Location Entry Codes

UNIVERSITY OF CAMBRIDGE
International Examinations

As part of CIE's continual commitment to maintaining best practice in assessment, CIE has begun to use different variants of some question papers for our most popular assessments with extremely large and widespread candidature, The question papers are closely related and the relationships between them have been thoroughly established using our assessment expertise. All versions of the paper give assessment of equal standard.

The content assessed by the examination papers and the type of questions are unchanged.

This change means that for this component there are now two variant Question Papers, Mark Schemes and Principal Examiner's Reports where previously there was only one. For any individual country, it is intended that only one variant is used. This document contains both variants which will give all Centres access to even more past examination material than is usually the case.

The diagram shows the relationship between the Question Papers, Mark Schemes and Principal Examiner's Reports.

Question Paper	Mark Scheme	Principal Examiner's Report
Introduction	Introduction	Introduction
First variant Question Paper	First variant Mark Scheme	First variant Principal Examiner's Report
Second variant Question Paper	Second variant Mark Scheme	Second variant Principal Examiner's Report

Who can I contact for further information on these changes?
Please direct any questions about this to CIE's Customer Services team at: international@cie.org.uk

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the October/November 2007 question paper

0610 BIOLOGY

0610/03 Paper 3 (Extended 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.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes must be read in conjunction with the question papers and the report on the examination.

- CIE will not enter into discussions or correspondence in connection with these mark schemes.

CIE is publishing the mark schemes for the October/November 2007 question papers for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.

Page 2	Mark Scheme	Syllabus / Paper
	IGCSE – October/November 2007	0610

1 (a) (i) chloroplasts ; **R** chlorophyll
cellulose cell wall ; **A** 'not made of, murein / peptidoglycan'
(sap / large / permanent) vacuole(s) ; **A** tonoplast
nucleus / nuclear membrane / nuclear envelope ; **R** DNA / RNA
nucleolus ;
mitochondria ;
endoplasmic reticulum / Golgi ;
amyloplasts ; **A** starch, grains / granules
more than one chromosome / linear chromosome(s) ; [4]

(ii) membrane ;
cytoplasm ;
ribosomes ;
chromosomes ; **A** 'strands of DNA' **R** DNA unqualified
glycogen granules ;
oil droplets ; [max 2]

(b)

cheese ;	tofu ;
yoghurt ;	soya sauce ;
sour milk ;	sauerkraut ;
bread ;	vinegar ;
alcohol / any named alcoholic drink ;	tapai ;
Quorn / mycoprotein ;	tempe / tempeh ;
single cell protein ;	kimchee ;

[max 2]

(c) *reject bacteria becoming immune and antibiotics causing mutation*

1 mutation / mutant ;
2 stronger wall / less permeable wall / enzyme to breakdown antibiotic / AW ;
3 antibiotic kills bacteria except those that are , mutant / resistant ;
4 antibiotic is, selective agent / AW ; **A** ref to (natural) selection
5 (resistant) bacteria reproduce ; *ignore mitosis* [max 3]

(d) *this may be answered with reference to insulin*

1 fast reproduction rate / AW ;
2 identical offspring / cloning ;
3 small number of genes ;
4 single cells ;
5 copy / use, genes from, other organisms / viruses ;
6 makes, protein / named protein, from another organism ;
7 have plasmids ;
8 used to transfer gene(s) into bacteria / easy to put gene(s) in bacteria ;
A DNA for gene
R product / protein, taken from, human / other organism [max 2]

[Total: 13]

2 **(a)** temperature / heat / cold ;
pressure ;
pain / sharpness ;
texture / touch ; [max

(b) ganglion ;
grey matter (of spinal cord) ; [2]

(c) **(i)** electrical ;
A electrochemical / movement of ions / electric current
R electrons / electricity [1]

(ii) myelin / (fatty) sheath ; [1]

(iii) *award two marks if correct answer with units is given*
if not, award one mark if
- *correct answer with no units*
- *incorrect answer with correct units*
- *no answer but correct working*
- *incorrect answer but correct working*

1.5 / 0.02 ;
75, metres per second or m/s or $m\ s^{-1}$ or $m\ sec^{-1}$; [2]

(iv) synapse(s) / gap(s) (between neurones) ; [1]

(d) **(i)** (**V** / biceps) contracts ;
arm / elbow, flexes / bends / pulls away from stimulus / AW ; [2]

(ii) *allow ecf from **(i)***
*if muscle not identified assume it is **V***

triceps (muscle) / (muscle) **W** / antagonistic muscle / opposing muscle, contracts ;
muscle **V** relaxes / passive stretching of **V** ;
A ref to **W** as antagonistic if already said it contracts
R 'V relaxes that causes contraction of W' [2]

[Total: 13]

3 **(a)** removal of waste (products) of, metabolism / chemical reactions ;
A 'made within cells' as alternative to metabolism
harmful / toxic / poisonous / AW ;
substance(s) in excess of requirements ; [3]

(b) **(i)** *accept statements from the question instead of letter*
accept letter written on the structure (no label line) or nearby if clear
reject if letter used on two or more areas and one is incorrect

