

Mark Scheme (Results)

November 2009

IGCSE

IGCSE Science (Double Award) (4437) Paper 4H

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Question Number	Answer	Mark
1(a)(i)	haemoglobin;	(1)

Question Number	Answer	Mark
1(a)(ii)	biconcave / biconcave described; more surface / large SA:VOL / eq; diffusion; I thin/permeable/small/lack nucleus	(2)

Question Number	Answer	Mark
1(b)(i)	shape of cell; Accept wavy outline cell membrane; cytoplasm; nucleus; Accept any nucleus not ball shaped	(3)

Question Number	Answer	Mark
1(b)(ii)	ingest / ingestion described / engulf / eq; digest / enzymes / breakdown / eq;	(2)

(Total 8 marks)

Question Number	Answer	Mark
2(a)	A rib(s) / ribcage; B diaphragm; C spine / disc / vertebra;	(3)

Question Number	Answer	Mark
2(b)	contracts; moves down / flattens / eq;	(2)

Question Number	Answer	Mark
2(c)	surface area (of alveoli) reduced / smaller alveoli; less oxygen (into blood/body); ↓ gas exchange respiration; less aerobic (respiration) / anaerobic respiration / lactic acid; less energy released;	(3)

(Total 8 marks)

Question Number	Answer	Mark
3(a)	arrow labelled P to nucleus;	(1)

Question Number	Answer	Mark
3(b)	arrow labelled Q to cell membrane;	(1)

Question Number	Answer	Mark
3(c)(i)	osmosis;	(1)

Question Number	Answer	Mark
3(c)(ii)	against concentration gradient / more ions inside than outside / eq; energy / ATP;	(2)

Question Number	Answer	Mark
3(c)(iii)	chlorophyll; amino acids / enzymes / protein / DNA / nucleic acid / eq;	(2)

(Total 7 marks)

Question Number	Answer	Mark
4(a)(i)	starch / cellulose / glucose / sucrose / protein / amino acids / fat / carbohydrate / eq; I cell wall	(2)

Question Number	Answer	Mark
4(a)(ii)	respiration; decomposition / decay / rotting / eq; combustion / burning;	Max (2)

Question Number	Answer	Mark
4(b)	dissolves; water / cloud; acid (rain); harms/kills organisms; I harm to humans	Max (3)

(Total 7 marks)

Question Number	Answer	Mark
5	named crop; control light / light bulbs / eq; control carbon dioxide / burning / eq; control temperature heating / eq; control water supply /eq; control humidity / mineral ions / pest; photosynthesis; growth for longer time / growth in cold season;	max (5)

(Total 5 marks)

Question Number	Answer	Mark
6(a)	loss of habitat; deforestation / pollution / climate change / eq; no food / no prey; hunted (by man) / predation / eq; disease / eq; less reproduction / eq;	max (3)

Question Number	Answer	Mark
6(b)(i)	(adult) nucleus / adult cell fused; empty egg cell / eq; (fine) pipette / microscope; electricity; Allow shock <u>mitosis</u> ; Petri dish / culture / nutrients / eq;	Max (3)

Question Number	Answer	Mark
6(b)(ii)	uterus / womb; nourish / feed / incubate / protect / placenta / allow development / allow growth / eq;	(2)

Question Number	Answer	Mark
6(b)(iii)	none;	(1)

(Total 9 marks)

Question Number	Answer	Mark
7(a)	D;	(1)

Question Number	Answer	Mark
7(b)	homozygous recessive; Accept if circled	(1)

Question Number	Answer	Mark
7(c)(i)	foreign / genetic differences / not same tissue/self / eq; I pathogen antigen; white blood cells / named white blood cell; antibody; attack cornea cells / eq; I infection	(3)

Question Number	Answer	Mark
7(c)(ii)	stop immune system working / stop rejection / stop reaction to foreign tissue / eq;	(1)

Question Number	Answer	Mark
7(c)(iii)	950 / 95%;	(1)

(Total 7 marks)

Question Number	Answer	Mark
8(a)(i)	4;	(1)

Question Number	Answer	Mark
8(a)(ii)	tertiary consumer / top carnivore;	(1)

Question Number	Answer	Mark
8(b)(i)	movement; excretion / eq; egestion / indigestible / faeces / eq; uneaten / eaten by other organisms; death; I heat	max (2)

Question Number	Answer	Mark
8(b)(ii)	16.09 / 16 / 16.1;; Allow one mark in working for 14 000 or 87 000	(2)

Question Number	Answer	Mark
8(b)(iii)	only 300 (from insects) / too much lost by respiration (of insects) / not enough energy / needs 500;	(1)

(Total 7 marks)

Question Number	Answer	Mark
9(a)(i)	risk of extinction / low in number / eq;	(1)

Question Number	Answer	Mark
9(a)(ii)	transport / carry / eq; sucrose / sugars / carbohydrate / products of p.syn / amino acids; I food respiration;	max(2)

Question Number	Answer	Mark
9(b)(i)	air / oxygen; respiration; carbon dioxide; photosynthesis; stop microbes / eq;	max (2)

Question Number	Answer	Mark
9(b)(ii)	glucose / carbohydrate / named carbohydrate;	(1)

Question Number	Answer	Mark
9(c)	quick / eq; large numbers; clones / genetically identical / eq; reduce deforestation;	(2)

(Total 8 marks)

Question Number	Answer	Mark
10(a)	4.4 / 22:5;; Allow one mark in working for 22 or 5	(2)

Question Number	Answer	Mark
10(b)(i)	water in; osmosis; high conc. (of water) to low conc. (of water); / eq;	Max (2)

Question Number	Answer	Mark
10(b)(ii)	A and B: water/osmosis into chip A; in water for chip A / A in dilute solution / cell contents more concentrated /eq; A and C: more water/osmosis into chip A / more movement into chip A; temp. higher for chip A / more kinetic energy for chip A; A and D: less water/osmosis into chip A; less surface area in chip A; Accept converse	Max (5)

(Total 9 marks)

Question Number	Answer	Mark
11(a)(i)	small use more oxygen; (more) heat loss; respiration; surface area to volume; larger (in small shrews);	Max (3)

Question Number	Answer	Mark
11(a)(ii)	1920;; Allow one mark in working for 20 / 4 / 80 / 96	(2)

Question Number	Answer	Mark
11(b)	vasoconstriction / eq; hair erect / eq; <u>less</u> sweat; idea of longer term changes / thicker fur / subcutaneous fat / eq;	max (2)

Question Number	Answer	Mark
11(c)(i)	sensory / afferent;	(1)

Question Number	Answer	Mark
11(c)(ii)	synapse;	(1)

Question Number	Answer	Mark
11(c)(iii)	arrow towards muscle;	(1)

(Total 10 marks)

Question Number	Answer	Mark
12	easily seen / eq; predators / easy prey / eq; no <u>camouflage</u> ; not well adapted / not well suited / adaptation / eq; struggle to survive / eq; less reproduction; less passing on of genes/characteristic / eq;	Max (5)

(Total 5 marks)

PAPER TOTAL: 90 MARKS

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