

Mark Scheme (Results) Summer 2010

GCE O

GCE O Biology (7040) Paper 01

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7040/01 O-LEVEL BIOLOGY MARK SCHEME - SUMMER 2010

Question number	Accept	Reject	Marks	
1 a	6/5 =3 4/3 = 2 2/1 =1		3	
	Process	Increase		Decrease
	Breathing rate	✓		
	Depth of breathing	✓		
	Heart rate	✓		
	Flow of blood to skeletal muscle	✓		
	Flow of blood to digestive system			✓
	Conversion of glycogen to glucose	✓		
Pupil size	✓			
b	oxygen / glucose; muscle; respiration / energy; escape / eq; removal of carbon dioxide / lactic acid;		Max 3	
Total Marks			6	

Question number	Accept	Marks																														
2 a	<table border="1"> <thead> <tr> <th>Group</th> <th>Multicellular</th> <th>Can carry out photosynthesis</th> <th>Have cell walls</th> <th>Example</th> </tr> </thead> <tbody> <tr> <td>Plants</td> <td>(yes)</td> <td>yes</td> <td>yes</td> <td>bean</td> </tr> <tr> <td>Animals</td> <td>(yes)</td> <td>no</td> <td>no</td> <td>human</td> </tr> <tr> <td>Fungi</td> <td>(some)</td> <td>no</td> <td>yes;</td> <td>eg ;</td> </tr> <tr> <td>Bacteria</td> <td>no</td> <td>(some)</td> <td>(yes)</td> <td>eg ;</td> </tr> <tr> <td>Viruses</td> <td>no;</td> <td>no;</td> <td>(no)</td> <td>eg ;</td> </tr> </tbody> </table>	Group	Multicellular	Can carry out photosynthesis	Have cell walls	Example	Plants	(yes)	yes	yes	bean	Animals	(yes)	no	no	human	Fungi	(some)	no	yes;	eg ;	Bacteria	no	(some)	(yes)	eg ;	Viruses	no;	no;	(no)	eg ;	6
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b	glucose / sugar; temperature; water / osmoregulation; salt / ions; pH / carbon dioxide;	Max 2																														
Total Marks		8																														

Question number	Accept	Reject	Marks														
3 a	cannot be replaced / lost forever / finite supply / eq; ignore recycled		1														
b	<table border="1"> <thead> <tr> <th>step</th> <th>order of step</th> </tr> </thead> <tbody> <tr> <td>Restriction enzyme cuts bacteria DNA</td> <td>(1)</td> </tr> <tr> <td>Transgenic crops grown in fields</td> <td>5;</td> </tr> <tr> <td>Ligase used to make recombinant plasmid</td> <td>3;</td> </tr> <tr> <td>Large amounts of bioplastic extracted</td> <td>(6)</td> </tr> <tr> <td>Restriction enzyme cuts plasmid DNA</td> <td>2;</td> </tr> <tr> <td>Recombinant plasmid put into crop plant using a vector</td> <td>4;</td> </tr> </tbody> </table>	step	order of step	Restriction enzyme cuts bacteria DNA	(1)	Transgenic crops grown in fields	5;	Ligase used to make recombinant plasmid	3;	Large amounts of bioplastic extracted	(6)	Restriction enzyme cuts plasmid DNA	2;	Recombinant plasmid put into crop plant using a vector	4;		4
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Recombinant plasmid put into crop plant using a vector	4;																
c	carbon dioxide; water;		2														
		Total Marks	7														

Question number	Accept	Reject	Marks
4 a i	mitosis;		1
ii	46 / 23 pairs;		1
iii	third box ticked / marked;		1
b	large surface area; diffusion / exchange; food / nutrients / amino acids / eq; glucose; oxygen; respiration; carbon dioxide; urea / waste; antibodies; prevent blood mixing; hormones / progesterone / maintain uterus/womb lining;		Max 5
		Total Marks	8

