UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the November 2005 question paper

0654/02 CO-ORDINATED SCIENCES

0654/02 Paper 2, maximum 100

This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which Examiners were initially instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began. Any substantial changes to the mark scheme that arose from these discussions will be recorded in the published *Report on the Examination*.

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*.

The minimum marks in these components needed for various grades were previously published with these mark schemes, but are now instead included in the Report on the Examination for this session.

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

CIE is publishing the mark schemes for the November 2005 question papers for most IGCSE and GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.

1 **(a)** **(i)** red; **[1]**

(ii) violet; **[1]**

(b) primary colours cannot be made by mixing colours together/secondary colours are made by mixing two primary colours together;

primary – red/blue/green;

secondary – cyan/magenta/yellow; **[3]**

(c) **(i)** all except sound and ultrasound; **[1]**

(ii) sound/ultrasound; **[1]**

(iii) infra red; **[1]**

(d) d = s x t = 1600 x 0.2 = 320 m;

so distance = 160 m; **[2]**

Total [10]

2 **(a)** **(i)** glucose; **[1]**

(ii) C H and O circled; *any missing or any extra loses the mark* **[1]**

(iii) symbols linked into chain or branched chain; **[1]**

(b) 3; **[1]**

(c) **(i)** covalent; **[1]**

(ii) non-metallic elements bonding; **[1]**

(d) membrane allows only certain molecules to pass through;

water and toxins can pass through the membrane;

other essential blood components do not pass through; **max [2]**

Total [8]

3 **(a)** A: vena cava;

B: left atrium; **[2]**

(b) label correctly placed; **[1]**

(c) oxygen needed for <u>respiration</u>;

supplies energy;

for muscle contraction; **max [2]**

(d) **(i)** chance is greater as she gets older;

steady increase/use of figures; **[2]**

(ii) it will halve her risk/decrease; **[1]**

(iii) amount of exercise/amount of (saturated) fat in diet/being too fat/stress; **[1]**

Total [9]

4 **(a)** **(i)** when the velocity of an object is increasing/changing; **[1]**

(ii) less than 20N;

overall downward force; **[2]**

(b) **(i)** 20N;

forces are balanced; **[2]**

(ii) pressure = 20/0.4;

= 50N/m^2; **[2]**

(c) **(i)** KE = 1/2 mv^2;

= 1/2 x 2 x 9;

= 9J; **[3]**

(ii) lost as heat to the surroundings; **[1]**

Total [11]

5 **(a)** **X** high high;

Y low low; **[1]**

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

(ii) magnesium is more reactive than titanium; **[1]**

(iii) (hot) titanium would react with oxygen/would oxidise;

(hot) titanium will not react with argon;

argon is unreactive; **max [2]**

(c) strong/much energy needed to break it;
needs to bear the weight of a person/owtte;

low density/lightweight;
patient comfort/owtte;

unreactive;
must not corrode/breakdown/react in the body; (property + reason) **max [4]**

Total [10]

6 **(a)** rays bend inwards at cornea;

and at lens;

come to a focus on the retina; **[3]**

(b) **(i)** B;

brown eyes;

BB, bb; **[3]**

(ii) parents are Bb and Bb;

gametes B and b from both parents;

offspring shown as BB, Bb, Bb (or bB) and bb;

yellow-eyed offspring identified as bb; **max [3]**

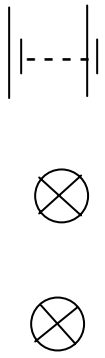
(c) **(i)** a change in, genes/chromosomes/DNA; **[1]**

(ii) X-rays/alpha/beta/gamma/ultraviolet;

damages DNA; **[2]**

Total [12]

7 **(a)** **(i)** competed diagram ; ; ; *minus one for each mistake*



(ii) electricity can still flow through the other lamps; **[1]**

(b) name;

use; **[2]**

(c) alternating current produces changing magnetic field;

changing magnetic field attracts/repels permanent magnet;

cone moves in and out; **[3]**

(d) more particles;

to collide with walls of container and increase pressure; **[2]**

Total [11]

8 **(a)** **(i)** 4; **[1]**

(ii) 2; **[1]**

(iii) lithium forms positive ions/forms Li^+;

cathode is negative/cathode attracts positive ions; **[2]**

(metals form at the cathodes scores 1)

(iv) chlorine; **[1]**

(b) **(i)** lithium oxide; (would also have to allow peroxide) **[1]**

(ii) water reacts to form hydrogen;

hydrogen is a flammable gas/hydrogen could cause explosion; **max [2]**

(iii) use of dry powder/CO_2; **[1]**

Total [9]

9 **(a)** **(i)** surface of leaf/in onion (bulb);

(ii) plant cells have cell wall/animal cells have no cell wall;

plant cells have (large) vacuole/animal cells have no vacuole;

plant cells have regular shape/animal cells are more rounded;

plant cells have nucleus at side/animal cells have central nucleus; **max [2]**

(iii) rectangular cell shown;

has cell wall and nucleus in appropriate place;

chloroplasts shown and labelled; **[3]**

(b) **(i)** ammonium salt/named nitrate; **[1]**

(ii) needed for protein synthesis;

proteins needed for, making new cells/enzymes/other named function;

nitrogen may be in short supply; **max [2]**

(c) **(i)** pepper plant → whitefly → wasp;; **[2]**

(ii) it would decrease; **[1]**

(iii) does less harm to other organisms;

because the wasps, do not/may not, eat other insects;

bees/other beneficial insects, can still live there;

cheaper;

only need to put them in once (rather than always spraying insecticide); **max [2]**

Total [14]

10 **(a)** **(i)** appearance of water;

limewater becoming cloudy/reactive gas formed; **[2]**

(ii) → (sodium carbonate) + carbon dioxide; + water; **[2]**

(b) difficulty in forming a lather;

formation of scum; **[2]**

Total [6]