

Mark Scheme (Results) Summer 2010

GCE O

GCE O Biology (7040) Paper 02

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7040/02 O-LEVEL BIOLOGY MARK SCHEME - SUMMER 2010

SECTION A

Question number	Accept	Reject	Marks
1 a	gametes; fertilisation / fusion / eq; (genetic) variation; no converse		Max 2
b	<u>two</u> (daughter) cells produced; one cell division; Ignore stages cells identical / no (genetic) variation / exact copy; same chromosome number / (diploid to) diploid / (46 to) 46 / eq; occurs in body cells; no bivalents / crossing over / eq; allow converse		3
c	stated phenotype / feature / characteristic / eq; same phenotype / feature / characteristic / no (genetic) variation / eq; fast / large numbers / high yield / eq;		3
d i	tubers are stems / bulbs are leaves		1
ii	chlorophyll / chloroplasts;		1
e i	iodine; blue / black / eq;		2
ii	starch digested / broken down / made soluble / eq.; glucose / maltose; 1 sugar amylase / maltase / enzyme; respiration / energy;		Max 2
f	root growth / roots / cell differentiation / eq.;		1
		Total Marks	15

Question number	Accept	Reject	Marks
2 a	(boy) needs more (energy); more active; greater mass / more muscle; Ignore ref to growth		Max 2
b i	growth / still growing;		1
ii	bone;		1
iii	menstruation / eq;		1
c	rickets / poor bones / poor teeth / calcium not absorbed / eq;		1
d	mass of person; (larger mass) increases requirement; activity / job of person; (more activity) increases requirement / eq; (air) temperature / hotter / colder; correct ref to increase/decrease requirement; pregnancy; increases requirement;		2
		Total Marks	8

Question number	Accept	Reject	Marks
3 a i	springtails in middle; arrows correct; plant → springtails → mites		2
ii	springtails;		1
b i	S = scale linear and half axes; L = lines through points; A = axes correct and labelled (number + months); P = points plotted correctly; K = key;		5
ii	numbers decrease/killed; due to pesticide/insecticide; numbers increase; less eaten / fewer mites / breed / reproduce / resistance / pesticide washed away / no longer effective / eq; I immune numbers decrease; more mites;		Max 4
iii	random placement / eq; several quadrats / repeat counts; same time of day / same day; multiplied sample by total area / eq;		Max 2
Total Marks			14

Question number	Accept	Reject	Marks
4 a	stop evaporation / eq;		1
b i	23(g);		1
ii	1.15;		1
c	plant gained mass / gained 1.3g/cm ³ ; growth; photosynthesis; water kept in plant;		Max 3
d	less mass lost / more water in flask / eq; less <u>transpiration</u> ; stomata not fully open / eq; less photosynthesis;		2
Total Marks			8

Question number	Accept	Reject	Marks
5 a	A trachea / windpipe; B bronchus / bronchi; C lung / lungs;		3
b	increase volume; decrease pressure; air in (balloons) / balloons inflate / eq;		Max 2
c	intercostal muscles; contract; ribs / rib cage; raised / up and out / increase thorax volume; Ignore lung volume		Max 3
d	increase rate; supply oxygen; respiration / energy; carbon dioxide;		2
		Total Marks	10

Question number	Accept	Reject	Marks
6	C acid and no acid; O same species / same age / seed / eq; R many plants / many plots / pots / fields / eq; M 1 height / mass / length / number of leaves / eq; M 2 after stated time in days plus / eq; S (same abiotic factor) soil / water / light / fertiliser / temperature / eq;		Max 5
		Total Marks	5

SECTION A TOTAL: 60 MARKS

Section B

Question number	Accept	Reject	Marks
7 a	Location: (gas exchange) in lungs / alveoli / air sacs; (respiration) in cells / muscle / eq; Description: diffusion; release energy / eq; Substance: oxygen / carbon dioxide / water; glucose / oxygen;		Max 4
b	Substance: (excretion) metabolic waste / urea / urine / carbon dioxide / water / salts / sweat / eq;; (egestion) faeces / undigested food; Location: cells; digestive system / gut; Organ: lungs / skin / kidney; anus / rectum;		Max 4
Total Marks			8

Question number	Accept	Reject	Marks
8 a	specific / eq; no food chain affect / bioaccumulation / ecosystem / eq; no <u>pollution</u> ; no resistant species; Ignore immune no residues / contaminants on crop / no affect on taste / eq; Ignore kills crop no need to reapply / long lasting / eq; Ignore environmentally friendly / no harm to environment / harm humans		4
b	(cloned) identical; same genes / same alleles / eq; one parent; (transgenic) genetic material from different species / eq; vector / named vector; recombinant DNA / genetic modification;		Max 4
Total Marks			8

Question number	Accept	Reject	Marks
9 a	white blood cells / lymphocytes / phagocytes; antibodies / ingest; (micro)organism / pathogen; vaccination / memory cells; faster production of antibodies / eq; resistance involves alleles / genes / DNA / eq; mutation; chemicals / antibiotic /eq; (natural) selection / eq;		Max 4
b	bacterium / virus / fungi / animal / <i>Plasmodium</i> / eq; named disease: eg HIV / AIDS / malaria / TB / eq; can be spread / infectious / eq; diet / exercise / smoking / eq; named disease: eg obesity / lung cancer / eq;		Max 4
Total Marks			8

SECTION B TOTAL: 16 MARKS

Section C

Question number	Accept	Reject	Marks
10	diffusion; high conc to low conc / eq; example of diffusion; osmosis; water; partially permeable membrane / eq; dilute solution to conc solution / eq; example of osmosis; passive; affected by temp; surface area; active transport; requires energy / ATP / respiration; low conc to high conc / against conc gradient; oxygen; example of active transport; endo/exo/pino cytosis;		12
		Total Marks	12

Question number	Accept	Reject	Marks
11	glass house / polythene tunnels / eq; heat / increased temp; (burners to release) CO ₂ ; light; water supply; photosynthesis; fertiliser / NPK / minerals / eq; nitrates for amino acids/protein; phosphate for ATP; organic fertiliser / manure; crop rotation; ploughing / aeration / oxygen; selective breeding; cloning / micropropagation / tissue culture / eq; genetic modification / transgenic crops / recombinant DNA; biological control; pest control / insecticides / pesticides; herbicides / weedkiller / weeding; fungicides;		12
		Total Marks	12

Question number	Accept	Reject	Marks
12	emphysema; alveoli damaged / eq; less surface area; less oxygen into blood / less gas exchange; carbon monoxide; haemoglobin; bronchitis; cilia affected / anaesthetised; cannot remove mucus / eq; bacteria / microorganisms / infection / pneumonia / eq; lung cancer / carcinogens; tar; mutation / damage to DNA / eq; nicotine; increases heart rate / high blood pressure; fat build up in arteries / arteriosclerosis / eq; <u>coronary artery</u> ; less oxygen/glucose (to heart muscle); angina / lactic acid; thrombosis / clot; heart attack / heart disease;		12
		Total Marks	12

SECTION C TOTAL: 24 MARKS

PAPER TOTAL: 100 MARKS

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