

Mark Schemes Summer 2009

IGCSE

IGCSE Biology (4325)

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IGCSE BIOLOGY 4325-1F MARK SCHEME

Key

- ; indicates separate mark points
- / indicates alternatives
- eq allow for correct equivalent
- word underlined means no alternatives allowed

Question Number	Answer	Mark
1	(a) A;	1
	(b) A;	1
	(c) D;	1
	(d) B;	1
	(e) D;	1
	(f) D;	1
	(g) D;	1
	(h) C;	1
	(i) A;	1
	(j) C;	1
		(10)

(Total 10 marks)

Question Number	Answer	Mark
4325 1F Q2(a)	(motor) neurone / nerve (cell);	(1)

Question Number	Answer	Mark
4325 1F Q2(b)(i)	nucleus;	(1)

Question Number	Answer	Mark
4325 1F Q2(b)(ii)	arrow from cell body;	(1)

Question Number	Answer	Mark
4325 1F Q2(c)	blood / chemical / slower / longer lasting / eq. ;; Allow converse	Max 2 (2)

(Total 5 marks)

Question Number	Answer	Mark
4325 1F Q3(a)	increased temp; increased CO ₂ ; increased light; increased humidity; increased photosynthesis;	Max 3 (3)

Question Number	Answer	Mark
4325 1F Q3(b)	more nitrates / nitrogen; protein / amino acids; growth; other named mineral eg Mg; function of mineral eg chlorophyll; Reject: nutrients	Max 2 (2)

Question Number	Answer	Mark
4325 1F Q3(c)(i)	choose parents / organism; desired characteristics eg stem length / increased yield; breed / mate; choose offspring; repeat;	Max 3 (3)

Question Number	Answer	Mark
4325 1F Q3(c)(ii)	milk yield / meat production / eq;	(1)

(Total 9 marks)

Question Number	Answer	Mark
4325 1F Q4(a)(i)	anther / stamen; stigma; petal;	(3)

Question Number	Answer	Mark
4325 1F Q4(a)(ii)	large petals / coloured petals; enclosed anthers/stamens; enclosed stigma;	Max 2 (2)

Question Number	Answer	Mark
4325 1F Q4(b)	transfer of pollen; by insect / wind / eq; from anther to stigma;	Max 2 (2)

(Total 7 marks)

Question Number	Answer	Mark
4325 1F Q5(a)(i)	water; carbon dioxide; oxygen;	(3)

Question Number	Answer	Mark
4325 1F Q5(a)(ii)	absorb / trap light / eq;	(1)

Question Number	Answer	Mark
4325 1F Q5(b)	destarch plant / eq; place in light; put in boiling/hot water; (boil in) ethanol; add iodine; blue / black;	Max 4 (4)

(Total 8 marks)

Question Number	Answer			Mark
4325 1F Q6(a)	Enzyme	large molecule broken down	small molecule produced	(6)
	Amylase	Starch;	Maltose;	
	Protease;	Proteins	amino acids;	
	Lipase	Lipid;	fatty acids;	

(Total 6 marks)

Question Number	Answer	Mark
4325 1F Q7(a)	Water / damp; oxygen; warmth / temperature; (allow) light;	Max 2 (2)

Question Number	Answer	Mark
4325 1F Q7(b)	5;	(1)

Question Number	Answer	Mark
4325 1F Q7(c)(i)	to produce clear beer / to remove debris / eq;	(1)

Question Number	Answer	Mark
4325 1F Q7(c)(ii)	to kill microorganisms / sterilise / stop fermentation / eq;	(1)

(Total 5 marks)

Question Number	Answer				Mark	
4325 1F Q8	organism	structure				
		chloroplasts	cytoplasm	cell wall	nucleus	
	fungus	X	/	/;	(/)	
	bacterium	(X)	/;	(/)	(X)	
	virus	X;	(X)	(X)	X;	

(4)

