UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the October/November 2006 question paper

0654 CO-ORDINATED SCIENCES

0654/02 Paper 2 (Core Theory), maximum raw mark 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 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.

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UNIVERSITY of CAMBRIDGE
International Examinations

1 (a) *Strigops habroptilus* **D** ;
Hemiphaga novaeseelandiae **B** ;
Ninox novaeseelandiae **E** ;
Platalea regia **C** ; **[4]**

(b) (i) one word is its genus ;
other word is its species ; **[2]**

(ii) name is Latin and made up of two words; **[1]**

[Total: 7]

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

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

(iii) R = V/I ;
= 12/2 = 6 ohms ; **[2]**

(iv) diagram to show clearly that the bulbs are in series ; **[1]**

(v) 12 ohms ; **[1]**

(b) (i) in correct position to control motor and other switches etc ; **[1]**

(ii) power = voltage x current ;
= 5 x 220 = 1100 W ; **[2]**

[Total: 9]

3 (a) (i) rusting not expected in either tube ;
rusting requires air/oxygen and water (together) ;
nail in A has no water ;
nail in B has no air/oxygen ; **[max 3]**

(ii) paint would be the barrier of choice ;
second mark for a reason why paint is suitable or why one or both of the others is not ; **[2]**

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

(ii) chromite reduced since it loses oxygen ;
carbon oxidised since it gains oxygen ;

or carbon oxidised and chromite reduced;
reference to oxygen gain or loss; **[2]**

[Total: 8]

4 (a) (i) **A** scapula
B ulna
C humerus ;
D tendon ; **[4]**

(ii) line to space within elbow joint or shoulder joint ; **[1]**

(iii) lubrication/reduce friction ; **[1]**

(b) (i) heat/touching the hot object ; **[1]**

(ii) biceps muscle ; **[1]**

(iii) as an electrical impulse ;
along a nerve/carried by nerve ;
along a motor nerve cell ; **[max 2]**

(iv) relaxes/is stretched ; **[1]**

[Total: 11]

5 (a) all alpha will be absorbed/will not pass through paper ;
very little/no gamma will be absorbed ; **[2]**

(b) (i) 110 130 150 all required for mark ; **[1]**

(ii) count is increasing ;
so thickness is decreasing ; **[2]**

(c) (i) to monitor technician's exposure to radiation ;
photographic film is sensitive to radiation ;
the darker the film goes the greater the exposure ; **[max 2]**

(ii) fabric will absorb some radiation ; **[1]**

(d) uranium, fission, heat, turbines, generators ;;; **[3]**

(e) fossil fuels are a finite resource ; (accept environmental answers) **[1]**

[Total: 12]

6 (a) (i) group of atoms/more than one atom ;
(chemically) bonded/joined ; **[2]**

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

(b) (i) **X** alanine
Y glycine
Z lactic acid (all correct) ;
spots for unknowns at the same position/height/travelled same distance as known substances ; **[2]**

(ii) new substances have been made/these are larger molecules so smaller ones have changed/joined/other reasonable ; **[1]**

(iii) proteins/polypeptides ; **[1]**

(iv) polymer is much larger/heavier/in the form of long chain/is made of amino acid molecules linked together ; **[1]**

[Total: 8]

7 (a) (i) label to outer layer ; **[1]**

(ii) no chloroplasts ; **[1]**

(b) (i) lime water ;
goes milky ; **[2]**

(ii) respiration ;
by yeast (cells) ;
glucose combining with oxygen ; **[max 2]**

[Total: 6]

8 (a) (i) blue and green ; **[1]**

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

(iii) reflected by fabric ; **[1]**

(b) (i) density = mass/volume ;
0.25 kg/dm^3 ; **[2]**

(ii) 40(N) ; **[1]**

(c) work = F x D;
= 40 000 J ;
(4 x 10 x 1000) **[2]**

(d) (sun's) heat causes particles to move faster ;
some molecules will be moving faster than others ;
only fastest molecules have enough energy to escape ;
wind carries away water particles ; **[max 3]**

(e) lightweight, waterproof, strong, rotproof, unreactive; ; **[2]**

[Total: 13]

9 (a) <u>coal</u> <u>methane</u> ; **[1]**

(b) carbon dioxide ;
water ; **[2]**

(c) reference to non-polluting emissions/water will not cause pollution ;
additional detail e.g. reduced health risks from CO/particulates ; **[2]**

(d) (i) (magnesium sulphate)
an electrolyte contains dissolved ions/for cell to work the solution must conduct ;
magnesium sulphate is ionic/forms free ions when dissolved ; **[2]**

(ii) **C** or **D** or **E** ;
(for cell to work) electrodes must be dissimilar metals ; **[max 2]**

[Total: 9]

10 (a) (i) circle around a flower or the fruit ; **[1]**

(ii) square around one of the little plantlets ; **[1]**

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

(ii) can colonise new areas ;
less competition with parent plant ;
for light/water/nutrients ; **[max 2]**

(iii) water ;
oxygen ;
suitable temperature ; **[3]**

[Total: 8]

11 (a) (i) water only in both **2** and **3** ;
2 spaced (three to five particles) ;
3 random and close (at least eight particles); **[3]**

(ii) add (acidified) silver nitrate (solution) ;
(positive test for chloride ions is) white precipitate ; **[2]**

(b) (i) removes insoluble material/reasonable example of ; **[1]**

(ii) chlorine/ozone ; **[1]**

(iii) lime/calcium carbonate/probably have to accept any correct ;
because water is acidic ; **[2]**

[Total: 9]