CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

MARK SCHEME for the May/June 2013 series

5090 BIOLOGY

5090/21 Paper 2 (Theory), maximum raw mark 80

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the May/June 2013 series for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level components and some Ordinary Level components.

CAMBRIDGE
International Examinations

Mark schemes will use these abbreviations:

- **;** separates marking points
- **/** alternatives
- **()** contents of brackets are not required but should be implied
- **R** reject
- **A** accept (for answers correctly cued by the question, or guidance for examiners)
- **AW** alternative wording (where responses vary more than usual)
- **AVP** alternative valid point (where a greater than usual variety of responses is expected)
- **ORA** or reverse argument
- **underline** actual word underlined must be used by candidate (grammatical variants excepted)
- **max** indicates the maximum number of marks that can be given
- **+** statements on both sides of the + are needed for that mark

© Cambridge International Examinations 2013

Question	Mark Scheme	Mark	Clarification
1 (a)	Carbohydrate; Water; roughage / fibre; other named mineral / other named vitamin;	[max 2]	
(b)	**(Environmental):** Drought; Flooding; Infertile land e.g. poor soil structure; Natural disasters e.g. earthquakes/ very severe weather; **(Political):** Significant increase in population; unequal distribution / supply of food; poverty / economic breakdown; war / political considerations;	[max 2]	Accept rain if qualified to suggest that it is below the required level for crop growth e.g. inadeguate rainfall Ignore: tornadoes
(c) (i)	**Diseases:** Rickets; Scurvy; Kwashiorkor; Marasmus; beri-beri; **Symptoms:** stunted growth; low body weight /death; weak/brittle bones; lowers immunity; anaemia; bleeding membranes; fatigue; obesity;	[max 3]	**A** any other relevant descriptions of symptoms

© Cambridge International Examinations 2013

(ii)	Contains everything for a balanced diet / all nutrients in right proportions; Peanut / sugar / milk + energy / respiration; oil + correct use eg provide energy / synthesise cell membranes; peanut paste / powdered milk + protein; protein + for growth / new cells / new protoplasm / tissue repair / named protein / prevents kwashiorkor; vitamin C + wound healing / prevention of scurvy; vitamin D + bones / teeth / prevention of rickets; iron + for haemoglobin / blood / prevention of anaemia; calcium + bones / teeth / blood clotting / prevention of rickets;	[max 4]	
		[Total: 11]	

© Cambridge International Examinations 2013

2 (a)	Box 1: sensory / afferent neurone Box 2: motor / efferent neurone /fibre Box 3: effector / muscle / gland / A named effector 3 correct = 2 marks , 1 or 2 correct = 1 mark	[2]	R nerve R unspecified organs
(b)	**(part A)** cerebrum / cerebral hemispheres / frontal lobes / fore brain; **(Problem)** loss of voluntary movement / speech difficulties / change in sensory perception / / learning difficulty / memory loss / change in emotional behaviour; **(part B)** Cerebellum / hind brain; **(Problem)** loss of control over movement / loss of learnt activity / loss of balance / coordination;	[max 4]	Require the effect of the damage. Need the idea of "loss"
(c) (i)	Mitosis;	[1]	
(ii)	Tissue;	[1]	
(d)	Y chromosome is only in males / female is XX; injected cells have travelled to brain; Replication / cell division has occurred / tissue has formed; Cells present after time period;	[max 3]	
		[Total: 11]	

© Cambridge International Examinations 2013

3 (a) (i)	**(species P)** self / insect / wind ; (pollen) from anther to stigma*; of same flower; **(species Q**) Cross; (by) insect (pollination); (pollen) from anther to stigma*; of different plant;	[max 4]	* accept once only in either P or Q Accept plausibly named insect eg bee, wasp
(ii)	brightly coloured petals; large petals; scent; nectar; sticky pollen or stigma;	[max 2]	
(b)	Cross pollination / has 2 parents / ref genes / alleles;	[1]	Accept "exchange of traits"
(c)	pollen tube; grows / digests + down style; to ovule / embryo sac / micropyle; male + female gametes /egg / nuclei fuse;	[max 3]	
		[Total: 10]	

