

# Mark Scheme (Results) January 2010

GCE O

## GCE O Biology (7040) Paper 02

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## Section A

Question Number	Answer	Mark
1 (a)	beneficial/useful characteristics / free from inherited disease / have no abnormalities / eq;	1
(b)	1000;; allow one for 50 or 20 million in working	2
(c) (i)	prevent sperm damage sperm / protects against cold / eq;	1
(ii)	kill bacteria / protect from bacteria / eq; I germs	1
(iii)	<u>anaerobic</u> respiration;	1
(iv)	prevent water in/out of sperm / eq; osmosis; not harm/damage sperm / keep sperm alive / eq;	Max 2
(d)	uterus / womb;	1
(e)	sperm/bull with desired characteristics / eq; fertilise female / put into uterus / eq; choose offspring; repeat;	Max 3
(f)	more convenient / easier / less expensive / eq; helps increase populations of rare/endangered species / helps reduce extinction / eq; helps create genetic variety / eq;	Max 2

(Total 14 marks)

Question Number	Answer	Mark
2	(a) (i) Bangkok;	(1)
	(ii) burning fossil fuel / factories / cars / eq;	(1)
	(b) (i) developed countries: 158; developing countries: in range of 240.100 to 240.130	(2)
	(ii) SO <sub>2</sub> not the only pollutant; particulate matter high / eq; reference to range of values / eq; other named pollutant;	Max (2)
	(c) SO <sub>2</sub> reacts with water / clouds; acid; kills organisms / loss of organisms / eq; affect food chains / web / habitat / eq; affects health / bronchitis / breathing / eq;	(4)

(Total 10 marks)

Question Number	Answer	Mark
3 (a)	flask A; tube in air / tube not in liquid / eq;	2
(b) (i)	limewater/ hydrogencarbonate / eq.;	1
(ii)	flask A/inhaled stays clear/less cloudy / red / eq; flask B/exhaled goes milky / cloudy / orange / yellow;	2
(c) (i)	respiration; (uses) O <sub>2</sub> ; (produces) CO <sub>2</sub> ;	2 max
(c)(ii)	warmer; more moist; less dust / bacteria / eq; (allow converse)	2 max
(d)	intercostals; contract; diaphragm; flattens / eq. ; ribs up / out; volume increases; pressure decreases;	4 max
(e)	lung cancer; emphysema; bronchitis;	2 max

(Total 15 marks)

Question Number	Answer	Mark
4	(a) (i) Size: half grid; Lines: neat + straight + through points; Axes: correct way + labelled (response + time in minutes); Points;;	5
	(ii) reduces / eq;	1
	(b) (i) move away / escape / eq; predator / danger / eq;	2
	(ii) no danger / habituation / gets used to stimulus / eq;	1
	(iii) touch / pressure;	1
	(c) receptors; impulse; sensory neurone / sensory nerve; synapse; spinal cord; relay neurone / relay nerve; motor neurone / motor nerve; muscle / effector; contracts;	Max 5

(Total 15 marks)

Question Number	Answer	Mark
5	C      small and large rats; O      same age / species / strain / eq; R      repeat; M      number of offspring / how many; S1 + S2    same food / water / male / temperature / eq;;	6

(Total 6 marks)

## Section B

Question Number	Answer	Mark
6 (a)	<p>in low light little growth / little/low(er) effect; light limiting / not enough light / eq;</p> <p>in high light more growth / more/great(er) effect; carbon dioxide limiting / not enough carbon dioxide / eq;</p> <p>photosynthesis; more glucose / more energy / more starch / eq.;</p>	4 max
(b)	<p>thin + light in / gases in / diffusion; large surface area + absorb light / gases; cuticle / upper surface/epidermis + light in / transparent; chlorophyll/chloroplasts + absorb light; xylem + water transport; phloem + sucrose transport / eq.;</p> <p>stomata + CO<sub>2</sub> / gas exchange / oxygen / transpiration; spongy cells + diffusion / gas exchange; palisade cells + lots of chloroplasts;</p>	4 max

(Total 8 marks)



Question Number	Answer	Mark
7	(a) (i) slows rate / eq; less kinetic energy / less movement / eq; fewer collisions / eq;	2 max
	(ii) increases rate / eq; more enzymes / more active sites / eq; more collisions / eq;	2 max
	(b) enzymes are proteins; active site; particular shape / ref to lock and key / eq; substrate complementary in shape; fit/bind / eq;	4 max

(Total 8 marks)

Question Number	Answer	Mark
8	(a) xylem dead + phloem living; xylem carries water/mineral ions + phloem carries sucrose/amino acids / eq; xylem carries upwards + phloem upwards and downwards /eq; xylem lignin/vessels + phloem sieve tubes/plates /companion cells; xylem passive + phloem active/requires energy / eq; xylem inside vascular bundle + phloem outside / eq;	4 max
	(b) (i) increases (transpiration) / eq; temperature increases kinetic energy / eq; wind blows away water molecules / maintains diffusion gradient / eq;	2 max
	(ii) decreases (transpiration) / eq; stomata close; less blown away / less diffusion gradient / more humid / eq;	2 max

(Total 8 marks)

## Section C

Question Number	Answer	Mark
9	insulin gene / DNA; pancreas cell / eq. ; restriction enzyme; plasmid; vector; same restriction enzyme; join gene/DNA to plasmid; ligase; insert plasmid/gene/DNA into bacterium; fermenter; sterile / eq; nutrients /eq; stirrer; oxygen; respiration; maintain temperature / cool / water jacket / eq; maintain pH;	

(Total 12 marks)

Question Number	Answer	Mark
10	mouth / saliva; amylase; digests / breakdown; ONCE starch to maltose; mechanical digestion / chewing / eq; bolus;  stomach; pepsin / protease; proteins to peptides/polypeptides;  small intestine / duodenum / ileum; pancreas / pancreatic (juice); trypsin / protease / peptidase; peptides/proteins to amino acids; lipase; lipid to fatty acids / glycerol;  bile; emulsify / increase surface area / eq; neutralise acid / increase pH;	

(Total 12 marks)

Question Number	Answer	Mark
11	<p>Protoctist / plasmodium / amoeba / eq;  malaria / amoebic dysentery / eq;  transmitted by mosquito / water / eq;  controlled by killing insects vectors / draining ponds /  drugs / purify water / eq;</p> <p>bacteria;  cholera / eq;  transmitted by water / food / eq;  controlled by vaccination / immunisation / antibiotics /  cooking food / boiling water / eq;</p> <p>viruses / HIV;  AIDS/ eq;  transmitted by sexual contact / body fluid / eq;  controlled by avoiding sexual contact /  having safe sex / drugs / eq;</p> <p>fungi;  thrush / athlete's foot / eq;  airborne / spores / contact / eq;  vaccination / immunisation / antibiotics /  avoid contact / eq;</p>	

(Total 12 marks)

(Total for paper: 100 marks)

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