(Total 4 marks)

Question Number	Answer	Mark
4325 1F Q9(a)	low in numbers / risk of extinction / risk of dying out / eq;	(1)
4325 1F Q9(b)	jellyfish in centre; arrows correct;	(2)
4325 1F Q9(c)(i)	higher temp reduces time to hatch / eq;	(1)
4325 1F Q9(c)(ii)	30 °C; Accept within a range of 29.9 - 30.1	(1)
4325 1F Q9(d)(i)	29 °C; Accept within a range of 28.9 - 29.1	(1)
4325 1F Q9(d)(ii)	24; 96; (allow one mark for 80:20 or for 96/24 wrong way round)	(2)
4325 1F Q9(e)(i)	eggs hatch early / eq; less developed (premature idea) / less time to develop / eq; fewer males / eq; less mating / less reproduction / eq;	(2)
4325 1F Q9(e)(ii)	less burning / less combustion; (of) fossil fuel / named fossil fuel; accept petrol grow more trees / reduce deforestation; increase photosynthesis; cycle / walk / less cars / reduce electricity use / recycle / wind / tidal / nuclear / renewable / eq; Ignore aerosols, ref to factories, pollution	(3)

(Total 13 marks)

Question Number	Answer	Mark
4325 1F Q10(a)(i)	vena cava; aorta;	(2)

Question Number	Answer	Mark
4325 1F Q10(a)(ii)	left ventricle;	(1)

Question Number	Answer	Mark
4325 1F Q10(a)(iii)	(blood) to the lung / alveoli; collect oxygen / deoxygenated / release carbon dioxide;	(2)

Question Number	Answer	Mark
4325 1F Q10(b)	blockage or narrowing / eq; by fat / fatty deposit / cholesterol / eq; in arteries / coronary artery / aorta / blood vessels; less oxygen / less glucose; <u>anaerobic</u> respiration; lactic acid; heart attack / heart disease / angina / eq; nicotine / carbon monoxide; increased heart rate / high blood pressure / make heart work harder;	(5)

(Total 10 marks)

Question Number	Answer	Mark
4325 1F Q11(a)	increases / eq; levels /stays at 120 / stops increasing / constant / eq;	(2)
Question Number	Answer	Mark
4325 1F Q11(b)	100;; (one for 60 and 120 in working however expressed)	(2)
Question Number	Answer	Mark
4325 1F Q11(c)(i)	<u>anaerobic</u> respiration;	(1)
Question Number	Answer	Mark
4325 1F Q11(c)(ii)	more oxygen / repay oxygen debt; (more aerobic) respiration / less anaerobic respiration;	(2)
Question Number	Answer	Mark
4325 1F Q11(d)	heat loss / cool / dehydration / maintain body temperature; increase heart rate / eq; blood vessels get wider / vasodilation;	(3)

(Total 10 marks)

Question Number	Answer			Mark
4325 1F Q12(a)	Plant part (stem)	Stimulus (light)	Response (positive phototropism)	(3)
	(root)	(light)	negative phototropism;	
	Stem / shoot;	gravity;	(negative geotropism)	

Question Number	Answer	Mark
4325 1F Q12(b)	obtain light; photosynthesis; make glucose / sugar / carbohydrate; for growth / energy;	(2)

(Total 5 marks)

Question Number	Answer	Mark
4325 1F Q13(a)	nucleus; empty / enucleated; Ignore unfertilised mitosis; embryo; uterus / womb; same / identical; Ignore similar	(6)

Question Number	Answer	Mark
4325 1F Q13(b)	Animal	Sex chromosomes
	CopyCat's mother	(XX)
	The surrogate mother	XX;
	Copycat	XX;
		(2)

(Total 8 marks)

PAPER TOTAL 100 MARKS

BIOLOGY 4325-2H MARK SCHEME

Key

- ; indicates separate mark points
- / indicates alternatives
- eq allow for correct equivalent
- word underlined means no alternatives allowed