© Cambridge International Examinations 2013

4 (a) (i)	500;	1	
(ii)	respiration produces CO_2; faster than it is used in photosynthesis; (light intensity) below compensation point (or described) / too low for photosynthesis .	[max 3]	
(b)	Forest has: shade / low light levels; Plant D uptakes more carbon dioxide at lower light levels; Plant D requires less energy to survive / has lower respiration rate; Plant D "saturates" at a lower light level / levels / can't make use of high light levels; correct use of figures e.g. After 850au increasing light level does not result in any increase in phs in plant D.	[max 3]	
(c)	large amount of detritus / leaf litter / organic material available; ref / bacteria / fungi; ref. warm; moist / damp (conditions); ref. increased + enzyme action.	[max 3]	
		[Total: 10]	

© Cambridge International Examinations 2013

5 (a)	unit of inheritance / give characteristics / traits; section of DNA; can be copied; (each) specifies production of one A/W protein / polypeptide;	[max 2]	Accept contains hereditary information
(b)	radiation; chemicals; faulty cell division;	[max 2]	
(c)	reduction in surface area / volume ; so less haemoglobin; *less AW oxygen + carriage / absorption / in blood (cell);* loss of elasticity + more difficult to move through blood vessels; sticky + may clump together / clot; (causing) blockage of blood vessel; reduction of blood flow (to tissue);	[max 4]	
		[Total: 8]	

© Cambridge International Examinations 2013

6 (a) (i)	(FSH) stimulates follicle to develop / egg to develop / helps to increase numbers of eggs released; (FSH) stimulates secretion / release of oestrogen; oestrogen stimulates secretion / release of LH; LH stimulates ovulation / release of egg;	[max 3]	
(ii)	(progesterone) prevents / inhibits secretion of FSH; follicle does not develop / egg unable to mature / prevents ovulation A/W; fertilisation / pregnancy does not occur;	[max 2]	
(b)	prevent mixing of maternal and fetal blood; allow <u>exchange</u> A/W of substances between maternal and fetal <u>blood</u>; <u>dissolved</u>; named nutrient; named gas; named excretory product; antibodies / hormones;	[max 5]	Accept nitrogenous waste
		[Total: 10]	

© Cambridge International Examinations 2013

7 (a)	ref to high fat diet; obesity / overweight ; high blood pressure; ref to cholesterol / saturated fatty acids / animal fats + in diet / blood; smoking; lack of exercise; genetic / inherited / family history (of heart disease); age / time factor; stress; diabetes;	[max 4]	
(b)	**Effect on individual:** depressant / lowers blood pressure; reduced reaction times/ poor muscular co-ordination AW ; risk taking / delusions A/W; liver damage; tolerance to alcohol / increased dosage required; addiction / dependence; cost (to individual) financial / social; **Effect on Society :** anti social behaviour towards family A/W or example; anti social behaviour towards community A/W or example; financial cost to community; ref to drink driving;	[max 6]	Accept inability to take decisions AW A refs to smell / poor personal hygiene , low self esteem, lose friends etc. e.g. reduced income / physical harm e.g. stealing / wanton damage etc e.g. cost of damage / "welfare" for family / "rehabilitation cost of the individual"
		[Total: 10]	

© Cambridge International Examinations 2013

8 (a)	carries / transports + food molecules / named example; dissolved / in solution / digested; from small intestine; to liver; in blood;	[max 4]	
(b)	breakdown + amino acids / deamination; into urea; and a carbohydrate; (converts) glucose + to glycogen (A. reverse); ref. storage (of glycogen); ref. drugs / toxins / alcohol; ref. hormones (A. named hormone); ref. storage of iron / vitamins or named; breaks down haemoglobin / red blood cells; synthesises bile; Produces (plasma)proteins;	[max 6]	
		[Total: 10]	

© Cambridge International Examinations 2013

9 (a)	**parasite:** (an organism) that grows / feeds on or in; another organism/host; harms its host; **vector:** (an animal that) transmits a pathogen / named ; from one host A/W to another;	[max 4]	Reject "lives off"
(b)	take an anti-malaria drug ; **(control of mosquito vector)** kill the mosquito ; mosquito coils ; insecticides ; long lasting chemical sprays ; screens / nets (bed) ; repellent spray / DEET on skin ; clothing + to cover skin / prevent bites ; sterile males **Modify environment** draining marshes / covering water containers etc a/w.; oil on surface of water; introduce fish to feed on larvae / pupae; Introduction of Bacillus to kill larvae /	[1] [max 5]	**A** correct named drug e.g. Quinine, Paludrin, Larium, Malarone **A** named pesticide e.g. DDT Accept any refs to removing standing water
		[Total: 10]	

© Cambridge International Examinations 2013