Question number	Accept	Reject	Marks														
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Total Marks	5																							

Question number	Accept	Reject	Marks
7 a	A <u>upper epidermis / epidermal</u> ; B <u>lower epidermis / epidermal</u> ; C guard cell;		3
b i	near top / near leaf surface / eq; for light / eq; <u>many</u> chloroplasts / eq; cells close together / elongated / eq;		Max 2
ii	air spaces / gaps / eq; gas exchange / diffuse / named gas / eq; moist surface / eq;		Max 2
c	xylem; transports water / minerals / ions / eq; phloem; transports sucrose / sugar / amino acids; Ignore glucose / food / products of photosynthesis;		Max 3
d	no shading / large SA / eq; helps trap (more) light; (more) photosynthesis;		2
Total Marks			12

Question number	Accept	Reject	Marks
8 a i	<i>Plasmodium</i> ;		1
ii	feeds / sucks / bites / eq; blood;		2
iii	E;		1
b	biological control / eq; pesticide / insecticide / eq; sterile males / eq; repellent / eq; drain pools / oil on water / eq; vaccine / drugs / eq; nets / eq;		2
		Total Marks	6

Question number	Accept	Reject	Marks
9 a i	X glomerulus; Y Bowman's capsule / renal capsule;		2
b i	water; urea; glucose;		2
ii	too big / eq;		1
c i	32;		1
ii	12,000;; allow one for 720 / 600 / 120 / 10 in working		2
d	dilute plasma / more water in plasma / eq; water (stays) in tissues/cells / not reabsorbed / eq; osmosis;		2
		Total Marks	10

Question number	Accept	Reject	Marks
10 a	biconcave / doughnut shaped; large surface area (to volume ratio); no nucleus so more space / eq; thin membrane;		Max 2
b i	cell membrane; cytoplasm; nucleus;		3
ii	lymphocytes; antibodies / antitoxins; antigens; phagocytes; ingest / engulf / surround / eq; digest / breakdown / kill / eq; enzymes;		Max 4
		Total Marks	9

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11 a	<table border="1"> <thead> <tr> <th>large insoluble molecule</th> <th>small soluble molecule</th> <th>enzyme</th> </tr> </thead> <tbody> <tr> <td>starch;</td> <td>(maltose)</td> <td>amylase / carbohydrase;</td> </tr> <tr> <td>(protein)</td> <td>amino acids / (poly)peptides;</td> <td>(protease)</td> </tr> <tr> <td>fat / lipid;</td> <td>(fatty acids and glycerol)</td> <td>lipase;</td> </tr> </tbody> </table>	large insoluble molecule	small soluble molecule	enzyme	starch;	(maltose)	amylase / carbohydrase;	(protein)	amino acids / (poly)peptides;	(protease)	fat / lipid;	(fatty acids and glycerol)	lipase;		5
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b i	X = <u>capillary</u> ; Y = <u>lacteal</u> ;		2												
ii	blood / plasma;		1												
c i	300; m ² ;		2												
ii	thin / small distance / one cell thick / eq; blood moves / maintain conc. gradient; lots of capillaries / vascular; microvilli;		Max 2												
		Total Marks	12												

Question number	Accept	Reject	Marks
12 a	as body mass increases rate of evaporation decreases / eq;		1
b	small; larger SA to Vol ratio; overheat / heat gain / body temp rise / eq; denature/destroy enzymes; dehydration / water loss / sweat / eq;		Max 3
c i	they sweat / eq;		1
ii	contain water / eq;		1
iii	<u>less</u> sweat (at night) / temperature lower (at night); Ignore less water loss		1
d i	(too) large / eq;		1
ii	activity produces heat / prevent overheating; death / enzymes / eq; avoid water loss / sweat;		2
iii	cells not damaged; by loss of water / osmosis; keep blood/plasma flowing; deliver glucose / oxygen; prevent strain on heart / eq;		Max 2
		Total Marks	12

(Total for paper: 100 marks)

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