Question Number	Answer				Mark	
4325 2H Q1	organism	structure				
		chloroplasts	cytoplasm	cell wall		nucleus
	fungus	X	/	/;		(/)
	bacterium	(X)	/;	(/)		(X)
	virus	X;	(X)	(X)		X;
					(4)	

(Total 4 marks)

Question Number	Answer	Mark
4325 2H Q2(a)	low in numbers / risk of extinction / risk of dying out / eq;	(1)

Question Number	Answer	Mark
4325 2H Q2(b)	jellyfish in centre; arrows correct;	(2)

Question Number	Answer	Mark
4325 2H Q2(c)(i)	higher temp reduces time to hatch / eq;	(1)

Question Number	Answer	Mark
4325 2H Q2(c)(ii)	30 (⁰ C); Accept within a range of 29.9-30.1	(1)

Question Number	Answer	Mark
4325 2H Q2(d)(i)	29 (⁰ C); Accept within a range of 28.9-29.1	(1)

Question Number	Answer	Mark
4325 2H Q2(d)(ii)	24; 96; (allow one mark for 96 24 / 20:80/eq)	(2)

Question Number	Answer	Mark
4325 2H Q2(e)(i)	eggs hatch early / eq; less developed (premature idea) / less time to develop / eq; OR if graph (d) used fewer males / eq; reject no males less mating / less reproduction / eq;	(2)

Question Number	Answer	Mark
4325 2H Q2(e)(ii)	less burning / less combustion; (of) fossil fuel / named fossil fuel; grow more trees / reduce deforestation; increase photosynthesis; cycle / walk / less cars / reduce electricity use / recycle / wind / tidal / nuclear / renewable / eq; Ignore aerosols, ref to factories, pollution	(3)

(Total 13 marks)

Question Number	Answer	Mark
4325 2H Q3(a)(i)	vena cava; aorta;	(2)

Question Number	Answer	Mark
4325 2H Q3(a)(ii)	left ventricle;	(1)

Question Number	Answer	Mark
4325 2H Q3(a)(iii)	(blood) to lung / alveoli; obtain oxygen / oxygenated / release carbon dioxide/ de oxygenated eq;	(2)

Question Number	Answer	Mark
4325 2H Q3(b)	blockage / narrowing; blood vessels /arteries / coronary artery / aorta; fat / fatty deposit / cholesterol; less oxygen / less glucose; <u>anaerobic</u> respiration; lactic acid; heart attack / heart disease / angina/ heart stops /eq; nicotine / carbon monoxide; increased heart rate / high blood pressure / make heart work harder;	(5)

(Total 11 marks)

Question Number	Answer	Mark
4325 2H Q4(a)	increases / eq; levels / stays at 120 / stops increasing / constant / eq;	(2)

Question Number	Answer	Mark
4325 2H Q4(b)	100; (one for 60 and 120 in working however expressed)	(2)

Question Number	Answer	Mark
4325 2H Q4(c)(i)	<u>anaerobic</u> respiration;	(1)

Question Number	Answer	Mark
4325 2H Q4(c)(ii)	(more) oxygen / repay oxygen debt; (more) (aerobic) respiration / less anaerobic respiration;	(2)

Question Number	Answer	Mark
4325 2H Q4(d)	heat loss / cool / dehydration /maintain body temp. /eq; increase heart rate; blood vessels get wider / vasodilation;	(3)

(Total 10 marks)

Question Number	Answer			Mark
4325 2H Q5(a)	Plant part (stem)	Stimulus (light)	Response (positive phototropism)	(3)
	(root)	(light)	negative phototropism;	
	stem/shoot;	gravity;	(negative geotropism)	

Question Number	Answer	Mark
4325 2H Q5(b)	obtain light; photosynthesis; make glucose / sugar / starch / carbohydrate;	(2)

