**UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS**

International General Certificate of Secondary Education

# MARK SCHEME for the May/June 2006 question paper

## 0654 CO-ORDINATED SCIENCES

**0654/02** Paper 2, maximum raw mark 100

These mark schemes are published as an aid to teachers and students, to indicate the requirements of the examination. They show the basis on which Examiners were initially instructed to award marks. They do 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.

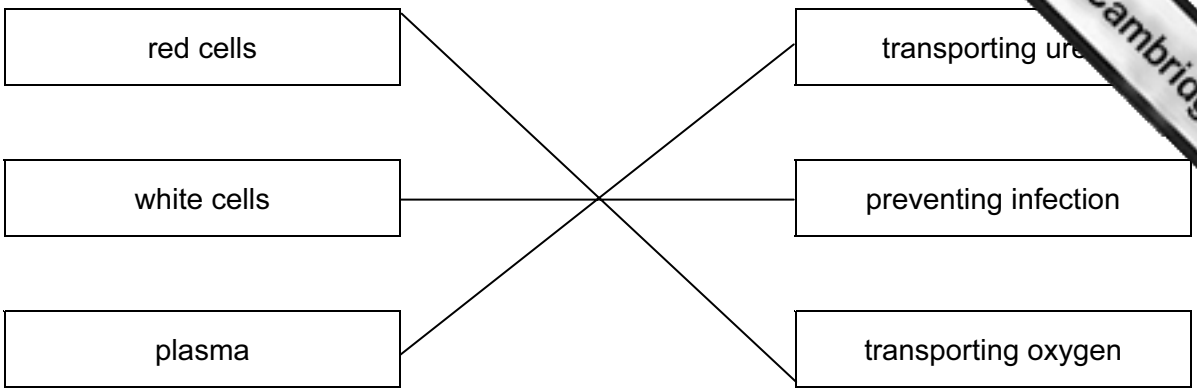
Mark schemes must be read in conjunction with the question papers and the *Report on the Examination*.

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 May/June 2006 question papers for most IGCSE and GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.

**1** **(a)**




two or three correct for 2 marks
one correct for 1 mark **[2]**

**(b)** muscles ;
contract ;
increase pressure / decrease volume ;
of ventricles ; **[2 max]**

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

**(ii)** transpiration ;
pulls water up ;
ref. pressure gradient / water potential gradient ; **[2 max]**

**[Total: 7]**

**2** **(a)** **(i)** particles move slower;
less pressure exerted on walls of balloon; **[2]**

**(ii)** water molecules have more energy/ move faster;
more are able to escape from liquid (and form a gas); **[2]**

**(b)** large area means smaller pressure;
stops skier sinking into snow; **[2]**

**[Total: 6]**

**3** **(a)** **(i)** (B)
water is neutral / has pH = 7;

**(ii)** (C)
this reaction requires an acid;
pH 1 is acid; **[2]**
(allow some credit for consistency even if pH for acid/alkali inverted)

**(b)** temperature increases;
it is a neutralisation / an acid is reacting with an alkali;
which is exothermic / gives out heat (energy); **[3]**

**(c)** gas evolved is carbon dioxide;
solid is a carbonate / acids react with carbonates to make carbon dioxide **[2]**

**[Total: 8]**

**4** **(a)** sun / sunlight ; **[1]**

**(b)** cattle and humans ; **[1]**

**(c)** feed on all living organisms ;
feed on dead material / wastes ;
recycling ; **[2]**

**(d)** **(i)** breaking down food ;
large particles to small particles / large molecules to small molecules ;
so that it can be absorbed ; **[3]**

**(ii)** amylase ;
in saliva ;
breaks starch to maltose ; **[2 max]**

**(e)** problem stated and food type involved ;
explanation related to specific health issue ; **[2]**

**[Total: 11]**

**5** **(a)** **(i)** retina; **[1]**

**(ii)** muscle?/specific muscle?/etc; **[1]**

**(b)** rays of light brought to a focus;
straight lines!; **[2]**

**(c)** **(i)** red, green & blue;; **[2]**

**(ii)** frequency/wavelength; **[1]**

**[Total: 7]**

**6** **(a)** electrolysis is a chemical change / reaction / breaking down of a compound using electricity / electrical energy;
electrolyte is the liquid / solution used in electrolysis;

**(b)** solution is a solid dispersed in a liquid;
emulsion is a liquid dispersed in another liquid; **[2]**

**(c)** longitudinal wave has medium moving parallel to the direction of the wave;
transverse wave has medium moving perpendicular to the direction of the wave;
OR
longitudinal wave always requires a medium to move through;
transverse wave does not always require a medium; **[2]**

**[Total: 6]**

**7** **(a)** A uterus ;
B cervix ;
C vagina ; **[3]**

**(b)** egg dies / passes out of body ;
lining of uterus breaks down ;
menstruation ; **[2 max]**

**(c)** from mother ;
from her blood ;
through placenta ; **[2 max]**

**[Total: 7]**

**8** **(a)** **(i)** B - no mark
no velocity so no momentum; **[1]**

**(ii)** C - no mark
velocity is increasing so momentum increases; **[1]**

**(iii)** A and B;
not accelerating; **[2]**

**(iv)** distance = speed x time;
= 70 x 30 = 2100m; **[2]**

**(b)** cancer etc;
damage to DNA/mutating cells etc; **[2]**

**[Total: 8]**

**9** **(a)** **(i)** potassium;

**(ii)** nitrogen / N and phosphorus / P;
same group / both in Group 5 / correct reference to electron configuration details;

**(b)** wheat;
evidence of working; **[2]**

**(c)** **(i)** nitrogen too unreactive / too stable to be converted directly into useful molecules; **[1]**

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

**(iii)** 10; **[1]**

**(d)** soil is too acidic for crops to grow (well);
lime neutralises the excess acid; **[2]**

**(e)** effect of water / acidic rain;
reference to dissolving of rock material;
effect of ice;
reference to freeze/thaw;
extremes of temperature;
reference to expansion and contraction;
animal / plant activity;
description; **[2 max]**

**[Total: 12]**

**10** **(a)** hair / fur **[1]**

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

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

**(c)** **(i)** work best at a particular temperature / denatured at high temperatures ; **[1]**

**(ii)** glucose + oxygen → water + carbon dioxide ; ; **[2]**

**(iii)** need more energy (when it is cold) ;
as more heat lost from body ;
food used in respiration ; **[2 max]**

**[Total: 8]**

**11** **(a)** kinetic/mechanical/rotational energy to electrical energy ;

**(b)** high voltage means low current;
this reduces energy losses;

**(c)** **(i)** power = voltage x current;
= 2200W; **[2]**

**(ii)** resistance = voltage/current;
= 22ohms; **[2]**

**(d)** **(i)** made millions of years ago;
from remains of plants/animals; **[2]**

**(ii)** coal/oil/gas/peat etc; **[1]**

**[Total: 10]**

**12** **(a)** glass;
ceramics;
plastics;
paper; **[4]**

**(b)** **(i)** carbon and hydrogen; **[1]**

**(ii)** at A (material has)
lower boiling point / smaller molecules / lower viscosity / less colour/ higher flammability; **[1]**

**(c)** **(i)** unsaturated - molecules have a double bond (between carbons)
saturated - molecules only have single bonds;
(could also allow some reference to reactivity) **[1]**

**(ii)** substance which speeds up / alters the rate of reactions;
but which remains unchanged / owtte; **[2]**

**(iii)** larger surface area (means greater efficiency); **[1]**

**[Total: 10]**