UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the May/June 2011 question paper

for the guidance of teachers

0653 COMBINED SCIENCE

0653/22 Paper 2 (Core 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 must be read in conjunction with the question papers and the report on the examination.

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

Cambridge is publishing the mark schemes for the May/June 2011 question papers for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.

1 (a) (i) gravity / weight ; [1]

(ii) idea of balanced forces / equal and opposite ;
no <u>acceleration</u> ; [2]

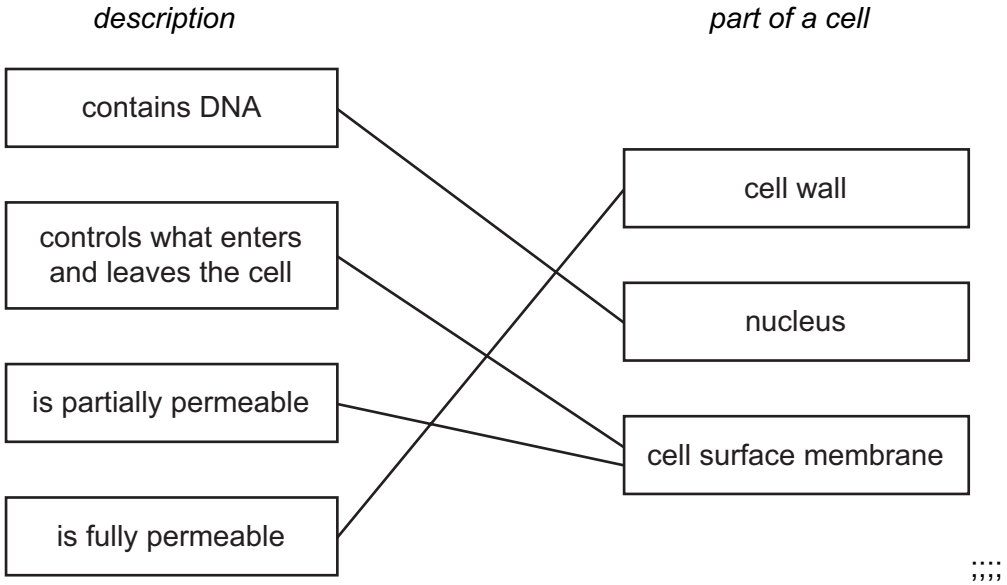
(b) (i) **X** on a horizontal part of the graph ; *(not at 50)* [1]

(ii) **Y** in correct position ; [1]

(iii) at end of graph / on the vertical part of graph at 110 s ; [1]

[Total: 6]

2 (a)



;;;;
(one mark for each line) [4]

(b) (i) enzymes ; [1]

(ii) enzymes, denatured / destroyed ; [1]

(c) (i) increases ;
steadily / linear, increase ;
from 0.6 to 1.1 (g / cm^3) / by 0.5 (g / cm^3) ; [max 2]

(ii) these foods contain calcium ;
needed for bones ; [2]

(iii) any citrus fruit / blackcurrants / other valid food source ; [1]

[Total: 11]

3 (a) (i) ignites / pops ;
hydrogen is given off ; [2]

(ii) both **A** and **C** did not react / two did not react / cannot decide between **A** and **C** ; [1]

(b) (i) limewater / calcium hydroxide / slaked lime ; [1]

(ii) copper sulfate + carbon dioxide + water ;; [2]
(all correct scores 2 marks, two correct scores 1 mark)

[Total: 6]

4 (a) (i) lines + arrows showing upward movement from the heater ;
lines + arrows showing downward movement round the side ; [2]

(ii) coldest **A** ;
hottest **C** ;
hot air rises / cold air sinks ;
hot air less dense than cold air (vice versa) ; [max 3]

(b) risk of fire / overheating ;
because socket overloaded ;
OR
risk of electrocution / shock (if touched) ;
because insulation damaged / live wires exposed ; [max 2]

(c) (i) no CO_2 production / no global warming / no depletion of fossil fuels ; [1]

(ii) radiation leaks / nuclear accidents / problems of storage of nuclear waste ; [1]

[Total: 9]