(Total 5 marks)

Question Number	Answer	Mark
4325 2H Q6(a)	nucleus; empty / enucleated/ eq; Ignore unfertilised mitosis; embryo; uterus / womb; identical / same; Ignore similar	(6)

Question Number	Answer	Mark
4325 2H Q6(b)	Animal	Sex chromosomes
	CopyCat's mother	(XX)
	The surrogate mother	XX;
	Copycat	XX;
		(2)

(Total 8 marks)

Question Number	Answer	Mark
4325 2H Q7(a)(i)	anthers/ filament / stamen outside 'flower'; stigma / style outside 'flower' / feathery/eq; Ignore carpel	(2)

Question Number	Answer	Mark
4325 2H Q7(a)(ii)	light / smaller / air sacs / larger quantities / smooth / large SA eq ; Accept negative converse eg not light / not sticky / eq; Accept converse if clearly insect pollinated	(1)

Question Number	Answer	Mark
4325 2H Q7(b)(i)	shape (oblong with an extension); cell labelled with at least two from nucleus, membrane, cell wall, cytoplasm, vacuole; max one if generalised cell	(2)

Question Number	Answer	Mark
4325 2H Q7(b)(ii)	osmosis; Ignore active transport high conc of water to low conc of water / eq; selectively permeable membrane / eq;	(2)

(Total 7 marks)

Question Number	Answer	Mark
4325 2H Q8(a)(i)	F;	(1)

Question Number	Answer	Mark
4325 2H Q8(a)(ii)	emulsifies / emulsification / small drops; lipid /fat / oil; large surface area; enzymes / lipase; neutralise acid / raise pH / <u>optimum</u> / alkaline / eq;	Max 4 (4)

Question Number	Answer	Mark
4325 2H Q8(b)(i)	<u>small</u> intestine / ileum / C;	(1)

Question Number	Answer	Mark
4325 2H Q8(b)(ii)	large surface area / microvilli; <u>capillaries</u> ; blood <u>moves/circulates</u> /eq; maintain concentration gradient; walls single cell thick / thin walls / short distance / (capillaries) close to wall; lacteal / lymph vessel; diffusion;	Max 4 (4)

(Total 10 marks)

Question Number	Answer	Mark
4325 2H Q9(a)(i)	parents: Nn and Nn; gametes: N and n and N and n; (gap, or, comma, circled must be visible) offspring: NN and Nn and Nn and nn; phenotypes no PKU, no PKU, no PKU and PKU; Allow not affected/affected / normal / abnormal eq Allow term carrier for Nn ECF 3 max	(4)

Question Number	Answer	Mark
4325 2H Q9(a)(ii)	$\frac{3}{4}$ / 3:1 / 75% / 3 in 4 / 0.75 / eq; No ECF	(1)

Question Number	Answer	Mark
4325 2H Q9(b)	diet lacking phenylalanine / dialysis / removal of phenylalanine /eq restrict / reduce protein in diet / gene therapy /eq ;	(1)

(Total 6 marks)

Question Number	Answer	Mark
4325 2H Q10(a)	water transport /water absorption; turgidity/ support/eq mineral / salt transport /absorption /; Ignore nutrients cooling;	Max 1 (1)

Question Number	Answer	Mark
4325 2H Q10(b)	stomata / pores open; increase (transpiration) / more water loss / eq;	 (2)

(Total 3 marks)

Question Number	Answer	Mark
4325 2H Q11(a)(i)	shape; (3 bars reducing in size from bottom to top) allow smooth order; (trees then primary consumers then secondary consumers) names; (regardless of position)	(3)

Question Number	Answer	Mark
4325 2H Q11(a)(ii)	bottom bar small(er) / fewer trees / inverted pyramid / eq;	(1)

Question Number	Answer	Mark
4325 2H Q11(b)	energy lost / used up / respiration / heat / movement / excretion / egestion / uneaten / indigestible / death / eq;;;	(4)

