UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the November 2004 question paper

0653/0654 COMBINED SCIENCE/CO-ORDINATED SCIENCES

0653/06, 0654/06 Paper 6 (Alternative to Practical), maximum raw mark 60

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 0653/0654 (Combined Science/Co-ordinated Sciences) in the November 2004 examination.

	maximum mark available	minimum mark required for grade:			
		A	C	E	F
Component 6	60	49	37	28	21

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: 60

SYLLABUS/COMPONENT: 0653/06, 0654/06

COMBINED SCIENCE/CO-ORDINATED SCIENCES
Paper 6 (Alternative to Practical)

1 **(a)** 24 °C, no tolerance, written correctly in table

(b) **Number of bubbles in 2 minutes**

28, 24 no tolerance

Number of bubbles in 1 minute,

4 no tolerance

3 correct (2), 2 correct (1) 1 or 0 correct, (0) **[2]**

(c) suitable scale and axes labelled correctly (1)

all 5 points plotted correctly (+/- 1° and 0.5 bubble) (1)

curve drawn or points joined in straight lines (1)

no penalty if axes reversed **[3]**

(d) enzyme activity rate increases with temperature (1)

up to the optimum temperature for the enzyme (1)

optimum temperature for the enzyme is around 35 °C (1)

decreases because enzyme denatures (reject "enzyme is killed")(1)

any 2 points **[2]**

(e) improvement: repeat readings/keep tube in water bath/measure gas volume/take readings at intermediate points (1)

explanation: average can be calculated/temperature is constant gas volume more accurate, optimum temperature can be found more accurately (1)

explanation must match suggested improvement **[2]**

total 10 marks

2 **(a)** **(i)** 3.0, 1.0, no tolerance (penalise lack of first d.p. only once) **[2]**

(ii) 21, 110 no tolerance **[2]**

(b) choice of scale, both axes correctly labelled with units given (1)

all points plotted correctly +/- 1 °C, 0.05 mol/dm^3 (e.c.f.) (1)

smooth curve (1)

one mark deducted if axes reversed

(do not penalise axes beginning at values higher than 0) **[3]**

(c) approximately 32 s (from candidates' own graph +/- 2 s) **[1]**

(d) reaction vessel and delivery tube (1)

suitable method of measuring volume e.g. measuring cylinder over water or graduated syringe (1) **[2]**

total 10 marks

3 **(a)** project a (real) image on the screen OWTTE (1)

measure distance lens-screen (1) **[2]**

(b) 20, 35, 65, 80 in correct positions (-1 for each error) no tolerance **[2]**

(c) smaller, inverted (1) same size, inverted (1) larger, inverted (1) **[3]**

(d) **(i),(ii),**
(iii) both light rays and image correctly drawn (1)

(iv) 16 mm +/-2 mm (e.c.f on student's own diagram) (1) **[2]**

(e) Experiment 3 (1) (allow this even if diagram is incorrectly drawn) **[1]**

total 10 marks

4 **(a)** smooth unbroken outer shape larger than original (1)

inner structures copied accurately (1) **[2]**

(b) **(i)** height measured accurately +/-1 mm **[1]**

(ii) 31 mm +/-1 mm **[1]**

(iii) height of drawing (1) (e.c.f.) correctly calculated (1)
height of cell **[2]**

(c) **(i)** chloroplast labelled on candidate's diagram OR on Fig. 4.1. **[1]**

(ii) nucleus labelled similarly **[1]**

(d) water plant with coloured dye (1)

make (cross- or vertical) section of part of plant and examine under lens or microscope (1) **[2]**

total 10 marks

5 **(a)** Experiment 1: no change, no, no (3)

Experiment 5: powder turned red/brown, yes, no (3) **[6]**

(b) anhydrous copper sulphate (white) (1) turned blue (1)

OR

anhydrous cobalt chloride (blue) (1) turns pink (1)

OR

boiling point (1) is 100°C(1)

OR

freezing point (1) is 0°C (1) **[2]**

(c) named substance undergoes addition (1) by combining with oxygen (1)

named substance undergoes reduction (1) by losing oxygen (1)

OR

explanation based on electron loss e.g. by H atoms and gain e.g. by copper metal

explanations must refer to a reaction from Fig. 5.2.

accept explanations based on two reactions **[2]**

total 10 marks

6 **(a)** **(i)** (gravitational) potential or kinetic

(ii) kinetic

(iii) electrical **[3]**

(b) 0.8 A, 2.2 V no tolerance **[2]**

(c) 5 x 10 x 1 = 50 J (accept answer with unit missing) **[1]**

(d) 2.2 x 0.8 x 10 = 17.6 J (accept answer with unit missing), e.c.f. from **(b)** **[1]**

(e) energy lost as heat because of friction (1)

resistance of connecting wire (1)

because the dynamo is not efficient (1)

lost as heat or sound when the mass falls to the bench (1)

(reject “lost as heat from the bulb”) (any 2) **[2]**

(f) change in voltage, current, time of falling, brighter bulb,

reject “pulley turns faster” or “change of energy” (any 1) **[1]**

total 10 marks