UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the NOVEMBER 2004 question paper

0653 COMBINED SCIENCE

0653/02 **Paper 2 (Core Theory), maximum raw mark 80**

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*.

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

CIE is publishing the mark schemes for the November 2004 question papers for most IGCSE and GCE Advanced Level syllabuses.

Grade thresholds taken for Syllabus 0653 (Combined Science) in the November 2004 examination.

	maximum mark available	minimum mark required for grade:			
		A	C	E	F
Component 2	80	N/A	42	24	16

The threshold (minimum mark) for B is set halfway between those for Grades A and C.
The threshold (minimum mark) for D is set halfway between those for Grades C and E.
The threshold (minimum mark) for G is set as many marks below the F threshold as the E threshold is above it.
Grade A* does not exist at the level of an individual component.

November 2004

INTERNATIONAL GCSE

MARK SCHEME

MAXIMUM MARK: 80

SYLLABUS/COMPONENT: 0653/02

COMBINED SCIENCE
Paper 2 (Core Theory)

1 **(a)** **(i)** smaller (than white cells)/no nucleus/bi-concave/doughnut shaped

   (ii) reference to clotting   [1]

   (b) **(i)** **O** on capillaries at top of diagram

      A on vein from bottom of diagram up to heart   **[2]**

   (ii) heart pumps blood

      so it travels faster to body cells

      at higher pressure   **max [2]**

   (iii) haemoglobin transports oxygen/CO decreases oxygen transport

      so body cells cannot respire as quickly

      leads to shortage of energy   **max [2]**

                                                                                              Total [8]

2 **(a)** **(i)** four   **[1]**

   (ii) covalent   **[1]**

   (iii) atom cannot be broken down/molecule can be broken down (into
      atoms)/molecules are made from atoms   **[1]**

   (b) **(i)** gasoline   **[1]**

   (ii) <u>fuel</u> for vehicles/petrol engines   **[1]**

   (c) **(i)** monomer(s)   **[1]**

   (ii) lower mass/density/not brittle/reasonable reference to safety   **[1]**

   (iii) carbon

      hydrogen

      polymer is hydrocarbon

      because complete combustion gives only CO_2 and H_2O **max [3]**

                                                                                              Total [10]

3 **(a)** regular arrangement

      touching   **[2]**

   (b) (volume =) 24 (cm^3)

      density = mass ÷ volume = 212 ÷ 24/8.83

      g/cm^3 **[3]**

(c) work = force x distance/or sensible symbols

=2.12 x 3 = 6.36 (J)   [2]

(d) (gravitational) potential (energy)   [1]

Total [8]

4 **(a)** **A**

D   [2]

(b) insect attracted to flower by petals/description of petals

reference to nectar

pollen attaches to insect's body

pollen deposited on stigma/part **E**   max [3]

(c) fruits only develop after pollination/fertilisation

from ovaries

the more insects, the more pollination

a few insects present even in absence of hives   max [3]

(d) add Benedict's solution <u>and heat</u>

positive result is red/orange colour   [2]

Total [10]

5 **(a)** **(i)** 12 electrons

arranged 2, 8, 2   [2]

(ii) neon   [1]

(iii) (unreactive)

it is a noble gas/(atoms have) full outer shell   [1]

(b) carbon plus copper oxide and lead oxide   [1]

(c) **(i)** sodium ion has one less electron than sodium atom/in the ion protons not
equal to electrons but are equal in the atom   [1]

(ii) sodium ion is positive and oxide ion is negative

opposite charges attract   [2]

(iii) sodium + oxygen → sodium oxide   [1]

6 **(a)** **(i)** background radiation

(ii) 184 [1]

(iii) not all radiation directed towards counter/some absorbed by air [1]

(iv) alpha [1]

(v) gamma
it is not stopped by aluminium [2]

(vi) lead shielding
use of radiation badges
use of tongs
use of gloves max [1]

(b) **(i)** helium nucleus/description [1]

(ii) deflected by magnetic
deflected by electric field
stopped by paper
positively charged
ionising max [2]

(c) **(i)** (nucleus) splits/divides [1]

(ii) (nuclei) join together [1]

(allow 1 mark if all correct but atoms instead of nuclei)

Total [12]

7 **(a)** **(i)** web shows all four organisms in correct relationship
arrows in correct direction [2]

(ii) consumers [1]

(b) (light captured by) chlorophyll/chloroplasts
(light used to) combine CO_2 and H_2O
energy contained in glucose/carbohydrate max [2]

(c) break down dead organisms/faeces
release nutrients from this process
nutrients recycled max [2]

(d) reference to high species diversity
reference to maintaining habitats
need to maintain oxygen production
danger of increased global warming/need to use CO_2
need to avoid soil erosion/flooding max [2]

Total [9]

8 **(a)** **(i)** cloudy
carbon dioxide is produced

(ii) copper chloride **[1]**

(b) (Aysha correct)
combustion requires oxygen (and none shown)
a complex substance is converted into simpler ones by the action of heat **max [2]**

(c) (unlikely to be white/will be some other colour)
copper is a transition metal
which have compounds which are usually coloured

(allow 1 mark for copper carbonate is <u>green</u>) **[2]**

Total **[7]**

9 **(a)** **(i)** conduction
convection **[2]**

(ii) the shiny/silvery surface will be a poorer emitter of IR than dull/black **[1]**

(iii) reference to insulation
shows the rate/reduces efficiency of conduction/convection
detail e.g. trapped air is poor conductor and cannot circulate **max [2]**

(b) correctly named region
some details about corresponding use
(e.g. X-rays   looking at bones in the body) **[2]**

Total **[7]**