Question Number	Answer	Mark
4325 2H Q11(c)(i)	trees/leaves/canopy block sun / light;	(1)

Question Number	Answer	Mark
4325 2H Q11(c)(ii)	chlorophyll; (absorb) light; photosynthesis;	(2)

Question Number	Answer	Mark
4325 2H Q11(c)(iii)	feeds on dead material / carnivorous / parasitic / ref to other pigments /eq;	(1)

(Total 10 marks)

Question Number	Answer	Mark
4325 2H Q12(a)(i)	still grows in cold / longer growing period / 2 crops per year / survive frost / winter / eq;	(1)

Question Number	Answer	Mark
4325 2H Q12(a)(ii)	no infection / disease / not killed / eq; better growth / yield / eq; Ignore help growth no fungus spread to other plants / eq;	(2)

Question Number	Answer	Mark
4325 2H Q12(b)	gene / DNA / allele; cut /eq; restriction (endonuclease) enzyme; plasmid; same restriction (endonuclease); ligase; join / stick / glue /eq; <u>recombinant DNA</u> ; vector; Agrobacterium / gene gun / virus;	(5)

Question Number	Answer	Mark
4325 2H Q12(c)	more plants / lots of plants / eq; quicker / faster / eq; same / identical / clones/ all have desired characteristic / eq; NB Ignore numbering: if two correct in 1. give two marks Ignore cost	(2)

(Total 10 marks)

Question Number	Answer	Mark
4325 2H Q13(a)	insulin pancreas; blood; liver; glycogen;	(5)

Question Number	Answer	Mark
4325 2H Q13(b)(i)	glucose normal / lower glucose level / glucose level only due to drink / food contains glucose / eq;	(1)

Question Number	Answer	Mark
4325 2H Q13(b)(ii)	starting / fasting level is within normal limits / eq; blood glucose level does not rise above 9 / rises to 8; blood glucose level falls (to normal levels); insulin released; allow converse for each point	Max 3 (3)

(Total 9 marks)

Question Number	Answer	Mark
4325 2H Q14(a)(i)	Iceland and Japan;	(1)
Question Number	Answer	Mark
4325 2H Q14(a)(ii)	13;; allow one for 130 or 100 and 30 in working	(2)
Question Number	Answer	Mark
4325 2H Q14(a)(iii)	amino acids / new cells / enzymes / tissues / muscle/ bone/ repair / membranes/ DNA / hormones/ antibodies/ eq;	(1)
Question Number	Answer	Mark
4325 2H Q14(b)(i)	remove waste / faeces / urine / eq; Ignore clean / disease / pollution oxygen / prevent stagnation / eq; respiration;	Max 2 (2)
Question Number	Answer	Mark
4325 2H Q14(b)(ii)	less wasted / all eaten / prevent oxygen depletion / less decomposition / less bacterial growth / eq;	(1)
Question Number	Answer	Mark
4325 2H Q14(c)	large fish / more growth / eq; from small amount of food / eq; economic benefit / eq;	Max 2 (2)
Question Number	Answer	Mark
4325 2H Q14(d)	(Intraspecific competition): no overcrowding / increase cage size / eq; separate sizes/ ages; Ignore gender supply enough food; (ONCE) (Interspecific competition): one species / type of fish per cage / stop other fish entering cage; (by) cover cage / size of mesh / use different cages / eq; eg separating species in different pens/cages = 2	Max 4 (4)

(Total 10 marks)

PAPER TOTAL 120 MARKS

BIOLOGY 4325-03 MARK SCHEME

Key

- ; indicates separate mark points
 / indicates alternatives
 eq allow for correct equivalent
 — word underlined means no alternatives allowed

Question Number	Answer		Mark
1(a)(i)	Name of apparatus	Letter of apparatus	(4)
	Bunsen burner	D;	
	Tripod	C;	
	Crucible	A;	
	Gauze	B;	

