CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the May/June 2013 series

0653 COMBINED SCIENCE

0653/61 Paper 6 (Alternative to Practical), maximum raw mark 60

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 should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the May/June 2013 series for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level components and some Ordinary Level components.

1 (a) (i) large (at least half of the area) neat pencil drawing ; allow any orientation (i.e. horizontal or vertical)
drawing clearly shows petals, stamens, carpel ;

(ii) stamen and carpel correctly labelled ;
drawing of stamen marked as male, drawing of carpel marked as female ; [2]

(b) (i) (add Benedict's solution and) heat / warm / boil etc ; (do not award mark if any other reagent mentioned) [1]

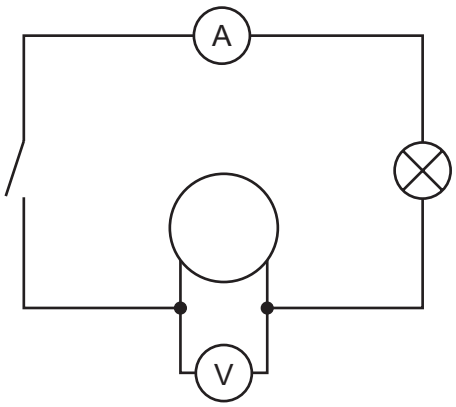
(ii) to attract insects / bees / pollinators ; [1]

(iii) colours make the flower more easily visible / more attractive (to insects) ;
lines guide insects (towards nectar) ; [2]

(iv) sugar / nectar present at the base / bottom (of the petals) ;
insects (will visit flower / petal to) collect sugar / sugar / nectar will attract insects ; [2]

[Total: 10]

2 (a) (i)



(ignore orange) to include ammeter in series and voltmeter in parallel, (allow two lamps OR two switches) correct symbols ;;
(*4 correct = 2 marks, 3 correct = 1 mark*)
no gaps or short circuits ; [3]

(ii) reading on ammeter / voltmeter **AND** lamp lights ; [1]

(iii) 1.39 ;
1.53 ; (both answers ± 0.01) [2]

(b)

electrodes	Voltage / PD / V
Mg and Cu	1.80
Mg and A*l*	1.26
Mg and Fe	1.39
Mg and Pb	1.53

(allow any other table layout, accept names or symbols)
(four sets of data for 1 mark, headings **and** units (mentioned somewhere in the table) for 1 mark) ;; [2]

(c) greater <u>difference</u> between reactivity greater V / PD ;
magnesium, aluminium, iron, lead, copper ; (must be in this order, but check their answer to **(a) (iii)**) [2]

[Total: 10]

3 **(a)** stopclock readings in table <u>17</u> ; 65 ; [2]

(b) **(i)** 0.059, 0.015 (either or both to 3 decimal places) ; (ecf) [1]

(ii) axis – correct and labelled with units for volume ;
scale – uniform and numbered for both axes ;
points – points plotted correctly by eye ;
line – best straight line through origin ; [4]

(c) **(i)** rate depends on (or increases with) amount (or volume) of potassium iodate / proportional / positive correlation ; [1]

(ii) blue / black colour (with starch) ; [1]

(iii) to keep the volume / amount of liquid constant / 10 cm^3 / to vary concentration ; [1]

[Total: 10]

4 **(a)** **(i)** 6.8 (cm^3) ;
5.2 (cm^3) ;

(ii) plotting correct by eye ;
smooth curve drawn not drawn with a ruler, (ignore before pH 3 and after pH 7) ;
axes correctly labelled ; [3]

(iii) pH around 5 (from student's graph) ; (if no graph allow 5) [1]

(iv) optimum could occur between measured values / pH 4 to 6 / some mention or 'around' 5 ; (ignore 'has not tried all pHs' or 'only tested between 3 and 7') [1]

(b) do experiment without enzyme / denatured enzyme / use the same volume of water instead of pectinase / enzyme ; [1]

(c) increase temperature / heat / warm / use 37 °C ;
increases collision (rate between enzyme and substrate) / reference to activation energy ;
OR
increase enzyme concentration ;
increases collision (rate between enzyme and substrate) ;
OR
make pieces of apple smaller ;
increases surface area (for enzyme to act) ;

(suggestion and explanation must match for 2 marks) [max 2]

5 (diagrams must be the 'correct idea' before labelling can score, ignore any other 'steps' if present)

(a) diagram to show filter funnel, filter paper and receiving vessel ;
two relevant labels ; [2]

(b) diagram to show filter paper with concentric circles with dropper / chromatography paper dipped in solvent and some form of separation ;
two relevant labels ; [2]

(c) diagram of reaction vessel connected to a syringe ;
two relevant labels (allow labels if collected over water) ; [2]

(d) diagram simple distillation (condenser or cooled receiver) and receiving vessel ;
two relevant labels ; [2]

(e) fractional distillation ;
heat the mixture until one liquid boils off ;
cool vapour / gas / condense vapour ; [m

[Total: 10]

6 **(a)** **(i)** 27.9 ; 25.5 ; [2]

(ii) 0.027
0.031
0.036
0.039
0.044
all recorded to 3 decimal places ;
any two correct ; [2]

(b) **(i)** points correct by eye ;
straight line of best fit ; [2]

(ii) gradient 2353 (allow between 2000 to 2600) ;
method clearly shown on graph ; [2]

(c) M = 2353/45 = 52 (g) ; (ecf) [1]

(d) metre rule will break (if mass very large) ;
rule not long enough (for large mass) ;
too difficult to achieve a balance ;
x too small (or large) to measure ; (ignore 'difficult to measure') [max 1]

[Total: 10]