted tubule;</p> <p>loop of Henle; osmoreceptors; increase in blood concentration; ADH; pituitary; changes permeability of; collecting duct; less urine; more concentrated urine; (urine enters) bladder; excreted;</p>	(12)

Total for Section C: 24 marks

Total for Paper: 100 marks