5 (a) (i) petals / nectaries ; [1]

(ii) anther / stamen ; [1]

(b) (i) photosynthesis ;
carbon dioxide combined with water ;
using energy from (sun)light ;
(energy) captured by chlorophyll ; [max 3]

(ii) for respiration / for energy / to make nectar / any named energy-consuming process ; [1]

[Total: 6]

6 **(a)** **(i)** coal / peat ; [1]

(ii) *reference to:*
timescale / time to renew ;
action of, heat / pressure ;
action of microorganisms / decay ; [max 2]

(b) **(i)** fractional distillation / fractionation ; [1]

(ii) too viscous / difficult to ignite ; [1]

(c) **(i)** 20 – 22 % ; [1]

(ii) some of it has been used to burn the fuel ; [1]

(iii) carbon monoxide / nitrogen oxides, produced ;
toxic to humans ; [2]

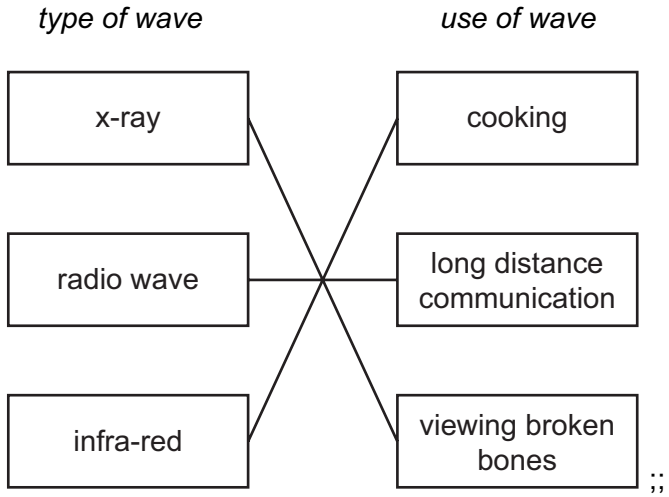
(d) $(CH_4 +) \ 2O_2 \longrightarrow CO_2 + 2H_2O$;;;
(one mark for each correct formula) [3]

[Total: 12]

7 **(a)** **(i)** lamp ; cell ; switch ; [3]

(ii) correct symbols linked together ;
in series ; [2]

(b)



;; [1]

[Total: 6]

8 **(a)** population ;
community ;
consumer ; [3]

(b) **(i)** diffusion ;
from, alveoli / air sacs ; [2]

(ii) more oxygen can be absorbed from the air / compensates for lack of oxygen ;
more oxygen, carried by blood / supplied to cells ;
for respiration / for energy ; [max 2]

(c) ref. to species diversity ;
idea of their importance in food chain / provide food for pumas / so pumas won't become extinct ;
other, e.g. tourism / moral arguments ; [max 2]

[Total: 9]

9 **(a)** **(i)** beta / gamma, too penetrating ;
can pass through smoke ;
alarm would not stop / current would not flow / beta or gamma not ionising enough ;
beta or gamma would be a hazard to people ; [max 2]

(ii) highly ionising ;
can damage cells / cause mutation / cause cancer / damages DNA ; 2]

(b) (granite) rocks / ground / radon / cosmic radiation ; [1]

(c) wear gloves / lead shield / wear radiation badge ; [1]

[Total: 6]

10 **(a)** **(i)** group 1
period 2 ; [1]

(ii) lithium, is (very) reactive / easily combines with other elements ;
oil forms protective barrier / oil prevents reaction with, air / oxygen / water ; [2]

(iii) lithium atoms have two shells / first shell can contain only two electrons ;
lithium atoms have three electrons ; [2]
(correctly re-drawn diagram scores 2 marks)

(iv) (yes)
lithium is a metal / on left of Periodic Table ;
(**or** no)
(although a metal it is so reactive) it is covered with corrosion / oxide which acts as an insulator ; [max 1]

(b) (i) ion is electrically charged and atom is neutral / ion and atom have different numbers of electrons / ion has a full outer shell ; [1]

(ii) label line to left electrode ; [1]

(iii) chlorine ; [1]

[Total: 9]