Question Number	Answer	Mark
1(a)(ii)	protect <u>eyes</u> / eq;	(1)

Question Number	Answer	Mark
1(b)	oven / dryer / heat / in dry area / drying agent / eq; time / until constant mass / leave longer (until dry);	(2)

Question Number	Answer	Mark
1(c)	5.0;; one mark in working for 2.0 - 1.9 or 0.1	(2)

Question Number	Answer	Mark
1(d)(i)	2.4 / sample 5 for sandy beach;	(1)

Question Number	Answer	Mark
1(d)(ii)	seaweed / (more) plants / dog faeces / human error / confusion with other samples / still wet / eq;	(1)

Question Number	Answer	Mark
1(d)(iii)	(more) leaves / idea of more plants;	(1)

(Total 12 marks)

Question Number	Answer	Mark
2(a)	finger on wrist/neck/pressure point / use inflated cuff idea; watch / clock / eq;	(2)

Question Number	Answer	Mark
2(b)(i)	names of <u>four</u> students; pulse / heart rate / bpm; rest + 10 (sit ups) + 20 (sit ups); correct values in table;	(4)

Question Number	Answer	Mark
2(b)(ii)	oxygen; glucose; respiration; ATP / energy; muscles / cells / tissues; Ignore body	max (3)

Question Number	Answer	Mark
2(c)	More accurate / closer to true value / eq; heart rate slows / eq; Allow converse eg higher in first 15s less chance of (counting) error / eq;	max (2)

(Total 11 marks)

Question Number	Answer	Mark
3(a)	S scale at least half of each axis + linear; L line straight + through points; A axes correct; A labelled conc (%) + time (s); P points plotted accurately;;	(5)

Question Number	Answer	Mark
3(b)(i)	as enzyme conc. increases time taken decreases; Allow converse Reject as time increases conc. decreases	(1)

Question Number	Answer	Mark
3(b)(ii)	breakdown/digestion (protein/paste) / more collisions; liquid/fluid/watery/runny / more soluble / eq;	(2)

Question Number	Answer	Mark
3(c)	temperature / pH / time of mixing / time to pour / <u>volume</u> of (enzyme) solution / size of funnel;; Ignore mass of jelly/paste	(2)

Question Number	Answer	Mark
3(d)	0.5g in 100 cm ³ / 1g in 200cm ³ / eq; or take stated volume of 1.00 % solution + add same stated volume of water / eq;	(1)

(Total 11 marks)

Question Number	Answer			Mark
4(a)(i)	Type of animal	Tally	Total number caught	(6)
	Ant	IIII III	8	
	Beetle	IIII IIII IIII IIII	20	
	Slug	IIII III	8	
	Spider	IIII	4	
	Woodlouse	IIII IIII IIII IIII II	22	
tally ;;;; number transfer ;				

Question Number	Answer	Mark
4(a)(ii)	used 10 traps / repeated trapping / many traps / eq;	(1)

Question Number	Answer	Mark
4(a)(iii)	at night: wet / less risk of drying out / eq; avoid predators / eq; more food / prey / feed / eq; cool / eq; hard to see trap; ignore more active	(2)

Question Number	Answer	Mark
4(b)	(yes) dead animals cannot escape / dead carnivores cannot eat other animals; or (no) adverse reason for killing eg cruel / not right / inhuman / unnecessary / disrupt food chain / cannot escape / put off by detergent / eq;	(1)

(Total 11 marks)

Question Number	Answer	Mark
5	C seeds sown at different distances apart; O same species of seed / same age / eq; R repeat; Ignore many seeds at each distance M1 (growth measured) mass / length / height / no of leaves / eq; M2 ref to time; S1 + S2 same LI / water / soil / temperature / fertiliser / nutrients / pH / eq;;	(6)

(Total 6 marks)

PAPER TOTAL 50 MARKS

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