F on cortex / white area between fibrous capsule and stippled medulla ; *allow on glomerulus but not anywhere else on tubule*
R on renal artery *including after it divides* ;
U on ureter ; [3]

(ii) ref to blood pressure ;
due to the heart / AW ;
ref to capillaries ; **A** glomerulus
small molecules forced out (of blood) ;
two examples ;
urea, water, amino acids, glucose / sugar, salts / ions / minerals, uric acid, ammonia, any named hormone / spent hormone

A any two named, ions / hormones as the two examples [max 3]

(iii) *glucose mark only the first two answers if more than two given*

diffusion ;
<u>active</u> uptake / <u>active</u> transport ;
A <u>selective</u> , reabsorption / uptake ; [max 2]

water mark only the first answer if more than one given

osmosis ; **A** diffusion [3]

[Total: 12]

4 **(a)** (where sperm are stored before ejaculation) **E** ;
(is cut or tied during a vasectomy) **B** ;
(produces fluid for sperm to swim in) **C** ;
(where meiosis occurs) **F** ; [

(b) **(i)** urethra ; [1]

(ii) reduction in flow of urine / difficult to urinate ;
difficult to empty bladder ;
pain (when urinating) ;
needing to urinate more often ;
dribbling / spraying, of urine ;
increased risk of infections of, bladder / kidney / prostate / urethra ;
difficult to ejaculate ; **A** difficulty in release of, sperm / semen [max 2]

(c) *many examples that candidates may give*

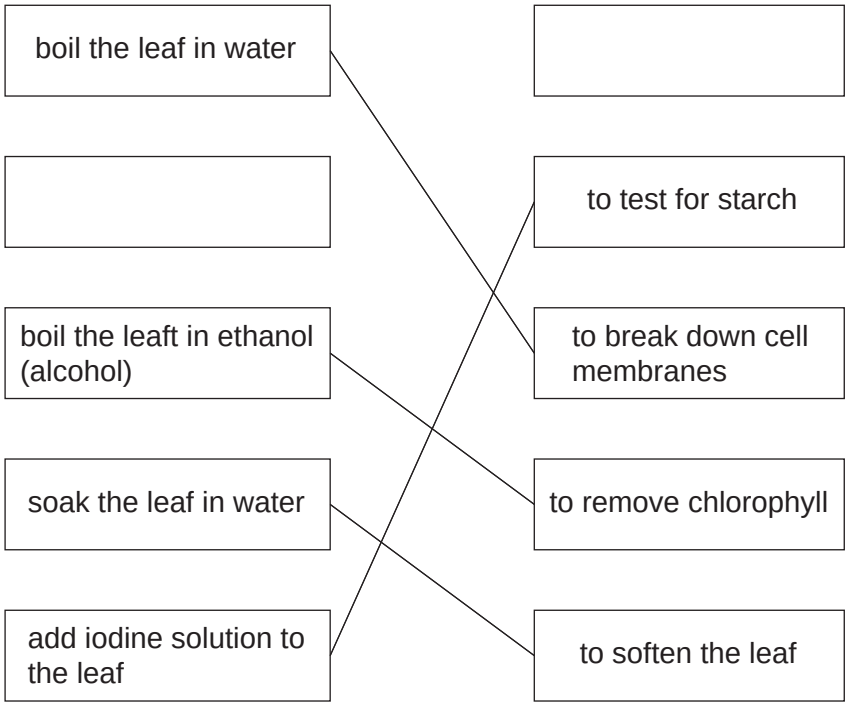
named structure ;
how diameter is reduced ;
purpose ; [3]

(d) fertility drugs
FSH / LH / clomiphene / clomid ; **R** oestrogen
causes the ovaries to produce more eggs / AW ;
increases chance of fertilisation ;
ref to in vitro fertilisation ;
female hCG ;
stimulates follicles to release eggs ;
progesterone ;
causes, lining of uterus / endometrium, to thicken ; **A** maintains lining
increases chance of implantation ;
male hCG ;
to stimulate testosterone production ;
FSH / LH / testosterone ;
stimulates sperm production ; max 3

chemical methods of birth control
oestrogen / progesterone ;
(contraceptive) pill / patch / injection / implant ; **R** tablet / medicine
prevents FSH release / AW ;
prevents, egg / follicle, development ;
prevents, ovulation / release of eggs ; **A** no egg to be fertilised
(progesterone only pills)
inhibit sperm movement through cervix / plug of mucus at cervix ;
prevents implantation ;
kills sperm in, vagina / cervix ;
prevents sperm, reaching egg / entering oviduct ; max 3 [6]

[Total: 16]

5 (a) (i)



[4]

(ii) chlorophyll masks the colour change (shown with iodine) / AW ; [1]

(b) light ;
water ; **A** moisture
suitable temperature ; **R** heat
chlorophyll ; [max 2]

(c) to show that the factor under test is responsible for the change observed / AW ;
e.g. to show carbon dioxide is needed
to show plants can photosynthesis under the glass cover
A so there is only one variable [1]

(d) to be sure that starch is produced during the experiment ; [1]

(e) *correct result for starch test and reason needed for each mark*
reject crossed ticks

stage	leaf from plant	starch test (✓ or ×)	reason
2	A and B	×	plants have had no light for photosynthesis / destarched / AW ;
4	A	×	plant has had no carbon dioxide for photosynthesis ;
	B	✓	plant has had, carbon dioxide / all conditions, for photosynthesis ;

[3]

(f) no photosynthesis ;
plant respires ; **R** 'plant begins to respire' / 'instead it respires'
carbon dioxide produced ; **A** correct equation for aerobic respiration
carbon dioxide, released / diffuses, from plant ; [max 3]

[Total: 15]

6 **(a)** community / (all) organisms / animals and plants / (all) species / (all) populations / AW ;
(living together) in same, area / place / environment ; **R** habitat
many habitats ;
interacting / interdependent / AW ; **A** food chains / food web
(together with) abiotic / physical / non-living, factors / features ; [max 2]

(b) they provide excellent food for humans ;
they provide, sport / fishing, for tourists ; [2]

(c) (producer) algae ;
(herbivore) cichlid fish + prawns ;
(carnivore) Nile perch + humans ; [3]

(d) **1** algae grow / plants grow ; **A** algal bloom
2 less light for, plants / photosynthesis ; **A** more competition for light
3 (therefore) plants die ;
4 plants stop producing oxygen ;
5 (aerobic) bacteria / decomposers, feed on dead plants ;
6 use up oxygen (in respiration) / ref to aerobic ;
7 low levels of oxygen cause fish to, die / suffocate ; **A** not enough oxygen to breathe / AW
8 bacteria produce toxins which cause fish to die ; [max 4]

[Total: 11]

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7 have plasmids ;
8 used to transfer gene(s) into bacteria / easy to put gene(s) in bacteria ;
A DNA for gene
R product / protein, taken from, human / other organism [max 2]

[Total: 13]

2 (a) (i) produce / secrete, saliva ; **R** excrete
amylase / ptyalin ;
digests / breaks down, starch (to maltose) ;
water for, enzyme action / hydrolysis ;
lubricates / softens, food (to make it easier to chew) ;
ref to pH ; [max 3]

(ii) grinding / chewing / crushing, food to reduce particle size ;
surface area increases ;
for enzymes ;
makes swallowing easier ; [max 3]

(b) <u>bacteria</u>, feed on / respire, sugars ; **A** sweets / sugary drinks / AW
produce acid ; **R** 'sugar turns to acid' / 'sugar is acidic'
acid, dissolves / AW, enamel ;
dentine is exposed ;
dentine, softer / dissolves more rapidly, (than enamel) ; [max 3]

(c) (fluoride) hardens / strengthens, <u>enamel</u> ; [1]

(d) people do not have a choice if fluoride is in the water / AW ;
can choose to use toothpaste with fluoride instead ;
fluoride can cause, mottling / discolouring, of teeth ;
only benefits children / does not benefit adults ;
unknown effects / side effects / harmful to health / poisonous in large amounts ; **A** allergic to fluoride, 'not healthy'
bones become, weaker / more brittle ;
may cause bone cancer (in boys) ;
ref to cost ; [max 3]

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[Total: 16]

5 **(a)** idea that gaseous exchange surface is
place where gases move between organism and its environment ;

(b) thin / one cell thick / short distance ; **A** ref to, cuticle / epidermis
capillary / blood, near to, surface / epidermis ;
gases dissolve in layer of, water / mucus ; [max 2]

(c) **(i)** softens testa ;
activation of enzymes ;
provide medium for transport / AW ;
vacuolation of cells ; A ref to cytoplasm
water is a solvent ;
hydrolysis / breakdown of, food stores ;
A involved in reactions **R** photosynthesis [max 1]

(ii) growth / development (of plumule / radicle / cells) ;
formation of, cytoplasm / organelles / membranes / cell walls / named molecule ;
to metabolise food stores / AW ;
transport ;
active uptake of, minerals / ions ;
cell division / mitosis ; [max 1]

(d) **(i)** to (oil droplet) moves, towards the peas / to the left / towards the tube ;
due to uptake of oxygen by seeds ;
carbon dioxide produced is absorbed by soda lime ;
volume of oxygen absorbed = volume of carbon dioxide produced ;
reduction in gas volume in boiling tube ;
reduction in pressure of gas in tube ; [max 3]

(ii) **1** carry out at, different temperatures / stated temperatures ;
2 allow peas to adjust to (new) temperature ;
3 measure distance travelled by oil droplet ;
4 over known period of time ;
5 rate = distance divided by time ; **A** cm min^{-1}
6 remove bung to allow fresh air in to apparatus / replace soda lime ;
7 repeats at each temperature ;
8 named variable to be controlled ; e.g. mass of, seeds / soda lime [max 5]

(iii) kinetic energy influenced by temperature ;
more frequent collisions at higher temperatures / fewer collisions at low temperature ;
respiration is controlled by enzymes / AW ;
enzymes denatured by high temperatures ; [max 2]

[Total: 15]

6 **(a)** community / (all) organisms / animals and plants / (all) species / (all) populations / A
(living together) in same, area / place / environment ; **R** habitat
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